

CORRECT THINKING: THE KOKHAN'S MATHEMATICS

2022

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Anatoly KOKHAN

UDC 5.51.510.5108
LBC 2.22.22.1
K75

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K75 «CORRECT THINKING: THE KOKHAN'S MATHEMATICS»,

Moscow, JSC "Open World", 2022. – 60p.

ISBN 978-5-906153-10-4

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A. Kokhan

This work reviewed a model of biological system with receptor perception, cognitive resources and subordinated system, changeable in terms of its form and structure.

It contains analysis of information, available for biological system, and estimates the result of information processing and actions, taken up on that basis.

Our conclusions suggest a strong need to:

- explanation of human language and forms of communication,
- adding a new section of “primary modeling” in mathematics and existing formal sciences for achieving correct results,
- changeover in business activity along the lines of “rules of a safe scientific experiment”,
- minimization of social influence from persons, using cognitive distortions in their practical activity, help in gaining the correct knowledge and amending cognitive mistakes.

This work is meant for obtaining practical skills in correct use of formal semantic representation in thinking and communications, which allow to harmonize social processes with technological development.

For that purpose we take it into research the informational processes, underlying the foundations of gaining practical skills, defined by overall physiology of organisms with neural systems, able to collect information from receptor system and exert influence on physiology of any given organism.

This material is founded on formalization, used in organic physiology. It describes the formal content, used by neural system and representing models with the formal method, applicable to these models.

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A word about bibliography

In scientific papers we are used to source references. However, in this work I made a reference to the physiology of readers, to their subjective experience.

Different perception of reality does not change the content of events. In case of correct thinking we talk about the level of correct recognition of events and processes.

Consequently, in this work the reference part is based on individual subjective experience without a current need of source references.

The correct mathematics lays claim to foundation of a scientific discipline, devoid of cognitive distortions.

Primary model of autonomous informational functioning — primary model of formalization

In this work we accept the following properties of model in question:

1. We have continuous three-dimensional space, heterogeneous in terms of inner and outer content.
2. Human organism is an aggregate phenomenon of the inner part of that space, consisting of receptor, neural and subordinated systems (functionally similar physiological systems are most common in animal kingdom, but exist in other kingdoms of organic life, wherein the organisms use adaptive changes in lesser degree of their forms).
3. Receptor system has function that transforms changes, occurring in living organism, into signals of nervous (excitatory) system.
4. Nervous system executes processing of receptor system signals into command instructions of subordinated system.
5. Subordinated system brings about changes in form and content of the space, occupied by organism and its immediate surroundings.
6. The model exists in changing conditions in form and content of the space, occupied by organism and its immediate surroundings, defined by general rules and principles.

We aim to define the mathematical apparatus, needed by organism for managing tasks of self-subsistence within a framework of referred model in process of enchantment of its functionality by means of artificial tools, semantic communications and developing technologies.

Destructive character of interaction and representing of information through properties

Development of technologies alters the understanding of processes taking place during interaction. The single common rule for understanding the processes of interaction consists in their destructive character.

All known physical, chemical, biological and quantum processes are unified by existence of result of the interaction itself, which can be registered by the biological organism or by use of instruments. The fact of change, resulting in process of interaction, creates a possibility of registering the process.

In existing languages it is not customary to use term “destructive interaction” in describing the fact of mutual influence, because the changes, occurring for participants (subjects) of interaction can be less obvious than apparent consequences in environment. However, the time itself is indicative of irreducible difference between past and existing condition. What seems unchanged now, was either destroyed in a minor way, or destroyed and regenerated. Therefore, we consider the term “interaction” as destructive factor quite appropriate for this process.

Because of destructive character of the interaction we can talk of “interaction” only as of “change”. The change, taking place during interaction, is registered by sensory system and processed by nervous system. The lack of change means that nothing can be registered.

One can object: “I see a tree — what process of destructive interaction there is?” In that case it is important to understand the destructive character of the interaction process. The eye has not direct contact with the tree, but it perceives the light flux. As a result, the protein cells, involved in interaction with the light, are in need of regeneration for subsequent use. It’s an example of destructive interaction process.

Changes, taking place in process of interaction, and their consequences, are inherent not only for biological organisms, but also for relevant tools, both physical and social.

Obviously, biological organism can register only “properties” of its own interaction with outer space. To be registered, the “properties” of the interaction must be available physiologically, by virtue of receptor, nervous and subordinated systems of organism. The process of destructive interaction implies certain consequences, that may be defined as:

changing property or property

The term “property” is defined as a subjectively registered change of interaction between the organism and its surroundings.

Anything other, besides the “properties” of interaction, is unavailable for men or other biological systems and does not exist for physical bodies. We can only register the results of destructive interactions, — in another words, only the object of interaction with the subject, having “properties of subjective interaction”.

Any interaction is destructive for both participants and creates consequences for both of them. The fact of consequences for participant allows him to register the fact of change.

By virtue of destructive property of the interaction, any appliances, used for measurement, are in need of regular checking. The biological organic tissues, participating in this kind of interaction, are in need of regeneration. And elementary particles, by virtue of destructive property of the interaction, cease to exist in forms, existing prior of measurement.

Any measurement consists of comparison, which would imply the need for the reference point.

Technically, in using own position in space for creating the reference point, biological organism settles for one kind of information, presented as “properties”. It associates his belonging to the destructive interaction with the “point of reference” according to the type of interaction.

The “subjective point of reference” and representing of information through “properties” enable us to interpret three–dimensional space and its changes in time.

As an interpretative notion, the “subjective point of reference” is not a real point in space and associates with boundaries of the physical body (in general case — the boundaries of the controlled space), defined by physiology and knowledge as practical skill of manipulating the sensory interaction with the environment.

We estimate the distance to desired object in space, pathway or time on the assumption of procedures that we can perform, — for example, reach out with hand, select the safest trajectory of car, or wait for the night time. In any case, organism uses the “subjective point of reference”; it can change its position, there can be several points of reference, they can be situated inside the organism, on its surface, far away or even have reference only in context of time.

The “subjective point of reference” brings “properties” of subjective interaction with different locations into a single informative representation. Therefore, the organism obtains a consistent informative representation, originating from all available resources of its physiological systems. The nervous system gets a seamless representation about itself, about time and space.

The notion of “subjective point of reference” is a part of revealed “property”, which can be formalized by identifying the chains of association between “properties” of destructive interaction and “reaction” of the subordinated system of any given organism (cause and effect chains).

The correctness of perception is provided, if cause and effect chains contain a description, sufficient for defining an attribute, which we know as “time”.

“Time”, as obligatory attribute of subjective interaction, defines the place of revealed “properties” in sequence of cause and effect chains.

A simple description of subjective interaction through its “properties”, founded on the previous experience, creates a conceptual construct of “time”. Current understanding and assessment of “time” is used as “subjective point of reference” for further actions.

The definition of “property” as a consequence of subjective interaction with the environment includes existence of obligatory attributes: an attribute of authorship, defining the subject itself, and an attribute of time, separating consequences of two different interactions.

The notion of “property”, as opposed of terms of Euclid mathematics (geometry), is used for definition of subject, space and time. This being said, the notion of “property” is intended not to divide the notions of subject, space and time, but to unite them by having the same meaning for all three notions.

Therefore, in this model of the organism formalization takes place in process of destructive interaction with environment on physiological level of organisms with functional receptor, nervous and subordinated systems.

Rules of communication, providing the functioning of organisms

Physiological functioning is represented by communication with environment through properties of destructive interaction.

The one and only known way of communication for organism with receptor, nervous and subordinated systems resides in creating the cognitive function by means of replicating (copying).

In consequence of his actions, the participant of communication creates a cognitive copy of his reaction. It is a copy of his interaction with environment, that connects properties of interaction, existing “before” and “after”. In process of subjective investigation of the physical world, we copy our surroundings in representation of cognitive function.

Communication with the environment and its separate parts can be either unilateral (when organism manipulates with surrounding space and its content) or reciprocal (when one organism provides informative support for another, i.e. renders assistance in acquiring of knowledge or practical skills).

We consider two possible ways of communication:

- **Pre-semantic**, unilateral communication amounts to purposeful action of person, aiming to achieve a certain result.
- **Semantic**, reciprocal communication amounts to cooperation, aiming to assist one person in acquisition of practical skills, acquired by another person.

Unilateral communication is defined as “pre-semantic”. One-sidedness is defined not by available tools, but by the content of communication. It reduces to manipulation (violation) on the environment.

The terms “violation” or “violence” are most commonly used for description of human actions, sometimes for wildlife. However, we can use those terms for the communication between subject and inanimate nature in virtue of its destructive character. The attitude of violator

implies ignorance of the rights of his victim as a full-fledged living organism. Therefore, the relationships “subject — inanimate nature” and “violator — victim” are equivalent as properties of destructive interaction.

In communication between two persons unilateral communication is worthwhile only for the manipulator. So far as unilateral communication is meaningless for the person being manipulated, the subject of manipulation can not be the voluntary participator of unilateral communication.

Unilateral communication has violent character; in this regard, it can be rightfully applicable to:

- Inanimate nature, as a tool for researching the outer space and physical processes.
- Another organisms, that can pose a direct threat for current sustainment of person or for his life.
- Another persons with cognitive impairments, whose activity can pose a threat for current sustainment of person, because applying of cognitive mistakes in practical activity is dangerous for others and for the environment.

For this reason, unilateral communication, being an important instrument for the scientific research and development of technologies, is devoid of harmonious character in interpersonal communication and is justified only in cases of a direct threat for life or dangerous practical activity of persons with cognitive impairments.

Reciprocal, or semantic communication implies a contractual nature and requires a conditional expression. One person uses an artificial altering of environment, available for another person’s perception, for sharing his own perception.

The development of communications resulted in creation of modern “sigils” for purposeful transfer of information between persons in the form of sound, color, image or composition, which can be described by means of different semantic representation: graphic symbols in written language, their sonic and gesticulation equivalents and also computerized, or digital representation.

Therefore, we have at least four different representations for one “sigil”: it can be represented by voice, gesticulation, written or digital means.

