

Journal of Theoretics

Volume 6-4, Aug/Sept 2004

Global Comprehensive Theory

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Abstract: Logically, learning in nature is not much different than learning of any other type of material. The basics of any learning are defined by the integrity of three components: a) material, b) entity (subject) which learns, and c) partial learning generator (teacher, coach, etc.) which defines methodical partial tasks. All together includes programed transformation process. Any real transformation process in nature, is obviously based on two main methodical knowledges, learning methods and excersise methods. It is not possible to establish qualitative movement control and regulation without those two methodical priciples, which are integrated in order with type of activity, expected intensity, subject status, final aims, and so on. In this article, we present rounded Global Comprehensive Theory which integrates all known learning approches and brings new quality with clear benefit in all transformation processes.

Keywords: learning theory.

Introduction

Usually, the identification of any global and universal parameters is connected with many problems, and among them with most frequent problem – a number of entities. Because of a small number of objects in process, usually the results of data analysis are unstable and unreliable. And similar, unappropriate methods derive results which lead to only partial problem solutions which are insufficient for anything global. So, in sense of this work, many references point to univariate results, which is also inappropriate for anything more. Logically, until this point, everything is fine in science. But, now, it seems as a contradictive situation. It is very complicated to identify more higher levels of entities organization (human characteristics, social phenomena...) without precise experimental conditions, and at the same time not possible to find global rules by exploring entities with lower organization levels (eg. atomic, subatomic levels an so on). Fortunately, the situation is clear and simple. More complicated entities give us an opportunity to make conclusions about Universe's rules if we start with an adequate methodology. First of all, we must reject chaotic definitions, which means that an deterministic approach is not only one approach, but is only one that exists.

That is because we can easily prove that the chaotic area of problem solution is not included in real scientific discussions. The chaos does not exist. We have no right to reference our solutions as "chaotic solutions" if we can not find clear logical proofs of our conclusions. It is not possible to confirm that we are extended from chaos to determinism. Everything is connected with everything, although sometimes with very small interference. But it is connected. If the chaos reality exists, we will not be able to anticipate anything, and there are no relations at all. As we all know, we can anticipate many things that will come in the future. That means: chaos is only a wrong presumption in many situations when scientists can not continue exploring nature's rules because of

individual or group comprehensive limits. And, that is not because of the chaos as it is, but rather because of our actual human imperfections.

So, when we define a sensor, we assume that the sensor is a mechanism necessary to generate primary reception of some phenomena and to translate it to a clear signal (analysis). Connection of different signals from different sensors generate relations (synthesis). As we all know, complicated phenomena are not possible to recognize on the basis of simple signals and relations, so entities combine variate relations to generate stable models (modeling). In technical sciences we can find many references about this conclusions. Based on all that information, we started to generate the most complicated theoretical approach, with the aim to explore any higher levels of comprehension, and to define a new universal theory which can explain all phenomena that ever existed, that exist now, and that will ever exist. We named our thinking: Global Comprehensive Theory.

Methods

"Hierarchical and multivariate experimental models easily become irreplaceable part, not only of a scientific thinking, but our everyday's attitudes and thinking too. Through them we can understand phenomena which surround us with much more precision, forming image of a Universe more and more like a real World is, according with our individual level of comprehension" (Bonacin 2000).

The idea was to use the model of simulating existence of pseudo-objects (entities) in a finite space, and to successfully recognise and describe types of entities (clusters). In the broadest sense, typology implying the stable parameter values which are invariant on further influences of any kind. This implicitly means that there are some final and universal characteristics which do not change – i.e., those are the laws in the nature. This is the reason why some previously set parameters – the variables by means of which these objects are measured – are used to describe and to monitor the objects. Under the classical cybernetics definitions, we are talking about a compound of methods that guide us to some type of status definition and regulation, as shown by Momirović et al (1987). Considering those methodological principles it is evident the existence of whole group of procedures for system analysis and system identification with a final aim of recognition analysis. Some basic examples are presented in works of Carev (2000). In the same broadest sense, a measurement implies any operation that, in congruence with a complete and accurate set of rules, makes it possible to allot a sign or a number that relates to a particular characteristic to an object which is a member of a homogeneous set of objects, so that any two objects that differ in this characteristic may be differentiated from one another according to this characteristic, and that any two objects that are identical as regards this characteristic may be considered to be identical. Owing to methodology and computer development, it is possible to create projects with multivariate methods that include a large number of parameters to control establishment of clusters as shown by Momirović et al (1987) and Bonacin (2000).

