



What are Complexity Sciences?

Excerpt from the book “Complexity Science: Unicist Research & Design of Human Complex Adaptive Systems” by Peter Belohlavek.

The unicist approach to complexity sciences integrates ontology, science and actions in a unified field. Therefore the research on human complex adaptive systems cannot be done through artificial experiments or simulations. It has to be done in an environment of real action. In the unicist approach doing and researching are integrated in a unified field.

The objective of applicative sciences is to study and research aspects of reality to find the foundations of their functionality in order to use the information to be able to do something.

There are aspects of reality that are complex and cannot be approached using a cause-effect systemic method, because their integrating elements have interdependent relationships and the boundaries are open (examples of these are described below).

Systemic sciences approach reality based on a dualistic cause-effect approach which is functional in all the cases where the isolation of variables is possible without generating unmanageable side-effects.

But when a complex adaptive system cannot be managed using cause-effect influences it needs to be managed in its oneness. The management of complex adaptive systems in their oneness is the field of complexity sciences.

It is self-evident that if variables cannot be isolated there is no possibility to make artificial experimentation or simulation to research the field of complex adaptive systems.

Complexity cannot be analytically apprehended. It needs to be conceptually apprehended as a unified field.

The extension of the unified field needs to include all the aspects that influence significantly a complex system.

Significance requires using pilot tests to be confirmed. A reality is perceived chaotic when the amplitude of a unified field of an actual reality exceeds the possibility of a mind to apprehend it.

Only individuals who are able to work with open boundaries can deal with the open boundaries of a complex adaptive system.

It requires a high level of inner freedom which implies being willing to assume the responsibility to produce results, and being able to extend the boundaries of the mind as far as it is needed to apprehend the unified field of the system.



The Unicist Approach to Applied Complexity Sciences

The complexity of a specific aspect of reality is objective. This means that it is impossible to deal with it using cause-effect research without changing its functional nature. This indicates the existence of complexity.

The unicist approach to complexity sciences implies the discovery of the ontological structure of a reality and the objects that integrate it, defining the ontological algorithm and then the actions that can be done to influence such reality.

This approach starts with the finding of the nature of a specific element of reality and ends with the definition of the actions that can influence such reality.

Unicist ontology is a specific type of ontology that is structured emulating the ontogenetic intelligence of nature. It considers that the nature of living beings and their actions is defined by a purpose, an active principle and an energy conservation principle which are integrated following the rules of the supplementation law (between the purpose and the active principle) and the complementation law (between the purpose and the energy conservation principle).

The ontology of a functional aspect of reality is unique, being therefore timeless and cross-cultural. Its application integrates unicist ontology, with unicist logic and the unicist ontology of evolution.

Things in real life might have different functionalities. Each of these functionalities has its ontology. For example, the same type of boat can be used as a fishing boat or a survival boat. A fishing boat has “one” ontology and the survival boat has another.

Biological Entities are a Paradigmatic Case of Complexity

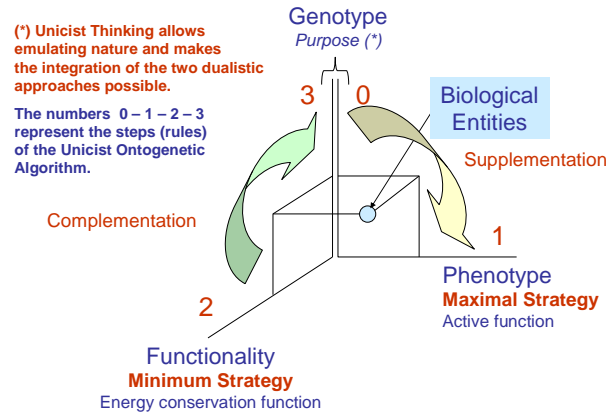
The unicist ontology of a “biological entity” defines its structure and functionality in an environment.

The genotype defines the genetic structure of the entity that rules its evolution and generates the phenotype of the being. The objective of the genotype is to ensure the permanence of species, its reproduction and production.

The phenotype defines the morphologic, behavioral and materialistic characteristics of the entity. It defines the functional characteristics, the functional power of the entity and the functional assurance.