We use bits and bytes to create a digital equivalent of semantic representation. However, the sigil has more comprehensive situational meaning, which can correspond with a succinct textual description. Owing to multimedia-based representation, computer systems provide a range of possibilities, bordering with traditional perception, and create an informational flow, promoting the development either correct or incorrect practical skills regardless of the essence of communication.

In view of each participant, reciprocal communication is not intended for achieving a subjective known result, because a subjective result is different for each participant and can not be known in advance.

The aim of reciprocal communication for each participant consists in sharing (or exchanging) a new knowledge or practical skill.

Each participant of reciprocal communication has own practical skill which he is willing to share, but he never knows the skill which can be gathered from another participant.

In some language groups persists common opinion about meaningful process of transferring the practical knowledge from teacher to student, but that's all wrong, because in unilateral communication the teacher manipulates the student and therefore trains him for certain reactions, but not assists him in gathering knowledge. Manipulations with the student results in development of associative reaction for unilateral pressure of the teacher, and not in gathering knowledge.

Subjective transfer of perception into semantic expression is usually depicted by Frege triangle: “time-space locality” / “association with property” / “the sigil”.

In pre-semantic communication only one person is the real actor (even if his manipulation affects many other persons). For purposes of unilateral communication it is not important, whether or not the other persons are relevant to the subject of research and artificial transforming of the environment.

The semantic Frege triangle in pre-semantic communication makes the process of communication quite sophisticated, but well registered and discerned by computer-assisted means.

The meaning of any communication consists in specification — the property of personal engagement. Therefore, in communication both sides are not just exchanging knowledge; they give a specification

for themselves. It helps to reveal cognitive mistakes on both sides of communication.

One subject of communication can not tell another nothing, but what he is, or his personal specification. It's a characteristic of subjective communication.

The cognitive distortions on one side of communication make it change from reciprocal to unilateral. Subjective strategy is revealed by means of semantic analysis. The subjective property of communication allows to evaluate the strategy of both sides on the basis of their statements.

Pre-semantic communications (if not gathered by semantic means) don't lead to mistakes of perception, because of the single authorship and single chain of events in time. Cognitive distortions can appear in reciprocal communication, and that results in changing the reciprocal communication to unilateral.

Therefore, pre-semantic communications are absolutely correct, except of using the practical skills, gathered from distorted semantic communications, or being inherently distorted.

Pre-semantic communications of person without cognitive distortions are absolutely correct, but limited in informative diversity and scarce of content by force of connection with one author and the duration of his subjectively useful existence (life). Because of that, semantic communications provide a significant advantage, upon condition of correctness.

The degree of correctness in reciprocal semantic communications is defined by measure of concordance between subjective semantic triangles of both sides, that is, the factual content of existing practical skills. One subject of communication always hold forth for another his model of reality. In order for correct perception of the offered model, the other subject of communication must have correct practical skills, corresponding with this model.

The interaction between subjective semantic triangles generates an artificial flow of perception, and both sides are participating in event, which they can interpret from their corresponding practical experience.

One side of communication delivers information about its own perception by means of sigils, which are being interpreted by the other side on the basis of its practical skills. For example, if one person shows

another person a lemon (a fruit of the lemon tree), the other will have his own existing association with lemon, notwithstanding of associations of the first person.

From this diagram we can conclude that action of Person 2 amounts to creating of an artificial flow of perception, different from perception of reality by Person 1 because of their different experiences (existing knowledge).

The diagram illustrates, how reality in perception of one person can become a perceived reality for another person.

The correctness of perception is provided by:

- Knowledge of the process by the perceptive side, which excludes the substitution of reality for fantasies.
- Correctness of information, communicated by author/source.
- Detailed description of primary perception by author/source and his explanatory tools.

The process of communication is inherently subjective and always takes place between two persons, regardless of number and status of participants.

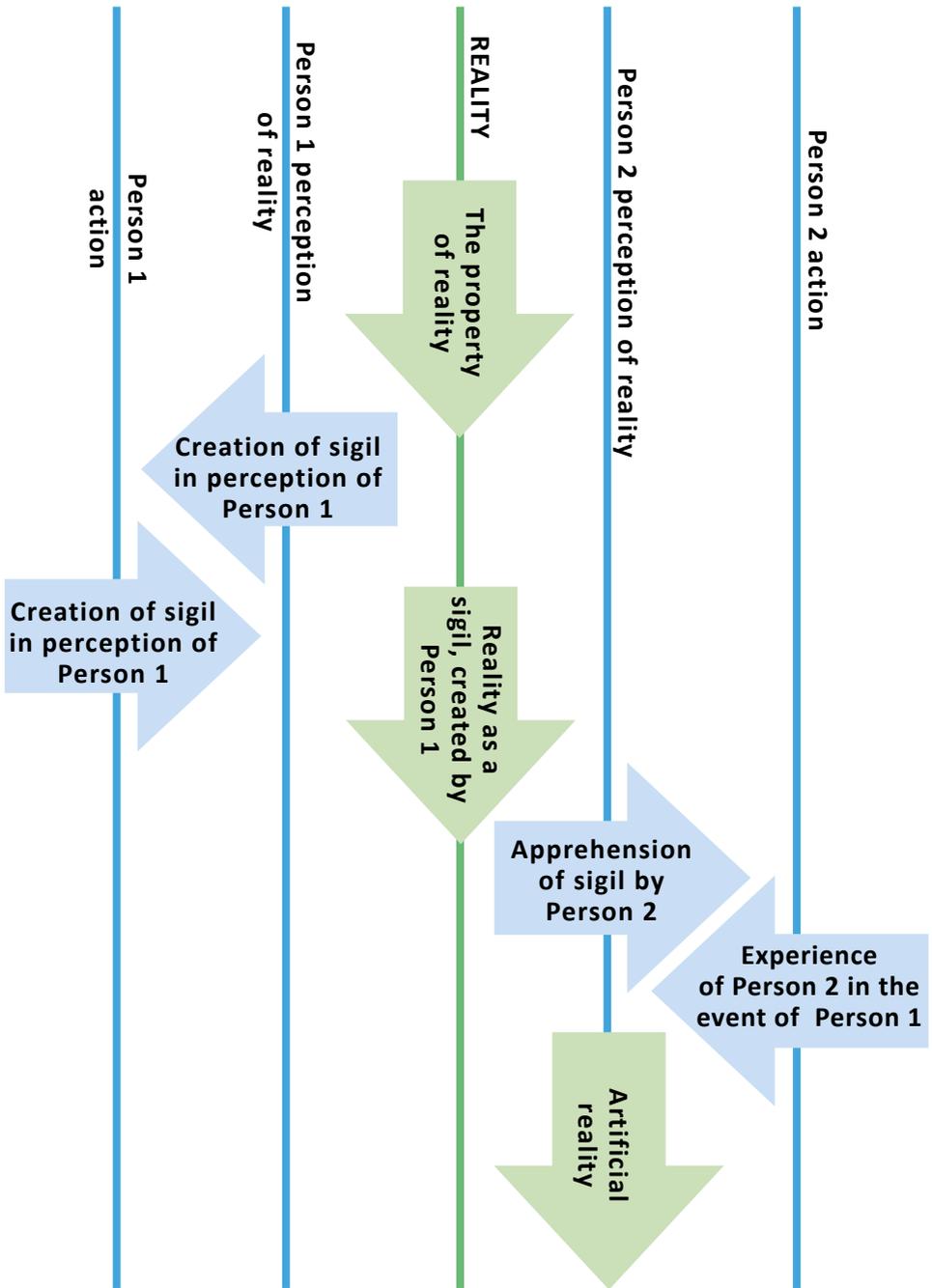
The point of communication is what the one person (source) deliver information for the other person. If several persons are present during this process, we have to do with different perception in each pair of source/perceiving side.

Especial case in communication process is a notion of perceived event. For example, if your friend tells you about an event he had seen, you can confirm only his words, i. e. your perception of his story, but not the real event.

Correct representing of information affords an opportunity for its correct perception, and employment of tools and models provides more detailed delivery of its content.

In process of semantic communication, participants acquire an experience in usage of sigils for the development of new practical skills. By virtue of organization of neural activity, based on “representing of information through properties” they attain versatility of information usage irrespective to the level of generalization or field of application.

Correct development of practical skills using perception, gathered



Pic. 1. Creation of artificial perception in communication.

in semantic communication, is possible in case of representing of information through properties.

In reduction of informative content to the form of representing through properties, the subject gets a possibility to assure the authenticity of information in a way, familiar from the beginning of personal experience, namely, through properties of representation on physiological level. The algorithms of neural activity, created in process of life experiences, are specialized for representation of information through properties.

In actual practice, persons lacking the rule of representing information through properties suffer from various cognitive distortions.

Cognitive distortions are not that significant if we don't use them in practical activities, but the development of technology currently makes obvious those cognitive distortions, that were insignificant just a while ago. As a result, old problems are not correctly solved in new situations, which leads to wrong actions.

In real life we perceive correctly delivered information, about which we have a set of correct practical skills or knowledge. Everything else is perceived incorrectly, not perceived or perceived as existence of cognitive distortions from the other side of communication.

The correct perception even of incorrect or incorrectly delivered information doesn't correct the mistake, but reveals a cognitive distortion. Therefore, for successful reciprocal communication is necessary:

For active participant — to have correct information and correct way to deliver it, i. e. to know about existence of necessary models of perception by other participant;

For passive participant — correctly interpret received signals into an artificial flow of information, i. e. to have a correct representation of his perceptual input.

The correct structuring of any available information regardless of its content can allocate an absolutely correct elements. However, the value of this information usually is not too large, so far as mistakes, committed in documentation, make it incomplete, contradictory and useless for a further analysis. Its effective volume is insignificant in comparison to the whole body.

Semantically correct information can be used on any level of generalization, allowing to create new models and to get correct results.

Therefore, the investigating of genesis and principles of development of the subjective practical skills allows to create models, ready for use at any one time.