Thus the set of values of some variables designating a set of objects is defined. By reasonably assuming that generally at least one permanent system of stable phenomena exists, the issue of defining a recognition is but a decomposition of a composite phenomena in its parts that can be described in particular clusters as presented by Bonacin and Carev (2002) or Momirović et al (1987). Likewise, by assuming that generally these systems of phenomena, that is, the elements of the composite characteristics contain the clusters that overlap in space, the issue of recognition identification apparently comes down to determining the existence and onset of a

particular part of the composite, that is, of the subsegmented phenomena as shown by Bonacin and Carev (2002).

Assuming that it is possible to describe some objects and to collect the multivariate data in the space that extends over some variables that we are interested in, then the identification of any phenomena comes down to detecting those clusters that commence their dominant position through stable types of specific clusters which is methodologically proofed by Bonacin and Carev (2002) or Momirović et al (1987). Many sets of objects are too complex to explore, and seemingly rarely allow too large a number of entities which the performance of a set of objects is followed. However, all recognitions characterized by a set of acquired parameter values allow such an approach. Lately, the number of such problems in many scientific areas is increasingly high, for example, computer simulations in medicine and diagnostics when entities are continuously engaged in the analyses on specialized devices such as monitors or treadmills implying the analysis of ventilation-related issues, in real-time process monitoring, in telecontrolled analysis, in data analysis on the basis of different video and stimulation devices, etc. It is, therefore, possible to define such algorithms and such models of data synthesis that provide a reliable recognition identification in technical sciences, but also elsewhere as shown by Bonacin and Carev (2002). To illustrate the recognition identification for the purpose of this paper, the data about the development model of pseudo-objects in a finite two-dimensional space ranging from a completely empty space to the complex phenomena occurring in it were mostly generated and simulated on a computer. First of all, it was 9x9 area defined as a space where everything happens (there were several different models, eg. 7x7, 8x8, 10x10..., and all of them derivate same results). The simplest entity was white, empty surface raster of 9x9 points, explaining that there was nothing. Then the authors generated a few hundred entities, and the computer, using random generator function, generates more entities in that space, with different structure, from simplest one point to more complex figures. Finally, the computer made a semi-random choice and choose finite 700 objects from that bulk. This number of 700 entities was not choosen accidentally, because that number allows any correlation, factor or taxon saturation etc., that is larger than 0.10 to be significant at probability level of 0.01.

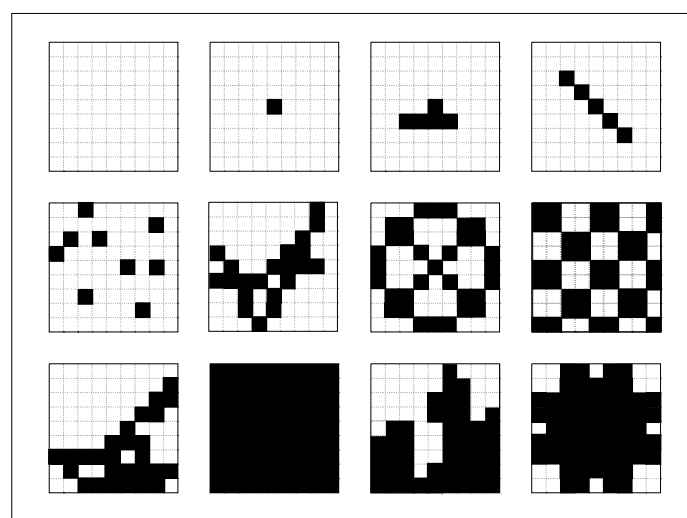


Figure 1. Some examples of primar entities.

