

BRIEF COMMENTS OVER THE INTRINSIC STRUCTURE OF THOUGHT

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NOTE : These paragraphs are extracted from the following articles :

- "Similaritats entre un Diccionari universal i un Datawarehouse" (=Similarities between a universal dictionary and a Datawarehouse). 10 pages/ 6000 words. © C. Udina 1998-11-11 R. P. I.: B-31391.
- "Alguns errors de base en l'estudi del llenguatge: Significant i significat; Comentaris a 'The symbolic species' (DEACON); ..." (=Some basic errors in the study of language: Signifier and signified; Comments on 'The symbolic species' ...; ...). 35 pages/ 21 000 words. © C. Udina 1996-04-26 R. P. I.: B-15987; 1998-11-11 R. P. I.: B-31390.

NOTE OF TRANSLATOR:

Some terms like "conceptuation", "relationability", "complexation" are the exact translations of the precise terms used by the author.

THE INTRINSIC SYMBOLIC STRUCTURE OF THOUGHT

All the known material reality, and up to the organisms and virtualities created by men, are formed by means of a generic strategy, that of constructing/ structuring elements, from other already existing ones which are more simple. I call it "complexation processes" by means of "evolutive interactions", which make "emergent processes" general and easier to understand. From this point of view, we can extend the Darwinian tree of human beings to all the reality. Some partial examples of this tree would be :

- Particle → Nucleus/ Atom → Molecule → Substance → ... → Star → Astral system → Galaxy → Galactic storage → Universe;
- Cell → Tissue → Organ → Anatomic apparatus → Individual;
- Myofilament → Myofibril → Muscle fiber → Muscular force → Muscle → Tendon ;
- Individual → Family society → Tribe/ Society →
→ (District → Commune →... → State → International organizations → ...) ;
- Component/ Spare parts → Aparatus/ Engine → Aparatus/ Engine progressively more complex ;
- Letter → Word → Sentence → Paragraph → Text → Speech ;
- Units → Tens → Hundreds → Thousands → ...;
- bit → Byte → Word → Sentence → Subroutine → Program unit (*.PRG) → Executable file with GUI (*.EXE) →...;

At first sight, there's no reason why thinking that thought is an exception ; it must only be a symbolic and virtual structure. Symbolic like Genetics, virtual like Information. And more precisely, it must necessarily be structured, if we point out that thought is composed by physiological and material structures which are too structured in levels, and that same strategy is the one that defines all the useful materials created by human thought. Even children have fun when play the same way since they were some little boys, with construction sets like "Lego", "Puzzles",..., "Scalextric", electric train, ... and with these latter, they build up more complex structures like buildings, cities,..., circuits,..., the derived activities and competitions,...

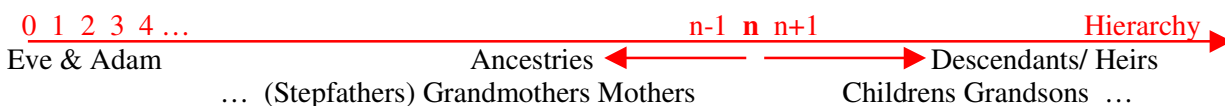
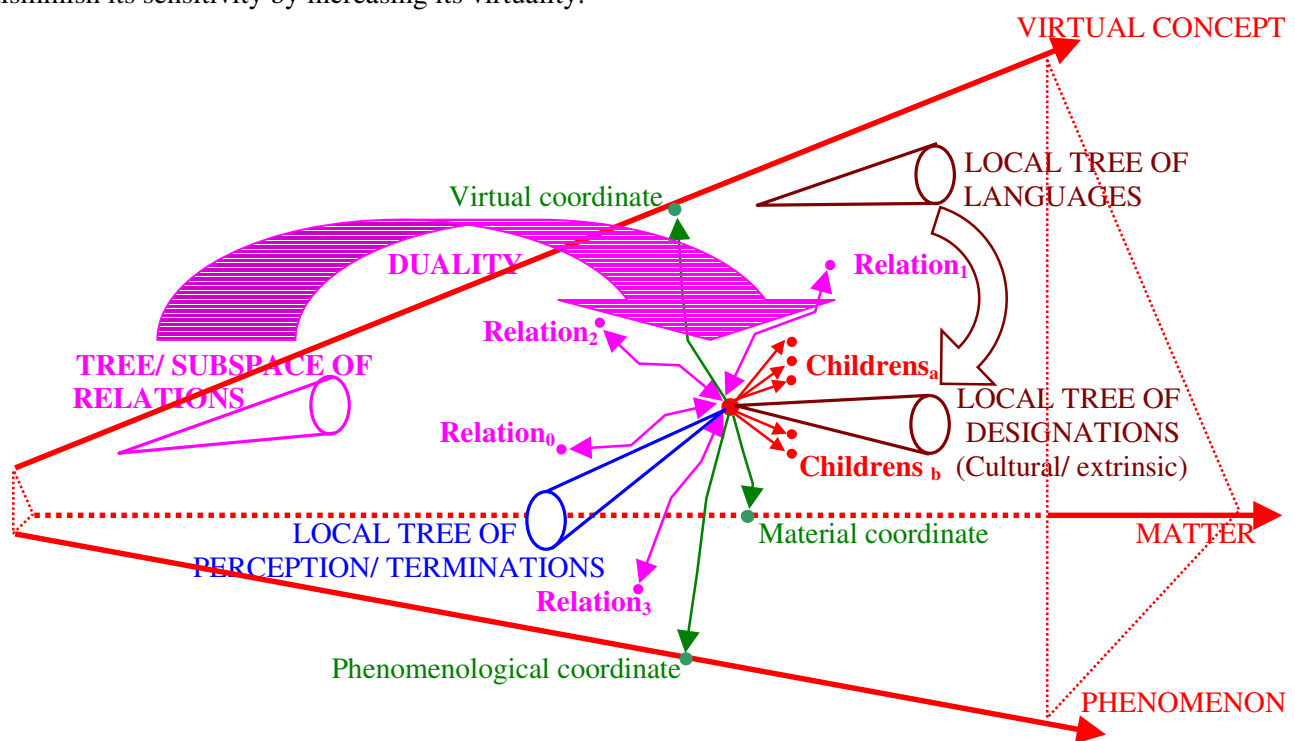
From the prospect of how thought is progressing/ maturing concepts, there's a constructive process in conceptual/ cognitive intrinsic levels which become progressively more complex ("genetic" psychology). These levels are :