Currently (2022) unwarranted practice of pre-semantic communication using semantics created a great volume of already distributed incorrect and contradictory practical skills, leading to asocial processes in human society.

Therefore, for correct evaluation of one's own interactions for correct imitation (copying) of the schemes and rules of conduct and practical skills, we need to research the formalization of a subjective interaction.

The expounded physiological model of communication allows to assert that pre-semantic unilateral communications are not possible between sensible persons because of impossibility of exchanging intangible assets, and therefore, are meaningless for the lack of practical results.

This important conclusion have significant social repercussions; it exerts influence on educational systems and the state structure.

Formalization of a subjective perception into a cognitive function. Facts and knowledge

Let's define a person as: subject

The formalization is taking place on the physiological level in process of interaction between "subject" and "property". It is effected by cognitive function: cognitive function (changing property)

The formal content of the cognitive function is a practical skill, depending on argument — revealed subjective "changing of destructive interaction", i. e. "properties."

The "presence of property", in its turn, is a result of another cognitive function of the same person, the argument or which was revealed by previous cognitive function. Thus certain cognitive function acquire a parental quality in reference to others.

By revealing the presence of one property, subject can reveal existence of another property, the relationship between them, and commit a physical action for achieving expected outcome — changing of properties in process of destructive interaction.

The notion of property of "destructive interaction" is also applicable to processes, verified by physical tools or through logical analysis,

because the physical process of change results in destruction of old and emergence of new. This being said, the time of establishing of the event and actual time of the event may considerably differ.

We can discern the events, in which we participated many years ago, or we can take an action, which will have a guaranteed consequences within a several weeks.

For example, you only now can realize, that someone cheated you many years ago. Or you can be sure, that the fact of your pregnancy can't disappear by itself and is going to change your life.

In this case the question is about a sequence of recognition/revealing of different properties of the destructive interaction, which can be either realization of past events or prognostic evaluation.

From the standpoint of subject, the time itself don't have a separate mechanism of perception in nervous system and is conceived on the basis of sequential changing of different properties, characterizing his interaction with the environment. However, for the purpose of attribute documentation, the notions of "subject" and "time" are required to define in the form, available for the participants of communication, as well for the future readers.

As mentioned above, we define "time" as attribute of subjective perception. Now, we turn on the notion of "fact".

"Fact" is a change of subjective perception, detected by subject. Therefore, the fact is necessarily related to certain attributes, or "properties" of changing personal perception, namely:

- Subject
- The spatial position of the subject and availability of tools for interaction with the environment
- Time

In reality, subjective facts create a model of existence in three-dimensional space with time as a factor of irrevocable changes.

The "fact" has a unique content: basic data and pre-existing model.

Aforementioned attributes, along with content of a "fact", are obligatory for a correct perception.

Between "subject", "the spatial position of the subject" and "time" exists an univocal connection, insomuch a subject can be present

simultaneously only in one place. It can't be occupied by another subject. Therefore, the spatial position of the subject can correspond with several moments of time, whereas any given moment of time can correspond with only one spatial position of the subject.

Subjectively, the organism builds sequences of "facts" into functioning of biological structures. However, in mathematics we don't copy the biological procedures, but formalize the basics of perception as a natural process. In this context it means that sufficient index (obligatory properties) for the "fact" as a value of cognitive function is a couple of properties: "subject" and "time".

"Fact" is a value of cognitive function, which represents an assembly of properties and has its own association — for example, a denomination or any other representation, available for organism, which can be used for creation of formal models as an individual value, tied to subject.

Allocation of facts into a separate class of the cognitive function values is related to an important moment: taking a decision.

Fact is a property, revealed by cognitive function which, in turn, represents an assembly of properties. Moreover, the argument of cognitive function corresponds with the sum total of practical skills (knowledge), available for the subject.

fact
cognitive function (changing property)

Inasmuch as "fact" is tied to the subject and time of occurrence, in general the mathematical expression is written as:

fact(subject, time, cognitive function (changing property))

The registration of "fact" has a fundamental meaning because any records, lacking the set arguments, can not be regarded as authentic. The form of record can be attractive in a sense, that it can be shaped automatically. Besides, using that format of recording in automatic processing (with unique index for every unit) provides an opportunity to correctly unify the information from different devices into a general consistent data store, to provide the security of information on the level of access permissions management, to avoid multiple duplication and also to cross over to program interface of information processing. This, in turn, enable to avoid a necessity to use hardware-dependent architecture in the process of migration to different principles of computation.

Using or not using the semantic communications, we express certain properties of subjective interaction through another certain properties of subjective interaction. It is necessary to take note of that “cognitive function” is executable, and revealed changing of properties are the same “facts”, as a value of calculable “cognitive function”.

The organism uses the revealed fact for further cognitive solutions and for correcting of the subjective perception by action. For example, if you get your feet wet, even if you wear waterproof boots, you can check the soundness of sole to detect the cause of wetness.

The organism uses the “facts”, demanding a purposeful changing of perception flow , for subjective reaction expressed in the management of subordinated system in limits of available and manageable space.

For example: registering a sound behind your back leads to a motor reaction, changing the field of your perception: you turn around.

Certain amount of facts don't get a practical usage, which devalue their content regardless of citation frequency.

A fact, used unconditionally or not used at all, loses its practical meaning, because it can not be used for gathering new practical skills in interaction with the environment, nor for research activity for transforming the environment or personal controlled space.

A known value of the cognitive function, which we defined as “fact”, can be significant — in other words, we can use the existence of “fact” for practical action or inaction. This is a moment of taking a decision. The moment of taking a decision is marked by a practical action, when we do something in accordance with the established fact or cancel the action in view of knowledge of other facts.

fact -> executable command
or: cognitive function (fact)
fact -> executable command

The cognitive function in reduced form is defined as “knowledge”, because it denotes a practical skill — reaction to established fact.

The fact, related to a practical action, amounts to knowledge.

knowledge (subject, time, fact -> executable command)

Knowledge represents a cognitive function of a full range — from perception to the practical action.

We call knowledge only those cognitive functions, which cause a practical action. It's obvious, that using of knowledge is possible only in those cases, when subject possesses not only an ultimate formula, but also formal constructs, used in calculating the finite expression in the limits of created formal model.

We define knowledge as practical skills of the subject. The practical skill allows to grant a wish — to achieve purpose, granting the possibility and necessity. There are various wishes, from satisfying a hunger to aspiring for space flights.

It is necessary to notice, that a “wish”, in spite of dual nature (to return in familiar condition / to find new possibilities) as a need is formed by the cognitive function on the base of existing knowledge.

In all likelihood, initial value and knowledge of a cognitive function is put together as a result of nervous system commands for the subordinated system, which creates a change in receptor interaction thus forming a cognitive function in process of organic growth. By virtue of nature of the cognitive function and its formal description the correctness of its development can be breached only in communication between subjects, and so we consider the process of communication to help subject to avoid cognitive distortions.

In general:

The cognitive function of nervous system (“cognitive function”) has an argument (“changing property”) and consists in generation of executable commands for subordinated physiological systems (“executable command”), using certain values of cognitive function — “facts”.

Causal relationship for cognitive function of nervous system can be represented as:

cognitive function (changing property) → executable command

Along with the practical realization of knowledge, there is a process of subjective development of cognitive function, based on flow of perception, changed by action.

executable command → changing property

Revealing the relationship of subordinated system functioning and perception creates a cognitive function. It'd not a contradictory notion. The organism with its receptor, nervous and subordinated system by

every action creates its own cognitive function. When it has enough knowledge for purposeful usage of its subordinated system it gets a possibility to grant wishes through deliberate exercising of cognitive function.

This is the process of interaction with the environment and its content.

We define a process of interaction as a relationship between sequence of recognized facts (events) and subjective associations. Being in process of perception, the nervous system generates new facts on the basis of previously established facts.

We compare properties of our current perception with those, which had been obtained previously. Therefore, we get a possibility not only to detect connection between conditions, actions and consequences, but also a possibility to interpret this connection on the basis of previous practical knowledge. This is a process of interaction with the environment, and other organisms can be a part of it. We put an emphasis on the term “cognitive”, since we consider the possibilities of organisms with receptor, nervous and subordinated system, and therefore, have a cognitive function.

The process of subjective interaction out of necessity is a process of formalization and acquisition of knowledge.

Perception is founded on previously gained knowledge, and it’s already a formalized process. Employment the results of practical activity creates new skills.

The cognitive function is represented by a model, formalized by two factors: physiology of the organism and physics of the surrounding space.

Content of cognitive function \equiv Model

Model is a formalized representation of knowledge. The organism creates it for sustainable functioning; it’s a subjective non-material asset.

Model is an assembly of properties, describing it. It is a content of a cognitive function.

Model always consists of the lesser models, which in turn consist of elementary models, defined by physiology.

Upon “models defined by physiology of the organism” (the natural models of formalization) we understand informational models, providing

its existence as an autonomous system and representing the functional principle of organisms with receptor, nervous and subordinated system.

Thus, we have a primary model, defined by physiology of the organism: “representing of information through properties”.

The model of representing information through properties, as much as the other models works out as a rule, in terms of which the new models are created.

The model of representing information through properties has a range of definition, stipulated by process of interaction.

Models, created within the model of representing information through properties, have a narrower range of definition and fall within the scope of general model.

The model of representing information through properties is a determinant for perception of organic and inorganic nature. For organisms with receptor, nervous and subordinated system such skills, as recognition, breathing, ingestion etc., are developed by virtue of models, in which the knowledge is formalized as a perceptual experience; they provide a correct reaction to a certain conditions of interaction with the environment. The refining of perception takes place as long as life endures, which allows to correct the perception in accord with condition of the organism and recognize new properties, formalized in new models.

Therefore, the nervous system perception is specified by known subjective models gained by receptor input and processed through a subordinated system.

The sum total of properties, used in models, is separated as subjective managed contemplation.

An available complex of properties, used in cognitive function, is defined by level of knowledge, language and social environment. Thus we have different descriptions of the same events from different subjects, from differing accounts of circumstances to using of gesticulation, not having a known language associations

In process of being, the organism constantly creates new models, using previous examples.