Thus the set of values of some variables designating a set of objects is defined. It was done several times with randomly chosen different sets of 700 entities, and the results were always the same. Acquisitional collection of data for 700 entities was simulated and monitored with a larger number of variables (64 in start) that was eventually reduced to 14 acquisitional variables and 4 arbitrary variables. This reduction was made by classical factor model with oblique rotations as defined by Momirovic et al (1987) and programed by Bonacin (2002), so only variables with significant saturations of any factor were included in further model. Those 14 variables were: number of points for information receiving (BRPR) number of points which can not receive direct information from outside area restricted by skeleton (XXXX), number of points in skeleton (BRSK), total number of points (BRTO), most distance free externe point (NSET), most distance free point in general (NSTO).

Then: maximal number of steps for information transmitting in worst case (IMXV), minimal number of steps for information transmitting in best case (IMNV), number of points for information emission (BREM), number of connections (BRSP), total number of lines (BRLU). number of points in “prison” (BRVR), total number of direct relations between points (BREL) and total number of free points arounded (ZAPO). Arbitrary 4 variables were: simplicity (JEDS), reproducibility (REPR), regularity (PRAV) and simetricity (SIME). Each of those four arbitrary variables were estimated by 3 independent judges, and final estimate result was generated by their common measure, by projecting their estimates on the first factor as common measuring subject generated by factor analysis of principal components founded by Hotelling (1933) and programed by Bonacin (2002). It is very interesting that several variables show a distribution that is different than normal, but all mechanisms of higher level (taxons) shows an absolutely normal distribution. That fact was established by standard Kolmogorov-Smirnov testing like Momirović (1987) proposed and programmed by Bonacin (2002). To achieve an accurate identification, these 18 variable data were taxonomized according to the Momirović's (1987) model of polar taxons until the general and ultimate taxon was derived. The procedure first generated 6, then 3 taxons of higher level, then two. Finally, it was one global taxon derived. Taxonomic procedure was chosen because it most efficiently describes the objects (entities), and if we want to understand objects development and structuring it is obviously that we have to maintain the transformation of our data in object's space, not in space of variables, that is frequently the case. *Polar taxons algorithm* completely published in: Momirović at all (1987), Bonacin and Carev (2000).

Results

Obviously, if initial objects data described by 18 variable shows the simplest space representation, then the general and ultimate taxon represents the final solution in the defined space. It is clear by intuition, and is easy to proof that the final solution is something to which our objects (entities) are converging in defined space, according with their characteristics described with variables of lower level. Owing to a large number of entities, it is easy to proof that global representation is ensured and that it is almost irrelevant if there were 700 or 7000 entities, which is firmly held by the Central Limit Theorem. The model of polar taxons produces one bipolar characteristic for each taxon so the recognition of those characteristics is connected with: a) recognition of variables which define taxons in variable space (Table 1.), and b) recognition of typical entities with maximal projections on extreme sides of taxon (Figure 2.).