Unicist Ontology of Biological Entities in Unicist Standard Language



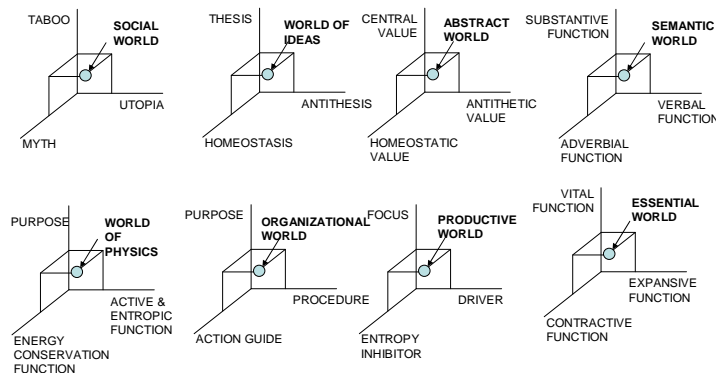
Functionality defines the effectiveness of the phenotype measured as the consequence of the adaptation of the biological entity to the environment. Functionality is measured in the capacity to adapt and grow, on the one hand, and to survive, on the other hand.

The understanding of the ontology of “biological entities” helps to follow the laws of nature when dealing with genetic engineering processes and use it to apprehend the nature of beings with “artificial life” such as institutions.

Researching and Designing Adaptive Systems is an Adaptive Process

The research and design of complex adaptive systems requires adapting to the different application fields.

Unicist double dialectics semantics





Therefore the semantics of the ontological structure has been defined using different wording for the homologous ontogenetic structure.

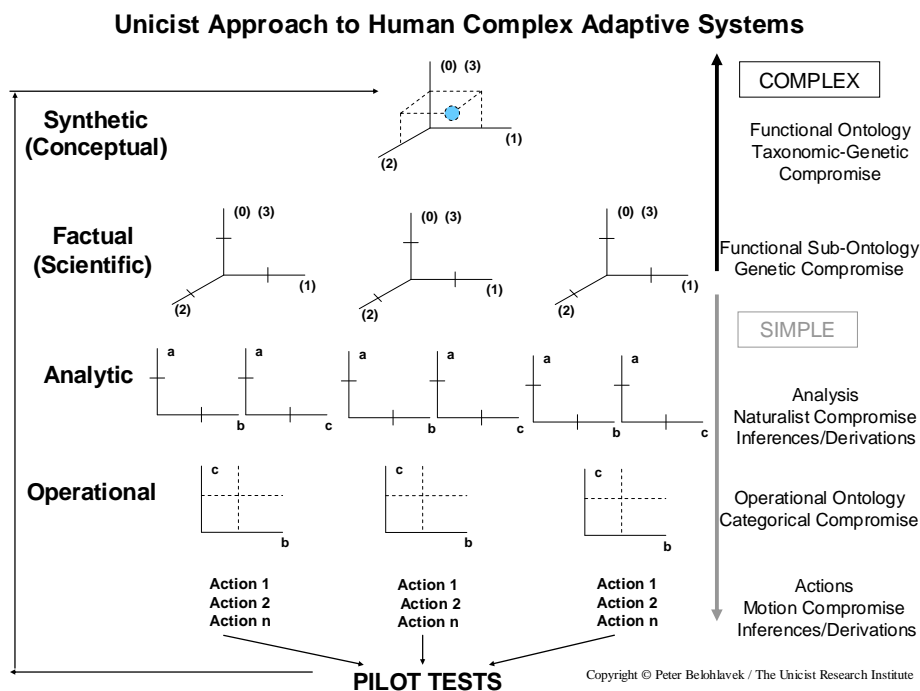
Logical approaches have been developed to solve specific problems. Researching and designing human complex adaptive systems implies the use of a new logic.

Unicist logic has been developed to deal with complexity and integrates preexisting logical approaches in their oneness.

The learning of the reading of unicist ontologies and unicist logic is strongly recommended when entering the field of researching human complex adaptive systems.

Human Complex Adaptive Systems

Human individual, institutional, businesses and social behavior are also paradigmatic complex adaptive systems. The application fields of the unicist approach to complexity science are the human complex adaptive systems.



The generic approach:

- 1) Human adaptive systems are in permanent motion. To establish a fixed point based on their oneness the ontological structure needs to be discovered. This definition includes limiting the boundaries of the system.



- 2) A taxonomic-genetic compromise needs to be done to transform the oneness into the elements that integrate its ontogenetic structure.
- 3) A genetic compromise is needed to deal with the sub-ontologies or objects included in the ontogenetic structure.
- 4) A naturalist compromise is necessary to divide the objects of the ontogenetic structure into the double dialectical elements and make the consequent inferences on their behavior.
- 5) A categorical compromise needs to be done to define the ontological categories at an operational level.
- 6) A motion compromise has to be done to define the actions that allow influencing the adaptive system.