The controversy about possibility of genetic or any other physiologically available transfer of disposition to any type of model on an incredibly

regular basis appears in the academic circles. But scientists, debating the subject, lose sight of the meaning itself: what is a transfer they consider upon? We can only say, that current social functions of homo sapiens in formal point of view in volume and complexity are incomparably small in comparison to gained functions, managed by nervous system only for its sustainment beyond the semantic representation.

Semantic communications are not so imperfect as contradictory by virtue of lacking formalization on the physiological level in interpersonal communications, which leads to cognitive distortions and as a result to the asocial practical actions, destroying the population of homo sapiens and the environment of our species.

Therefore, the success of modeling on semantic level, used in social communications depends on existence of cognitive mistakes, and not on physiological imperfection of receptor, nervous and subordinated system.

As a matter of fact models are the result of perception; when they are built on basis of representing information through properties, the unification of repetitive experience into the master models allows to modify perception of facts, continuously increasing its formalization.

It follows thence, that on certain conditions the level of subjective knowledge formalization is inversely related to the cognitive resource for its implementation.

This allows to free the physiological resources of nervous system from factual perception, providing aforementioned resource for constantly modified formalization.

The process of replacement a certain models with others is connected with rebuilding of nervous system and activities of daily living. In case of minimal cognitive distortions or thief absence it is a natural process of organic adaptation, harmonizing the sustenance of the organism it the process of gathering of a new correct knowledge. In case of cognitive distortions the process of correction is rather painful for the organism, — the more painful, the longer it used those cognitive distortions, because disturbances in cognitive activity generate contradictions in functioning of subordinated system and result in perception mistakes.

The resource of the nervous system is defined mostly by capabilities of receptor and subordinated systems of organism, because physiology determines the amount of problems, that can be solved in process of everyday activity. It is necessary to keep the balance, so that physiology

of organism enable the user to employ a set of tools, sufficient for the investigation and exploration of environment, thus providing an existence of population.

For purposes of necessary physiology for gathering any knowledge we can discuss physiologic possibilities, but in case of correct usage of semantic communications the demands to physiology can be considerably lowered, and we rather can discuss the balance of a quality (correctness), effectiveness of semantic perception and the life-span of an organism.

The organism constantly modifies the categories (knowledge of properties), which it operates. This refers to models, created not quantitatively, but qualitatively. It can be well illustrated on the example of vision: when we learn to recognize images by sum-total of properties, we don't need to analyze the details, as it was previously. Moreover, if needed, we can recompense defects of vision with our experience.

By virtue of physiology, we have in one model:

- receptor perception
- current knowledge (previous perceptual experience)
- acquired knowledge of reaction and consequences (a new subjective experience of actions)

Therefore, the model represents practically used subjective analysis of one's own subjective perception. There is no tautology: the subject uses previously gathered subjective practical skills on the basis of previously formed subjective rules.

Regarding the notion of subjective fact, the model can be represented as:

Established totality of elementary model properties = the fact of creation
of the integral model → defining the properties of reaction on the
integral model
(action, inaction or plan of actions).

In case of that description, the "action" is understood both as a muscle reaction and as a realization of a new artificial flow of perception analogous to the reaction of nervous system, as though cognitively revealed fact or its properties were perceived by receptor system.

The model represents the content of cognitive function.

Elementary models are used for the development of next (integral, or master) models. The models are identical in their essence, but have a

natural hierarchical arrangement, covering their causal relationships of its emergence in perception, which explains a dendriform structure of neural networks in biological organisms.

The model connects perception and reaction. Therefore, we can classify the models into descriptive ones, used for searching “facts”, and governing ones, previously defined as “knowledge”.

In general case, the model consists of assumptions, to which relates the “totality of properties of elementary models” (the range of definition).

However, the model of representing information through properties implies a decision, the sequence of actions or a plan. Considering this, it is necessary for the model to have not only suggestions about natural processes, but also assumptions, expanding the possibilities of usage the receptor and subordinated system with every byte of a new information.

For example, the solution of problem with restoring the functionality of an electrical appliance depends on available tools. In one case you have only to check voltage in power line, and in other case you’ll need repair or replacement.

In essence, it’s a mechanism of a formal correspondence, which is absolutely correct when the range of definition and causal relationships is intact.

The physiological factors, important for the biological existence, are:

- limit of functioning (the life–span) of the organism
- existence of gender role
- magnitude of population, sufficient for propagation
- the habitat, including biological diversity

Those physiological factors define a necessary set of models for satisfaction. Without these models, the life of an organism is being in danger.

In case of homo sapiens we need to create an hierarchy of models, at least to the level of reciprocal communications.

Therefore, any cognitive function, associated with knowledge, shall comply with all necessary conditions of the organic physiology, including the restoration of environment and biological diversity.

The sequence of cognitive development by copying reality into subjective artificial perception

Reciprocal, or semantic communication

Reciprocal, or semantic communication is effected in single reality, though it has differences in the subjective perception of participants.

Subjective semantic triangles (Frege triangles) of the participants don't transfer the information of reality: they use reality as a medium, because each of subjects has information only of his own interaction with reality. Therefore, every participant of communication can use only perception of the sigil, reproduced by the other participant.

In case of a correct perception of sigil, subjects are bound to create a contract relationship (cooperation) for the association of sigil with any given space, available for both participants.

Acquisition of semantic sigils begins on the principle of allocation of the general from different examples. For example, the subject indicates a certain area, which he perceives as a one-colored, and says a word, defined as a color. This is a cognitive association. Thus the participants of semantic communication, who are physiologically able to detect different colors, have a chance for agreement, that property of the color, defined by a certain word, will be defined similarly by other participant regardless of his perception of that color.

The property of unambiguity of reciprocal communication is defined by reality, existing irrespectively of subjects of communication. Personal interaction with the color marker is different for both participants of communication, but in virtue of cooperation they can denote their different perception with a certain sigil — for example, a word. Thus reality becomes a medium, refined from subjective perception, and a subject matter of communication itself. But its perception remains subjective for both sides of communication.

Achieved contract relationship (cooperation) creates an appearance of equivalent perception, which as a matter of fact is not so. Usage of measuring instruments makes the agreement about the sigils more accurate, because it translates the intricate perception of interaction with the environment into more easily perceived properties.

Therefore, the development of technology allows the participants of

semantic communication to make more accurate agreements; however, rectification of reality in communication does not change one's physiological perception.

The correct thinking resolve itself not only into condition of restriction for the physiological subjective perception, but also in the authorship of communicated sigil and the time of perception of that sigil by the other side of communication. It means that if the other person says: "A fence was painted in red" it should be read as "Such-and-such person then and there told me, that a fence was painted in red". This can be ascertained only if you with another participant of communication can see the aforementioned fence. This is an important notion for creating correct databases and automatic processing of data, allowing to make the computer-assisted representation suitable for further analysis.

Unilateral, or pre-semantic communication

In case of unilateral, or pre-semantic communication the subject directly communicates with the reality. Upon that, the process primary modeling is taking place.

It is commonly supposed that on the basis of natural needs of an organism, the biological system is assigned with the objective of preservation of its wholeness, providing metabolism and functionality of the organism in its interaction with environment. Those problems are solved, but the cognitive function solves it without an obvious representation. The problems, associated with existence of one organism and whole population, are soled solely by correct thinking, regardless to the volume of knowledge.

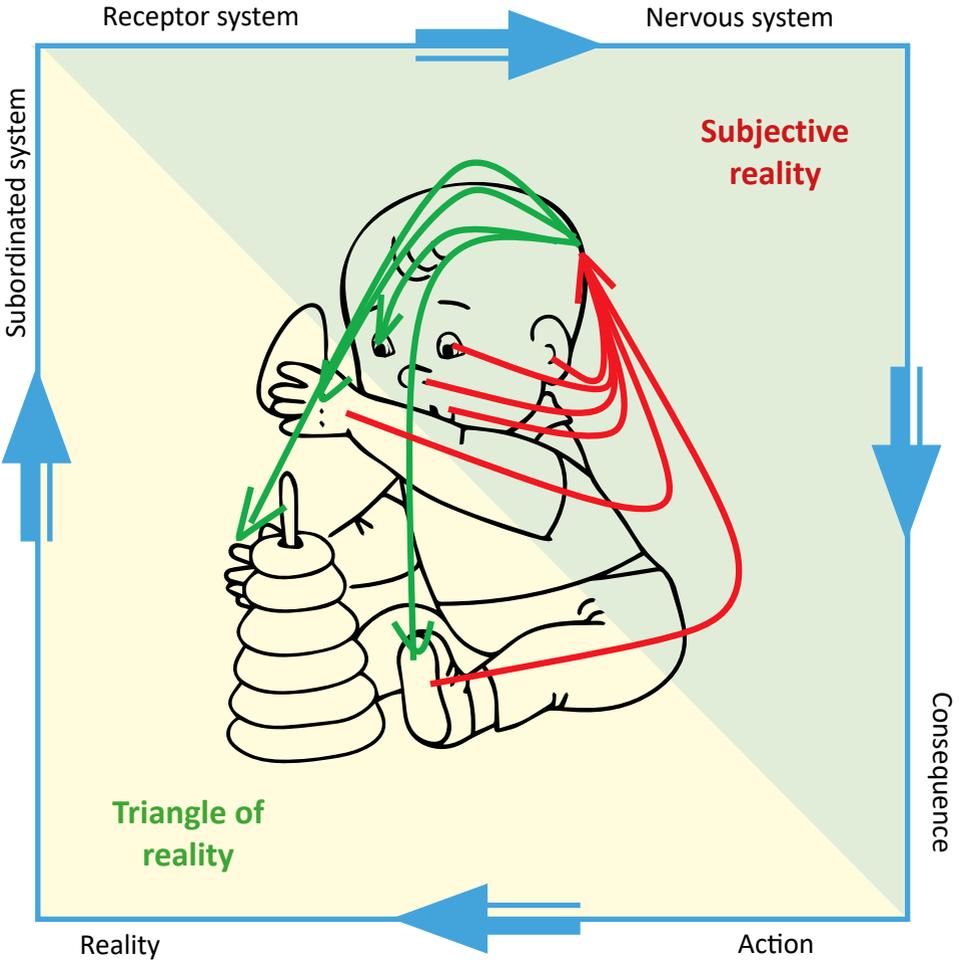
An autonomous organism and his nervous system manages with developing of sustainable models, and we can observe it in practice.