	Tax1	Tax2	Tax3	Tax4	Tax5	Tax6
BRPR	0.53	0.12	0.44	0.09	0.33	-0.38
XXXX	0.49	0.40	-0.42	-0.26	-0.22	0.12
BRSK	0.72	0.30	-0.15	0.13	-0.05	0.01
BRT0	0.66	0.41	-0.08	-0.10	0.30	0.11
JEDS	-0.93	0.35	0.05	0.06	0.04	0.15
REPR	-0.89	0.48	0.10	0.04	-0.04	0.11
NSET	-0.57	-0.56	-0.09	0.08	0.27	0.30
NSTO	-0.60	-0.52	-0.13	0.06	0.19	0.38
PRAV	-0.68	0.83	0.09	0.21	-0.07	-0.04
SIME	-0.47	0.89	0.12	0.28	0.00	-0.10
IMXV	0.36	0.04	0.84	-0.11	-0.19	0.39
IMNV	0.35	0.16	0.71	-0.16	-0.30	0.48
BREM	-0.03	-0.26	0.68	0.12	0.12	-0.44
BRSP	0.46	-0.01	-0.13	0.75	0.09	0.23
BRLU	0.51	0.00	-0.06	0.77	0.05	0.18
BRVR	0.12	0.38	-0.03	-0.40	0.74	0.15
BREL	0.46	0.39	-0.16	-0.13	0.55	0.17
ZAPO	0.30	0.19	-0.31	-0.14	-0.80	0.01

Table 1. Oblique position of taxonomic dimensions.

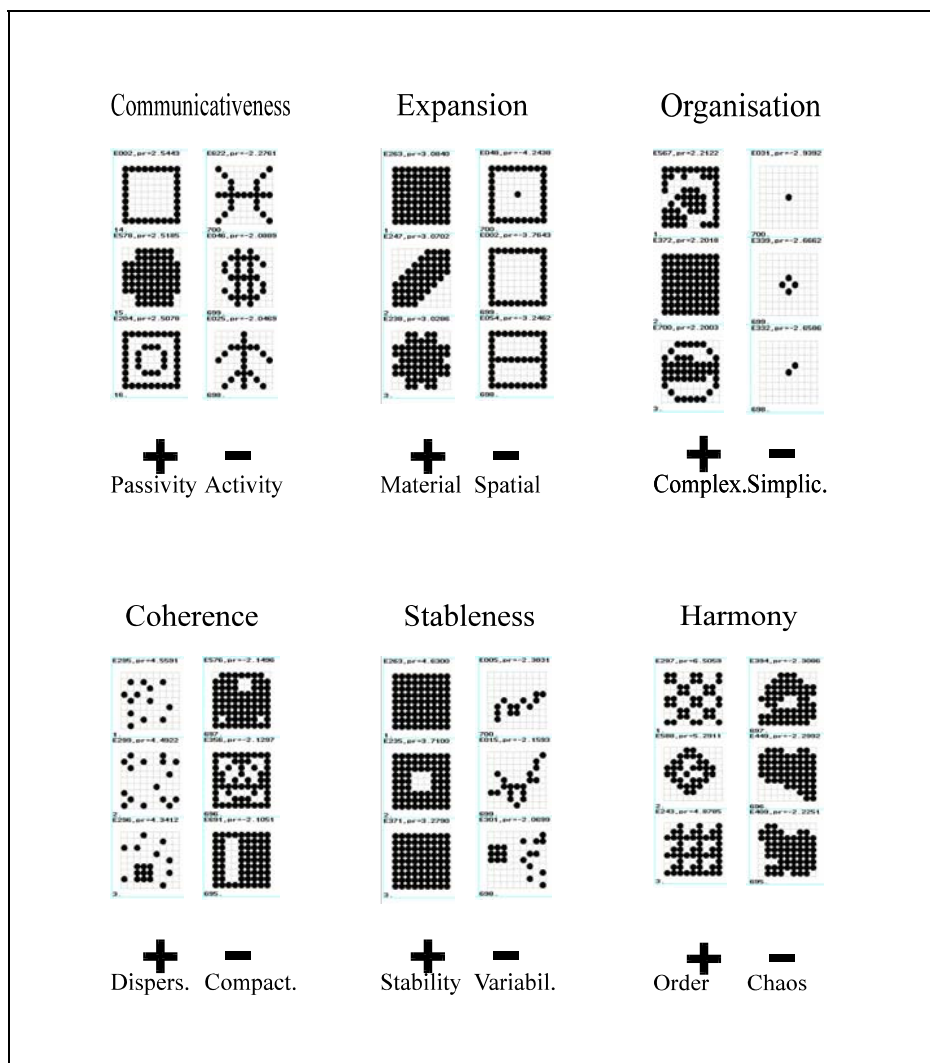


Figure 2. Typical entities with maximal projections on extreme sides of taxes.