This approach implies transforming a human complex adaptive system into a manageable system making the necessary compromises to transform their oneness into operational actions to generate results.

The knowledge of an ontological structure of a unified field defines the existence of the possibility to exert influence on it.

Mathematically, a possibility exists or not (1 or 0). The success of influential actions belongs to the field of probabilities because of the multiple compromises that have been done.

Pilot Testing

Ontologies are omnipotent fantasies unless they have been tested. The testing of ontologies implies testing their functionality and requires a precise design of the tests. The “trial and error” use of objects is not a pilot test.

Pilot tests are the drivers of the unicist reflection processes. Pilot tests have two objectives:

- 1) Falsification of knowledge
- 2) Validation of knowledge

1) Falsification – Destructive testing

Falsification, in the field of complex problems, implies finding the limits of the validity of a given knowledge. To do so, it is necessary to develop experiences in homologous fields until the limits of validity are found. It defines the unified field that can be apprehended.

The falsification process is a destructive test for knowledge that is applied to realities with incomplete homologies. The destruction occurs when a condition is found to demonstrate the fallacy of the knowledge.



2) Validation – Non-destructive testing

Validation implies the factual confirmation of the validity of knowledge. Validation is achieved when knowledge suffices to exert influence on a reality in a predictable way.

The validation process is homologous to a non-destructive test in the field of material research. Validation implies cause-effect relations. Therefore, validation can only be applied to a simplified field of a complex reality.

Complexity Science Methodology to Research the Ontology of Human Adaptive Systems

There is a general research methodology that has to be followed to define the validity of an ontological structure that is needed to deal with human adaptive system which is the following.

The basic steps are:

- 1) Develop the hypothetical structure of the ontology.
- 2) Analyze the ontology and divide it into sub-ontologies following the laws of complementation and supplementation (only when necessary and possible).
- 3) Define observable results that need to be considered to validate the ontology.
- 4) Define the application fields of the ontology to validate its functionality.
- 5) Develop the applications beginning with destructive and non-destructive pilot tests to forecast reality.
- 6) Develop at least five experiences in the application field differing completely one from the other.
- 7) Develop forecasts of at least three periods with full certainty.
- 8) Restart the research process every time a deviation occurs.

The research developed in the field of human complex adaptive systems allowed developing more than 3,500 ontological structures that cover the field of individual, institutional, business and social behavior. The main abstracts on ontological structures can be found at: <http://www.unicist.org/sdp.shtml>



Examples of Human Complex Adaptive System

Cultural Archetypes

Cultures have to be considered as a unified field which implies that they have a structure of taboos, utopias and myths to face the external reality in a defined way that has to be considered as a limit for any human complex adaptive system.

Economic Models

As economic models have to be redundant with the social values included in a cultural archetype, the use of non-consistent economic rules will produce paradoxical effects because it cannot be recognized as valid.

Educational Models

One of the objectives of an educational model is to socialize people's behavior making it consistent with a cultural archetype. The introduction of alien educational models produces necessarily paradoxical results.

Businesses

Businesses are, by definition, complex systems that need to deal with the market, going beyond the present boundaries of the activity. Therefore they need to be defined considered as part of the unified field of the market they work with.

Conscious Personal Development

Personal evolution depends on the capacity of individuals to adapt to the environment they decided to live in. Thus it depends on the individual's capacity to apprehend the unified field of that environment and influence it.

Mechanisms to Avoid Dealing with Complexity

People who cannot apprehend the unified field of a human complex adaptive system need to have substitutes to deal with it.

Some of them are:

- 1) Statistics
- 2) Ceteris Paribus
- 3) Intuition
- 4) Consensus of expert opinions
- 5) Analysis



- 1) Statistics substitute the approach to possibilities with probabilities. This allows eliminating the perception of chaos produced by the unknown unified field and dealing with the system as if it were not complex.
- 2) Ceteris Paribus allows stagnating a variable and thus eliminating the complexity of a complex system.
- 3) Intuition is the natural approach to an unknown field. But complexity cannot be perceived when intuition is not followed by conscious knowledge.
- 4) Consensus of expert opinions is a natural substitute when dealing with complexity. It allows believing that the integration of different points of view provides objective knowledge of complex systems.
- 5) Analytical approach to complex systems implies dividing them into components that are considered as non complex or have a smaller “unified field” making them apprehensible. This is a fallacious approach because a complex system is not the sum of its parts.

It is necessary to use substitutes until the ontological structures of complex systems are discovered. This can be done as a solution or as a provisional solution. It is up to every individual who is responsible for producing results in the field of human complex adaptive systems.

The Unicist Research Institute