Different organisms have a different level of inheritance of characteristics, dependent on physiological processes, but regardless of it, the modeling begins immediately with the development of subordinated functions.

The primary model is developed by fixation of changing the flow of perception, gathered from controllable environment.

The cognitive function is developed in the process of circumambulation about the square of interaction, consisting of "subjective triangle" and a "triangle of reality", having the common side of "properties of the interaction of subject with reality".

Pic. 2. The square of interaction with environment. “Triangle of subjective perception” and “triangle of interaction with reality.”



The organism solves a problem with one indeterminate, but the unknown variable depends of its own functioning and is limited by properties, common to organism and its environment, because it is a part of environment. This being the case, the cognitive function in pre-semantic communication has a pronounced subjective meaning — investigative or experimental value, — and in childhood can form without sigils and

realized in ununified images or exists out if the boundaries of realization as an “intuitive knowledge”.

Reception flow	Acton of the subordinated system	Reaction of the environment
cognitive function (changing property) -> executable command	reality(executable command) = changing reality1	altered reality (changing reality1) = changing property1
cognitive function (changing property1) -> executable command1	reality(executable command1) = changing reality2	altered reality (changing reality2) = changing property2
...
cognitive function (changing property N) -> executable command N	reality(executable command N) = changing reality N+1	altered reality (changing reality N+1) = changing property N+1
...

Revealed changing of properties as a result of cognitive function action, creates a “fact” for reaction of the subordinated system. The change of reality, in its turn, creates a change of perception — revealed properties of personal interaction with the environment.

Mathematical presentation of the subjective cognitive function

The initial sequence of functional system activity of biological organism is underexplored, because it occurs concurrently with growth of an embryo.

In a manner of speaking, giving commands for subordinated system, organism changes the function of receptor system. Proceeding from existence of actual connection of those processes through reality, the nervous system can detect a causal relationships.

Just as well we can say about initial functioning of nervous system, providing physiological connection between the receptor and subordinated system.

In actual practice, in all likelihood, both mechanisms are employed. Considering our current knowledge of technology it doesn't matter, which of those mechanisms has a precedence, because both of them (in different proportions) have the same constituents and bring about the same result. For further development the importance lies in the fact of gaining a totality of practical skills within a model framework, and not in the sequence of acquisition. Ultimately, it's not important, which way the organism solved the problem. The solution is defined by conditions of problem and not by the way chosen.

It's absolutely correct to say, that the accepted model defines the result of cognitive processing. Thus, different organisms achieve the same results only if their accepted models are the identical. But the models, as a result of cognitive function, depend on perception, for which the inciting factors are the receptor possibilities and conditions of perceptual experience.

When we call attention to the fact that reality is a common factor for the organisms, we have in mind different perception of reality for any organism, and the standards of perception occur only in semantic models of formalization. Besides, to join a semantic communication, the organisms must use identical models.

The common feature of cognitive activity of different organisms is a model of autonomous informational functioning, addressed in this work. It is common for the organisms with receptor, nervous and subordinated system. It defines a totality of natural formalization models, which usage depends on organic physiology and technological development of social structures with reciprocal communication.

The model of autonomous informational functioning unites known and unknown forms of life, which have an informational way for purposeful harmonization in their coexistence with environment.

Previous to gathering the skills of semantic communication the information from the receptor system is absolutely adequate, lacking the signals, gathered from the other side of communication.

However, this period can be a short-lived. In case of Homo Sapiens, the baby constantly keeps contact with mother, who keeps a constant interaction with the outer world. Moreover, even in a womb the baby in some specified sense is a part of maternal organism, sharing the one blood circulatory system.

The awareness-raising elements, addressed in this section, begin to form as early as in utero, so that mother's physiological and emotional condition is important for her child. On common level it is quite true that the experience, gathered from "cradle in a blooming garden" will differ from the experience, gathered from "a hole amidst the ice desert".

However, in any case through different ways of adaptation to environment conditions the organism is functioning within the model of "the square of interaction with environment".

From a formal standpoint it's absolutely of no importance, which process is preceding or following: the receptor perception or the influence of nervous system upon the subordinated system. The important part is a correct development of a causal relationship between them.

We always have the same sequences of reactions with the same function in nervous system: existing and acquirable cognitive functions.

Existing cognitive function

cognitive function (changing property) = «fact» → «executable command»

Represents following sequence:

- cognitive function (changing property) = fact
- cognitive function (fact) → executable command
- changing property1

The result of this sequence is a consequence: change of perception (changing property1).

Acquirable cognitive function

«executable command» => «changing property» = «fact»

Represents following sequence:

- executable command
- changing property
- cognitive function (fact)

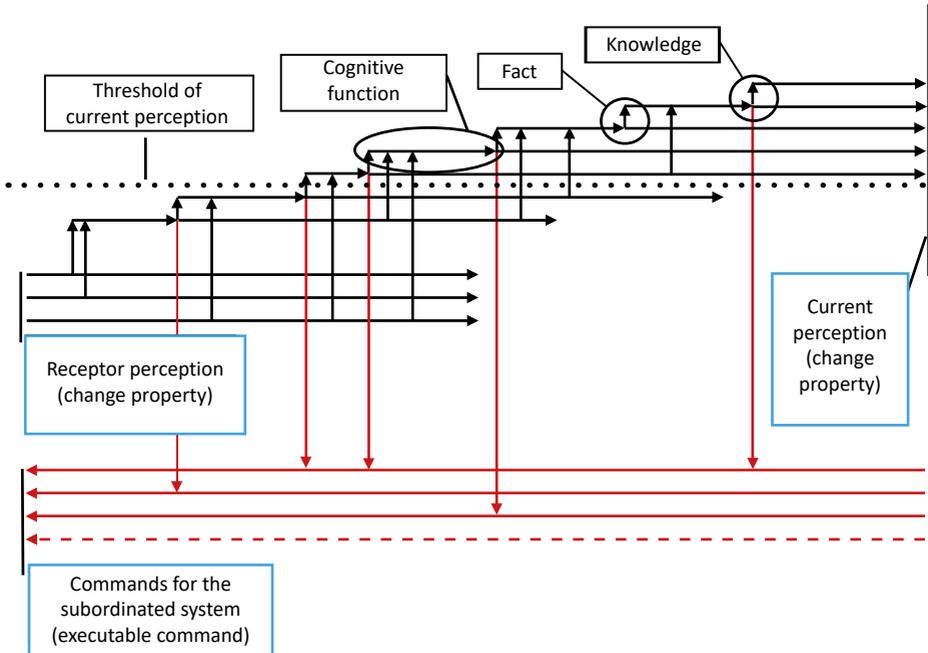
fact = (executable command = changing property)

Let's give an example of existing and acquirable cognitive function.

- The mosquito lands on your forehead, and you decide to kill it, using your hand; you execute cognitive, and then motor function.

- In process of killing the mosquito, you slap your forehead: thus you gathered or confirmed your knowledge that to kill a mosquito you need to slap a certain part of your body.

Pic. 3. Human perception. Mathematical model of processing the information, represented through properties.



Thus we can see, that existing cognitive function occurs due to the purposeful desire, and acquirable cognitive function is related to a causal relationship.

By practical using of our knowledge we execute a sequence of actions, both physical and cognitive. Having this sequence, the subject can estimate the required time, and counting invariably would start from the current moment, regardless of chosen method.

We can call “time” any sequence of events, but from it we determine not only the time, but all known events.

Mathematical formalization of problems in representing of information through properties is more similar to diagram, than to the familiar equation, though it is neither one thing nor the other. It is important to

note that the solution itself is a setting of the problem, i. e., creation of models, where generally accepted process of solving problems is a singular case of general representation.

It is necessary to note, that in representing of information through properties, the receptor system, cognitive function and commands of the subordinated system amount to properties, controlled by the organism.

The term “systems, controlled by the organism” in context of representing information through properties is much wider, than the organism itself, as an entity separated from environment by integumentary system. The notion “systems, controlled by the organism” includes certain elements of environment, both natural and artificial, used as tools for interaction with its surroundings.

On the diagram, illustrating perception, we have a mathematical model of processing the information, represented through properties in the autonomous system with receptor and subordinated elements.

Therefore, we have a self-regulating mathematical model for correct perception on any level of generalization. It means, that on any level of generalization the model remains correct.

If we formalize current perception in semantic form, it also would be correct. However, the correct semantic representation would be expressed in terms of “properties” and in context of a present time.

The model represents a modifiable and optimized set of functions, being executed in real time and resulting to a current perception with a corresponding reaction.

This model allows to correct perception, taking into account the changes in parameters of the organism itself and its environment. This being said, the organism creates models, revealing fluctuations and ways of filtering information for confirming of its authenticity.

The model always works with real benchmark data, which excludes intrusion of false information.

The current perception is constantly upgraded by circumstances and situations. In general case it takes a form of images or sensations, which can be denoted as variables, i. e. they can be provided with various names.

In principle, the current perception has a subjective representation and depends on the living conditions of subject. However, providing for origin of subject, it always reflects his environment and includes description of his interaction with immediate surroundings.

In case of similar environment, we have a similar current perception. The level of its formalization depends on time, spent on the education of subject. The difference in self-education of subjects lies in different circumstances of interaction with their environment and in their physiological differences.

Obviously, the worm and the dragonfly by virtue of their physiological differences acquire different practical skills, which ultimately define their subjective environment, way of live and their role in ecological cycle.

But irrespectively of physiology, they must solve similar problems concerning with self-regulation, spatialization, foraging, reproduction, communication, and probably, even with task planning.

Therefore, we can observe the development of natural models of formalization.