Discussion

Consequently, six easily interpretable taxons were obtained: 1. communicativeness (+passivity, -activity), 2. expansion (+material, -spatial), 3. level of organisation (+complexity, -simplicity), 4. coherence (+dispersion, -compactness), 5. stableness (+stability, -variability) and 6. harmony (+order, -chaos). Plus (+) and minus (-) sign represents the opposite sides of taxons. Entity abilities that stands at the beginning of stimulus registration are exposed through : a) Stimulus type recognition (large width scale, specialization, discriminativity), b) Intensity recognition (protoliminal – with no sensor reaction, subliminal – with no obvious sensor reaction but with cumulative changes, liminal - with clear registration and sensor changes, supraliminal – with serious sensor reaction, fatal – with sensor or entity destruction). c) Frequency recognition (rare but uniformed stimuli, rare but ununiformed, frequent but uniformed, frequent but ununiformed, combined). It is clear that we talk about degree of influence from the entity environment. For entities which better absorb those stimuli we can say that they stand at the higher level of internal structure organization and that longer satisfy survival conditions. Simply, the same conclusion is defined in sense of frequency, because entities which can better accomodate frequencies we can defined that they stand at a higher level. They just better accumulate disturbances from the environment.

Simple sensors: We can conclude that the entity contains a sensor if it can recognize larger boundaries of some distrubancies, different frequencies, and intensities. This works always and for all, no matter what is a concrete object. In the minimalistic sense, a sensor is simply receptor mechanism which is specialized for reception more or less strictly defined disturbances from the environment. We call it a receptor. It is more than clear that such a receptor can not be defined once and forever, but is unconditionally exposed to development because is constantly trying to absorb wide types of disturbances. In that way becomes more and more complicated and organized in **stimulus recognition (analysis)**.

Sensors in the wide sense: Such a sensor is not self-aimed, because that information is to be saved somewhere in the entity, which means that the entity has to develop transport. Finally, with transported information it has to do something, because the contrary is that the information is unnecessary. This is a chain: reception – transport – memorizing – computing. In the wide sense, sensors represents information managing with specific goals. So, sensor includes more segments of organized entity with tasks of recognizing environment phenomena and **developing relations. (synthesis)**. Sensors in the global sense: If we suggest that everything be written before it is clear that it is possible to memorize only final amount of primary information, so the entity must recognize the main rules of generalization, categorization, discrimination, and globalization, which are foundations of any phenomena recognition. So, from infinite variations, entity forms final, stable, minimal and finite amounts of rules which help him to determine all other phenomena. That is what we call **modeling**. Rules: After sensor forming, based on qualitative integrative models, the entity generates rules which are invariant of further comprehension. That means the entity recognize rules of a nature that surrounds it. Based on it, the entity manages with himself, trying to reorganize itself, and redefine all its models according to rules he comprehends (**self-regulation**). Environment actions: From this point (because the rules are determined) the entity develops actions into its environment, trying to extend its rules to all other entities. If its rules are not persitent, he will be destroyed in some way. If the entity incorporates strong and truth rules, it will communicate with many other entities and develop cooperation, expanding its knowledges. This phase we call **expansion**. Integration: Owing to the

communication between entities and to forming new inter-entity relations final stage of development is making new entities, we call supra-entites with characteristics of more entities included. This phenomena we call **harmony**, and is characterized with integration between more and more entities.