Models, resulting from the model of autonomous informational functioning — natural models of formalization — primary (associative) and secondary (cognitive) content

Subjective functioning in the model of “representing information through properties” results in answer to a question “What is what?”

The mathematical model of processing the information, represented through properties, includes the following elements:

- Receptor perception
- Commands for the subordinated system
- Cognitive function with especial cases:
 - Fact
 - Knowledge

All of this contribute in forming of a current perception.

The subject creates models, unifies them in interrelated chains of cognitive functions, resulting in facts and knowledge, which

subsequently, upon reaching a certain level of formalization can be defined as descriptive science or formal mathematics.

The organism with nervous and subordinated system solves a a limited number of known problems. For that purpose it creates a certain number of models. Currently we have nine models of autonomous functioning:

1. I can move (manipulate) this way (I, I can)
2. My manipulation causes such and such changes in my environment (manipulation)
3. The properties of my interaction with environment are interconnected in such and such way (association)
4. My interaction with different places of my environment has such and such common features (sets)
5. Equivalent and differences. The comparison of sets, revealing equivalence by limited set of properties, by significant interaction and by the result (logics)
6. This chain of action leads to such and such result. The process of achieving results, which leads to purposeful changing of property (model of hierarchy of sets and spatialization)
7. Thus I can to create a contract relationship with certain part of my environment (semantic communication)
8. The environment is constantly changing (time)
9. I can achieve the set goal by arranging the sequence of actions in time, with due account for exactable changes (plan)

Aforementioned models, on the face of it, not include representation of physics, chemistry, medicine or computing. However, all descriptive and formal scientific models are contained in those limits, considering the relevant practical skills.

The level of generalization and practical skills for creating natural models depends on physiology of organism (biological species) and its possibility of communication or, more precisely, on existence of subject for communication with corresponding practical skills.

Thus, for the life support in contained environment, applying the first five models will be sufficient.

For the life support of different species in contained environment it is necessary to have first seven models.

Using all nine models gives an opportunity to create environments,

habitable even on the other planets, providing the sufficient intangible assets, gathered in the process of life.

The generic difference for notion of “rationality” apparently originates in the fifth model, which is arbitrarily called “logic” and expresses in creating a post-associative cognitive function in case if after a solution “what it looks like” emerges a possibility to discover “what’s the difference of the revealed property of previously known ones”. But the notion of “rationality” implies the need of acquisition of all nine models.

Thus, we call “rational” a reaction, following the analysis of associative definition of the situation (spatiotemporal aggregate of changing the properties of subjective interaction).

Natural models of representing information through properties lead to rational reactions, for example:

The first model is forming the current idea of identity (“I”), represented in the cognitive function, based on consequences of commands for the subordinated system.

Cognitive function («executable command», changing property) = «fact»
(my command, changing property)

Now it can be seen that on the diagram “Mathematical model of processing the information, represented through properties” on level of “current perception” appears the notion of “I” (term, definition) and/or aggregate definitions, such as “my hand”, “my leg”, “my ear”, “my voice”, etc. Hereafter the notion/definition of “I” for a person expands to “my smartphone”, “my spanner for unscrewing different bolts”, “naivety of other person, which I can use on my behalf” , etc.

For the organisms with different physiological abilities models can differ, but general content remains unaltered. In the model of representation through properties it appears as (“subject”, “time”, “fact”)

Knowledge (subject, time, fact)

In biological systems this relationship can be impaired or disrupted; that obviously suggests a cognitive mistake. However, in the absence of semantic communications and considerable damage for the organism itself this relationship develops successively and a provides correct functioning of the organism.

All following natural models of formalization are built on the same

basis. We can nominally define these models as “levels”, because every consecutive model develops from previous models and has the same formal representation for each new term/definition.

Conditionality of separation natural models of formalization in “levels” lie in the fact that current representation, acquired in any model, can be used in any other model, available for organism.

Hierarchical pattern of natural models of perception lie in the fact that development of the next level model is impossible without creation of previous model.

Formation mechanism of subjective perception: manipulation

Representing of information through properties from receptor perception by means of available practical skills (knowledge) creates a current perception.

The organism perceives reality of its own interaction with environment owing to experience (acquired knowledge). Therefore, it perceives nothing else but what it can recognize.

The flow of perception is changing in virtue of acquiring new practical skills. Knowledge as a set of practical skills, is a seminal element of perception.

The organism acquires new knowledge by using natural models of formalization in the process of life–sustaining activity. It uses “manipulation” as a foundation of interaction with environment. With “associative mechanism” as a practical tool, it acquires a factual description. With the tools of “logic” it becomes possible to acquire a desired practical skill — i. e., to research one or another event or process and use manipulations in experimental work. However, acquiring the knowledge, usable for humans, requires semantic communication.

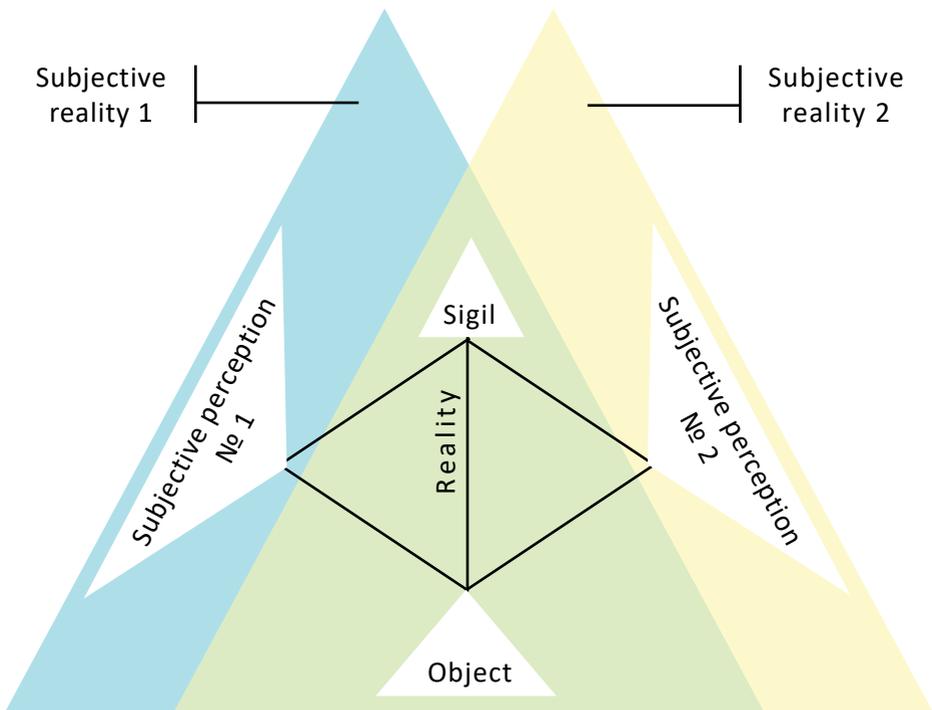
Contractual arrangements for semantic communication

For an organism with receptor and nervous system any other organism subjectively is a part of its environment.

By virtue of natural models of formalization the subject can define a correspondence. In communication we use a contractual correspondence between our perception and sigils. Thus, for the adjustment of perception between them, two subjects make arrangement about definition of properties of the subjective interaction with sigils.

Therefore, we have contractual arrangements, establishing equivalence between two different subjective perceptions of the same object with a semantic connection in the form of a sigil.

Take note, that on the diagram, illustrating adjustment of Frege triangles, emerges a new notion of “object”. This is a segment of space, perceived by subjects of communication through its properties. However, after



Pic. 4 . Adjustment of Frege triangles in communication

establishing communication, the properties of interaction with given segment of space for both participants become non-existent for any other participant, who can perceive the sigil.

The difference between interaction of each subject with the same segment of space retains subjective character, but the relationship between “sigil” and “object” is devoid of subjectivity. More accurately, each participant, perceiving the sigil, will use his own perception of object, represented by that sigil on account of mutual agreement.

As a general rule, correctness of sigil interpretation is defined by correctness of mutual agreement between participants of communication.

Such formal offers, described in definition dictionaries, are commonplace and correspond with the level of technological development and social relations in any given period. Therefore, careless usage of sigils, having historical origin, creates a potential danger of cognitive mistakes in communication.

Obviously, the definition of object or notion by one set of subjective properties is incompatible with another set of subjective properties for one and the same subject. If it happens, that leads to ambiguousness and mistakes of interpretation. Such mistakes occur, when participants of communication have different personal agreements about the meaning of sigils. It is especially dangerous in case of impossibility to ascertain the terms of mutual agreement, — for example, when one of participants has passed away.

Migration or shift of notions and lack of contractual relationships about sigils devaluates knowledge, delivered through the mechanisms of delayed communication, such as books and global internet. We set a goal to rectify this situation by means of representing information through properties and correct thinking.

As a matter of fact, we now contemplate a correct language of communication, appropriate for a modern man. Neither of existing common languages possesses the required features, although any of them can become a basis for the correct thinking, — it will be sufficient to use correct terms in correct time and to observe the limits of aforementioned models. Each of us with some practice can learn a meaningful language.

Mathematical representation of artificial cognitive function, created by semantic communication

The subject perceives a sigil. Upon that, the subject turns to internal agreement, accepted after the previous perception of the same sigil. In other words, the subject initiates process related to his perception of an “object” (a segment of space, denoted by sigil).

We observe emotional (associative) reaction in people, reading literary works, accompanied with salivation or other physiological reaction, up to relaxation of the digestive tract, providing that content of the work is directly or indirectly deals with the other side of communication.

The model of representing information through properties explain these processes as rapid emergence of artificial flow of perception.

From the diagram, it is obvious that sigil can not be defined by properties (the latter being consequences of the action of sigil), because it can induce a self-energizing busback in the nervous system or its logical equivalent — a recursive link in computation.

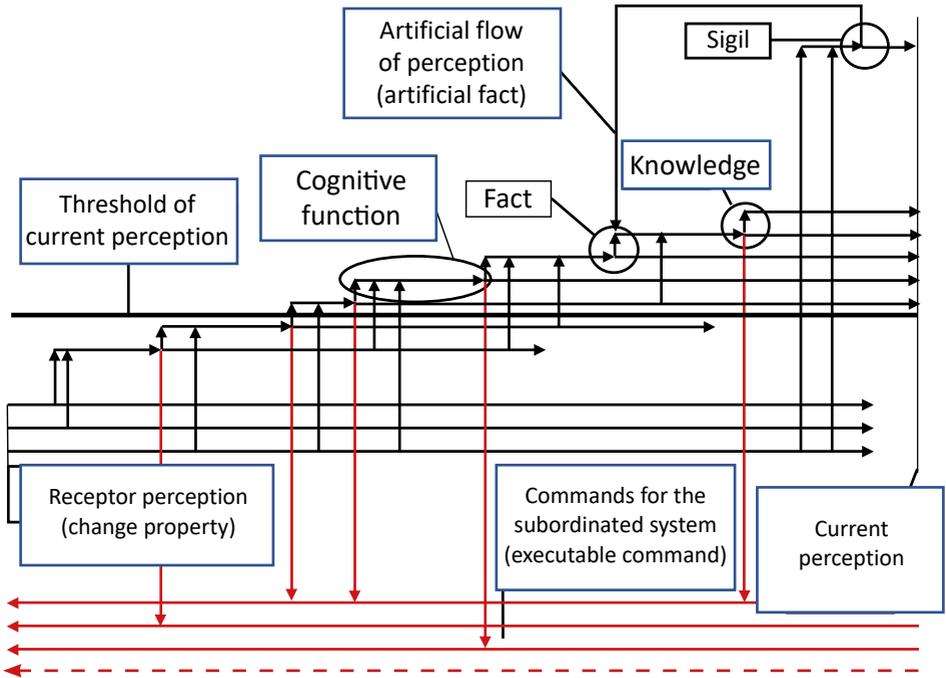
Correct using of sigils demands a correct mutual agreement.

The modern technology can ascertain agreements by means of measurement tools. For example, using the reference palette or spectrum analysis you’ll never be faced with the problem, which color must be taken as red or blue.

Thus we can see, that by means of natural models of formalization the subject gets down to mathematics even before the learning of mathematics in school.

Consequently it is important to build the process of learning in such a way as to avoid mistakes of perception and to help the student to become a full-fledged creative person, capable to build correct models using semantics and to create a worthwhile intangible asset.

Two errors in thinking process. Two kinds of mistakes in developing the cognitive function



Pic. 5 Artificial flow of perception in the model of processing information through properties

This section bears no relation to the physiology and estimates only the informative content of cognitive function within a framework of mathematical model, representing information through properties.

The root of cognitive mistakes is incorrect application of model #7 from the list of natural perception models — namely, the model of semantic communication. However, expression of acquired cognitive distortions can occur in any model and causes a contradiction between logical constriction of semantic cognitive function and its elder equivalent, developed in process of pre-semantic communication.

In a mathematical model of representing information through properties, cognitive distortion expresses as an alter ego. This “second self” can be compared to the independent algorithmic structure, rendering competitive decisions for the subordinated system. Cognitive mistakes lead to the multiple personality disorder.

Even though a “second self”, created by cognitive distortion, can prevail

so much so that correct “self” can find no outer expression whatsoever, the correct “self”, formed on the basis of reality, still exists, lest the organism die because of dysfunction of physiological systems.

Notwithstanding the diversity of possible cognitive mistakes, there are two widely different types of cognitive distortions, and consequently, behavior characteristics for both types:

- Cognitive distortions, created by substitution of fundamental notions
- Cognitive distortions, created by transgression of logic.

Cognitive distortions, created by substitution of notions, provide successful functioning in the framework of simple isolated systems. As a matter of fact, the subject becomes a good automaton for performing in certain spheres of action and absolutely helpless out of the bounds of an artificial life cycle. This being said, his nervous system works properly, but on the ground of incorrect feed data; i. e. it can not work beyond the scope of an artificial cycle. Outer expressions of the cognitive distortion, related to substitution of notions, are noted by a high efficiency in performing certain tasks along with marked aggressive conservatism and attempts to return outdated social systems and relationships.

Cognitive distortions, created by transgression of logic, are evident in occurrence of incorrect logical links, disrupting the principles of functioning within the framework of model, representing information through properties. Hierarchical structure of this model is disrupted by links, processing cyclic calculations. It is necessary to indicate, that in the model of representing information through properties it is permissible to use all links and connections, beside the cyclic ones. Consequently, any connection, disrupting the logic of building the cognitive function, results in cyclic calculations. In algorithmic links, disrupting the structure of mathematical model, we can trace a similarity to the paranoid cycles, observed in psychiatry.

Regardless from the type, practically used cognitive distortion leads subject to finding a difference between “expected result” and reality, which leads to researching the cause of mistake.

Rectifying cognitive distortions (mistakes of thinking)

The correct cognitive function consists in correspondence between the action and expected result.

cognitive function (changing property) = «fact» → «executable command» ⇒ expected property change

The correct cognitive function connects action and expected result. Cognitive distortion leads to unexpected results. Thus, we have:

function of cognitive distortion (changing property) = «fact» → «executable command» ⇒ unexpected property change

We can discuss an artificial origin of cognitive distortions, because purposeful insertion of a cognitive distortion on the initial level of technological development could bring a positive social effect. In such a way you can create a warrior or a slave for the plantation work. However, the development of technologies demanded cognitive functions, reaching beyond the slave labor.

Modern technologies pose a real challenge for the necessity of cognitive distortions even in the consumer society.

As you can see on the diagram “Adjustment of Frege triangles in communication”, people are united by dint of reality

Therefore, any person (and, by the way, any living organism) can exercise control over the content of semantic perception, — for example, comparing the informative content of semantic communication with his own practical skills, acquired as a result of unilateral communication with environment (by means of experimenting and learning new knowledge).

Incorrect cognitive function can be amended upon detection of results, entering into conflict with reality.

function of cognitive distortion (changing property) = «fact» → «executable command» ⇒ non-expected property change

For the transformation of cognitive distortion into a cognitive function it is sufficient to connect incorrect result with action.

Cognitive function	Action	Resulting change
--------------------	--------	------------------

function of cognitive distortion (changing property)	«fact» -> «executable command»	non-expected property change
correct cognitive function (changing property)	«fact» -> «executable command»	expected property change

Cognitive function establish connection and correspondence between action and result, subjectively calculated by means of mathematical model of processing information, represented through properties (executable command, expected property change)

You'd think., it would be sufficient to attach this pair (executable command, expected property change) to any specific action, and possible cognitive mistake would be amended. As a matter of fact, the brain is doing as much.

But it is a factual perception, leading only to associative connection, which is used in the first three natural models of formalization.

In this situation there emerges a need to incorporate the third level model into the higher level models. It takes time, if at all possible. And all the time existing perception will lead to results, different from reality.

The subject, being in this situation, will always know the results of his previous actions, but by virtue of difference between past and present his cognitive function still would be incorrect. The results of new actions will differ from expected because of circumstances for which it is necessary to use the rest of natural models of formalization.

“We wanted the best, but it turned out as always” — a quote from Victor Chernomyrdin, a notable communist, who moved out gas assets of USSR into subordinated joint-stock-company. This social dictum bespeaks of insuperable cognitive distortions.

Now it can be seen that restoring associations in correspondence with reality the subject can come round to a good sense and correct his cognitive mistake. But for that end he'll gonna have to return at the time, when the mistake was made, a practically live through it once again.

There is another way to come round to a good sense — searching a mistake in the subjective model — but it is available only for those, who have practical skills in using “representation of information through properties”, or else the subject in searching for mistake will use approach, already

containing a cognitive mistake.

In case of discrepancy between the result of action and value of cognitive function the subject uses strategies allowing to protect himself against erroneous decisions. He can try to turn to reality, but correction of one's own cognitive distortions can be a time-consuming and even overwhelming because of lack of practical skills for a purposeful correction of cognitive mistakes.

Using methods, containing cognitive mistakes, for correction of cognitive mistakes, leads only to the new mistakes and distortions. It must be noted, that diverse methods for correction of some cognitive mistakes through the use of other cognitive mistakes have a tendency to progress, raising the level of harmful actions of men with cognitive distortions.

This is a particular case of a social disability, when a person needs a "wise guidance" and "smart people". He replaces his own cognitive function with cognitive functions of the other people. However, because of his own cognitive distortions, he can not find really "wise guidance" and "smart people".

The subject grows functionally limited in solving of social problems, where his expectation are at variance with reality. He is compelled to repeat someone else's opinions to be excluded from active solving of pressing social questions and to use various lies for parasitism on his behalf.

By using a cognitive distortion in choosing of valued opinion or the person, worthy to be elected the next time, this position leads to a high possibility of choosing a man with disposition to social parasitism, who can deceive, threaten or bribe the other people.

Practical cognitive distortion is revealed by offensive argumentation of one's actions, "honor protection", any form of discrimination and introducing factitious laws and regulations.

Any action of the person, using cognitive distortions, always belongs to pre-semantic, unilateral communication. In the process of semantic communication it reveals his cognitive distortions to other participants and points at his incapability.

Disavowal of his incapability impels the subject to aggressive actions, using manipulations and propagation of lies.

If subject with cognitive distortions participates in business activities, it is dangerous both from the point of dire consequences of his actions and

changing the aim of these activities. Practical use of cognitive mistakes invariable leads to a twofold consequence: a dangerous product and a person, convinced in necessity of its usage. Thus, the dangerous weapons emerges simultaneously with a wicked dictator.

Correct social functioning. Requirements for a safe scientific experiment

Natural models of formalization lie both in the basis of mathematics and functionality of an organism.

From the mathematical (formal) point of view, the first five models (models of subordinated space, manipulation, association, sets/assemblages and logics) are sufficient for sustaining the life and propagation of organisms.

Appliance of the sixth and seventh models create not only the image of equivalency, as in association, but render a possibility to project the image onto actions or properties, connected with actions. It's not planning yet, but already neither an association. It opens a possibility to define a meaningful sigil in one's own artificial perception, as well as in reality.