	PERSIS	REGULA	EDUCAB	DETERM	DEVELO	GLOBAL
BRPR	-0,09	0,44	0,32	0,33	0,37	0,49
XXXX	0,78	0,51	-0,34	0,70	-0,64	0,04
BRSK	0,69	0,49	0,10	0,77	-0,22	0,38
BRTO	0,67	0,68	0,10	0,87	-0,20	0,47
JEDS	-0,10	-0,54	-0,13	-0,45	-0,12	-0,40
REPR	-0,03	-0,53	-0,21	-0,42	-0,22	-0,45
NSET	-0,51	-0,45	0,25	-0,53	0,43	-0,07
NSTO	-0,43	-0,50	0,17	-0,54	0,32	-0,16
PRAV	0,33	-0,32	-0,13	-0,05	-0,31	-0,26
SIME	0,43	-0,16	-0,02	0,15	-0,26	-0,08
IMXV	-0,02	-0,41	-0,34	-0,38	-0,32	-0,49
IMNV	0,17	-0,41	-0,48	-0,30	-0,53	-0,59
BREM	-0,77	-0,19	0,20	-0,53	0,55	0,02
BRSP	0,58	0,01	0,67	0,54	0,27	0,57
BRLU	0,56	0,00	0,66	0,53	0,27	0,55
BRVR	0,25	0,65	0,08	0,60	0,01	0,43
BREL	0,59	0,72	0,22	0,89	-0,05	0,59
ZAPO	0,51	-0,02	-0,60	0,12	-0,77	-0,46
ORGANI	0,47	0,58	0,11	0,69	-0,09	0,42
STABLE	0,78	0,26	-0,21	0,57	-0,55	0,02
COHERE	-0,50	-0,47	-0,13	-0,65	0,10	-0,38
HARMON	0,26	-0,35	0,78	0,15	0,48	0,44
EXPANS	-0,12	0,54	0,65	0,47	0,66	0,80
COMMUN	0,53	-0,44	-0,15	-0,02	-0,45	-0,33
PERSIS	1,00	0,12	-0,01	0,68	-0,51	0,12
REGULA	0,12	1,00	0,09	0,76	0,12	0,62
EDUCAB	-0,01	0,09	1,00	0,35	0,86	0,84
DETERM	0,68	0,76	0,35	1,00	0,02	0,71
DEVELO	-0,51	0,12	0,86	0,02	1,00	0,71
GLOBAL	0,12	0,62	0,64	0,71	0,71	1,00

Table 2. Taxonomic mechanisms of a higher level (inter-correlations).

The next step of development (and Global Comprehensive Theory too) is recognizing a mechanisms of higher level which was done with the same methodology. Thus, this 6 mechanisms were obtained in first step, and now we put them into initial position, and then provide a Polar taxon algorithm again.

Now, we derive 3 taxons with further characteristics : Persistency (+ Endurance, - Sensitivity), Educability (+ Systematicity, - Superficiality) and Regulation (+ Accuracy, - Elementarity), as shown in table 2. All entities were projected at those taxons. The next step (in the same way) produces 2 taxons: Development (+ Stagnation, - Advancement) and Determinism (+ Desintegration, - Integration) as shown in table 2. The final step proceeds one global taxon – Comprehence, as representative taxon for that space with bipolar characteristic of Global comprehension (+) and Partial comprehension (-) as shown in table 2. Finally, we defined a process of simultaneous activities that really exist in defined space, but always with the aim of new entities forming. It is concluded that there exist constructive development process in according with logic expressed in final taxon, because the entities at the top of that taxon are most complex, most invariant on influences, and with characteristics that easy establish relations with other entities. At the bottom of that taxon, we can recognize entities that really fall to pieces, so is very hard to look them as entities at all. Founded on the concept Sensor-Relation-Model-Rule-Acting-Harmony, it is established a completely new methodology, and completely new light on world development. Of course, that methodology is easily applicable in any scientific discipline, nevertheless it is Kinesiology, Engineering, Education, Informatics, Medicine, and Atomic physics as expamples. Concrete applications will continue in the future.

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Received June 2003

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