The eighth and ninth model open a possibility for prognostics and good sense as not to take irreversible actions, dangerous for further survival.

Therefore, we can define the necessary conditions for practical use of one or another model, in the form of requirements for a safe scientific experiment. Only models, that satisfy the conditions of a safe scientific experiment, can be used in practice by persons, having sufficient and correct scientific knowledge.

The current level of technological development forbids acquiring new knowledge as a result of cognitive mistakes. It's too dangerous and unacceptable line of conduct in modern circumstances.

The modern business activity can take place exclusively in the experimental framework.

The structure of a safe scientific experiment:

1. The goal, intended for achieving
2. The formal description of needed measures and gathering of data
3. The project
 - 3.1. The project of development
 - 3.2. The project of exploitation
 - 3.3. The project of utilization
4. Periodicity and method of report generation
5. Site of publication and access privileges

This isn't about a formal correspondence with sections of technical documentation in any type of business activity.

- It is necessary to understand the objective and to have a clear vision as to estimating the real results.
- It is necessary to define a complete cycle plan: i. e., development, exploitation/ realization and utilization with detailed description with prognosis of environmental and social impact.
- A safe scientific experiment must comply with modern knowledge of technologies. Therefore, it is necessary to organize automated data collection, related to experiment and personnel.

Modern technologies enable automatic collection of all necessary information. For the formulation and realization of ideas it is sufficient to understand the working principles.

Communicatory disposition of persons with maximally harmful cognitive distortions

A certain social harm comes from the cognitive distortions of people, when they actively interfere in natural environmental cycles, lacking a sufficient knowledge of technologies. Therefore, mishandling of dangerous materials is as much harmful as a construction, built with violation of the design specifications, or environmental damage, unaccounted for in the project documentation.

However, the maximal damage to social processes is caused by actions of men, preventing and prohibiting the propagation of correct knowledge. It is subject to different categories: bureaucrats, administrators, businessmen, conformists and traditionalists. By

virtue of inflicted damage we know those people, their occupations and potential damage of their actions in future. But more importantly, we must prevent this damage, before it occurs.

In this regard it is necessary to provide social circumstances, beneficial for realization all cognitive potential in creating correct intangible assets, irrespectively of pursuits and occupations

Modern technologies allow to control the occurrence of cognitive distortions, safely counteract the practical actions influenced by cognitive mistakes, and render help in acquiring the correct knowledge and amending cognitive distortions

The changes in mathematics because of disregard to primary model of formalization

Existing modern mathematics disregards the primary model of autonomous informational functioning, applied for its creation as a formal science. Consequently, the formal representation and mathematical apparatus ended up divorced from models, used for their development.

The primary model is used on the physiological level, thus it remained unnoticed, although it always existed for the subject, exercising formalization.

However, the cognitive mistake of disregarding the notion of model in representation of language, numerical expression, geometry and other branches of mathematics leads to a cognitive dysfunction, and consequently to incorrect results in solving complex problems.

Applying cognitive mistake of common language in formal science leads to producing contradictory and impractical documents and inapplicable rules.

Use of logical induction, defined as “object”, in the capacity of a basic notion for programming languages has led to incompatible codes and the need of developing new codes for solving of new problems and binding mathematics with the hardware of computing systems.

We a dealing with situation of impossibility of altering of our representations without rewriting program codes.

The failure to grasp that perception is based on representing the

information through properties, have led to creation of multiple duplicated, contradictory databases, excluding authenticity and usable only for manipulations and asocial actions.

Those cognitive mistakes and its consequences can be amended by applying the primary model of autonomous informational functioning. This model is relevant not only for homo sapiens, but for all living organisms.

Researching the primary model of formalization (primary model of autonomous informational functioning) we can rectify the problem of incorrect formalization and cognitive distortions.

Mathematics is a formal science, consisting of formal models, available in the physiological limits of the organism.

The subject of mathematics is description of models, defining properties of subjective interaction with environment.

The term “formal” is used for models, or, more precisely, for allowances about inalterability of baselined terms and conditions for the model.

The science is a description, devoid of intentional distortions.

Those theses are posed with consideration for physiology of living organisms. Acceptance of the primary model paves the way to correct mathematical development and applying of formal models.

Use of the formal logics in conception of a model permit to apply the notions of “correct thinking” and “authentic data”.

Representation of information through properties implies usage of necessary characteristics (attributes) of space–time continuum: “author/source” and “time”. The content, or the current model, represented as a function, consisting of parental models.

Representation of information through properties allows to develop and use the correct languages and create groups of models, answering the purpose of “necessary and sufficient” and not contradicting the other semantic conceptions.

Representation of information through properties allows to create universal automatized systems and make the stored data suitable for technical record–keeping, reference usage, analysis and carrying out scientific studies.

Representation of information through properties opens the possibilities of artificial intelligence, currently limited by object-oriented approach

Natural models of formalization help to harmonize education plans with physiology and cognitive level of students.

And certainly, we'll get to a new level of robotechnics.

Even at the conclusion of this paper we definitively can say, that education programs are lacking of such important sections, as formalization of knowledge and conception of sigils. Theory of sets must be learned before the sections, related to arithmetic; every section, related with numerical representation, must be learned on acting models; geometrical representations also need models, even if it complicates the stuff of natural sciences.

The sections, related to the theory of probability and higher mathematics, are closest to the content of the primary model of autonomous informational functioning, and its understanding significantly facilitates obtaining the correct results.

Our conclusions in part of social development on the basis of primary model of formalization

Because the primary model of autonomous informational functioning has a communicatory nature and is based on practical skills, we can make several conclusions about correct strategies of practical activity:

- Our knowledge — the only efficient and not properly used human resource, which creates and controls the social processes. Knowledge can be correctly formulated, collected and used by technology of representing information through properties in the form of correct intangible asset.
- For correct thinking and excluding the cognitive distortions the man must have a concept of primary model, correct thinking and authentic information.
- Cognitive distortion is a deficiency of intellectual functioning.
- The practical activity of human being must be limited by his correct practical skills (knowledge).
- Correcting of the cognitive distortion takes place through rendering assistance in understanding mistakes of logical induction and/or demonstration of invalidity of previous line of thinking.

- Business activity always is a kind of experiment, which must be carried out with scientific approach to reveal and take into account all possible events in life cycle of the project.
- Social structures of good-sensed people can solve the problems of applicability of one or another technology for safe and efficient intended use.
- There is no two correct opinions on one question in the framework of one model. It carries a formal resemblance with totalitarianism, but the correct opinion, notwithstanding of its subjectivity, can not be prejudiced as a result of formalization and searching a correct solution.
- Lies and its derivatives — plagiarism, manipulations, violence and other elements of pre-semantic communication, — can occur with the loss of good sense at least from one side of communication.
- Manipulations and violence as a pre-semantic communications can be applicable in normal society exclusively to the subjects, using cognitive distortions in their everyday life.

And so on.

Adjustment of subjective perception and creating an intangible asset

The man performs work with his brain, and not his hands, even if it is a handwork.

Each of us creates a subjective intangible asset — at first for adaptation to the social processes and business activity, to have a life sustenance. Then we work for the maintenance of family and children, but we do a little more, than necessary: we always create a subjective intangible asset, which we can share, providing its value.

Our intangible asset is partly inherited by our children and significant others, but often it goes to no one. The loss of intangible asset is irrevocable not only for the subject, but also for his neighborhood. We have used to lose it from one generation to the next. But in lacking the correct thinking, the only value for us was an experience, acquired upon our mistakes. Today, we can not afford to make mistakes for acquiring knowledge. Our technologies are too complex and dangerous for unreasonable usage.

Representation of information through properties opens for each of us a possibility to formalize his own understanding of his language,

his mathematical knowledge and professional skills, to harmonize his experiences for correct perception of reality. The society needs to have intangible assets of its citizens for correct decisions in use of modern technologies.

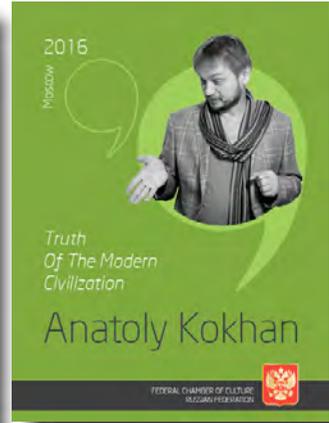
The information, currently represented in textbooks and reference books, is not sufficiently formalized to be correctly used directly, as it is. The correct thinking allows each of us to take part in educational process.

Teachers fill students with information without describing the models, and then we hear shocked exclamations about the stupidity and incompetence about young specialists. You can change that.

Formalize your representation in terms of properties, take notice of the sources of information and the order of its reception. In the first place, make sense of the model, then deal with mathematical apparatus.

And then you understand the reason for a long, happy and successful life.



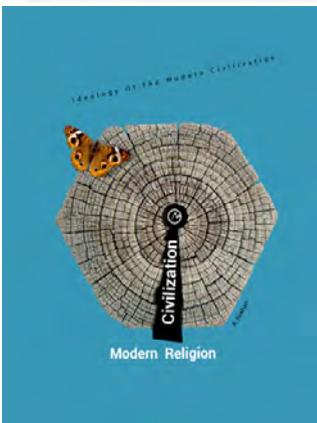


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Kokhan , Anatoly Arkadyevich
CORRECT THINKING: THE KOHAN'S MATHEMATICS

Passed for printing 10.09.2022

Appearance 10.09.2022

Format 170x220. — 55p.

Authors sheet — 2.5

Printed sheets — 11.36

Pressrun 500 copies

Order 160

UDC 5.51.510.5108

LBC 2.22.22.1

K75

ISBN 978–5–906153–10–4

©Анатолий Кохан.

©АО «Компания «Открытый Мир»

Printed in typography JSC “Open World”

Publisher: JSC “Open World”

Releaser: Anatoly Kokhan

Editorial staff: Sophia Shudegova, Natella Gorshkova

Translation: Cyril Savelyev

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