- level "0", that of Identification, with the sublevels "00" (static/ simple identifier) and "01" (phenomenological identifiers);
- level "1", that of sensitive/ simple conceptuation ;
- level "2", that of conceptuation progressively more virtual/ composed, with the sublevels "20" (enumerative concepts "200" and/ or operational "201" to "203") and "21" ("comprehensive/ understandable concepts");
- level "3", defined by the specialization of relationability, which generates the comprehensive/ understandable knowledge;
- level "4", that of method, which makes the existence of transferable methodological elements possible/ procedures, technics,...); and
- Extrinsic/ cultural abilities, derived from the other former intrinsic levels through the quoted complexation processes. These abilities are levels which are profusely productive ; i-e, with some limited elements from basic levels, some more complex and very numerous elements can be observed. They are extrinsic giving that they are structured in symbolisms which are arbitrarily defined. This is the case for : syntaxes, whatever they are, either computer, mathematical, or discursive/ linguistic ; the reasoning of logic and axiomatic; ...

Like numbers, concepts also have intrinsic characteristics which imply the intervention of some other faculties of thought. If we analyze the existing concepts, in a general view, and from a prospect of synthesis, we can structure in a trimendisonal space ("the first intrinsic repartition of concepts"):

- "Matter" (what is perceived as being static/ isolated)
- "Phenomenon" (what is perceived as dynamic/ relational) and
- "Virtual concept" (the abstract/ virtualized). This third dimension admits in the same time:
 - proper subspaces (State, Magnitude [with subsubspaces like the habitual Space, Time...], ..., Tangible/ Pure virtual)
 - improper subspaces like Science, Toponyms..., the concepts through which they were the outcome of operations and/ or combinations of concepts from any other dimensions;
 - It also admits designations/ conceptions of elements from superior levels which are the result of the structuring of concepts (see previous paragraph), for example:
 - level "3", that of the knowledge composed by simple knowledge; level "4", that of method;
 - Reasoning, which generates laws, axiomatic structures, theorems, demonstrations, ..., as well as sentences, paragraphs, texts, ...

As it can be expected, there's an interdependence between the two exposed prospects, the constructive/ heuristic one and that of the effects/ of synthesis, which, moreover, are coinciding giving that concepts diminish its sensitivity by increasing its virtuality.



We thus have a trimendisonal space which is interdimensional : the axes/ dimensions are intrinsically linked. It does not deal with an exclusive theoretical construction, with no links between the three axes/ dimensions. All the concepts are in the space which is formed by the three axes, a "Cone"/ "Trihedron". Concepts can have different ancestries ("legitimate" mother, and illegitimate mothers), and different descendants ("legitimate" children, and "illegitimate" children/ bastard). This is a multiple heredity, but controlled by the equivalent relationships (ER) that generate them (the "stepfather"), and by the remaining relationability I will develop later.

Let's suppose a step towards duality between relationships and concepts (Concept and Relationships are dual as regards strict mathematical interpretation). If, as we can do with concepts, we apply correctly the equivalent relationships to relationability (R/ ER), we'll obtain an intrinsic tree composed by relationships. We therefore, have another interdimensional space, much more reduced, which, however, allows us to apply it to concepts.

A universal dictionary is a representation of knowledge which is constructed that way, with an intrinsic tree of relationships, which is applied to an intrinsic tree of concepts. And with this latter, structured like an "exact conceptual system", similar to positional number systems (binary, octal, decimal, ...). We can then understand that it is no more only a dictionary of concepts, but it is a dictionary of knowledge, and obviously, of underlying concepts. In this one, all the understandable Knowledge as well as all the concepts from any level ("1", "2", "3", "4") are being structured, and all the factual knowledge (level "0") can be referenced.

An "exact conceptual System" allows a child or an adult to optimize the efficiency, the potentiality and the understanding of thought. It would be a repliche/ analogy for language, to current positional number systems used for quantities. Sooner or later, these systems will be imposed and will substitute the absurd and anti-intuitive alphabetical order. And I hope this will take less time than it took for the decimal system between the 9 th and the 16 th centuries... This could suppose a cultural change, similar to that generated by the decimal systems, concerning the development of mathematics and technology in the 17 th and 19 th century, from which the current achievements originate.

We thus have a geometric complet and pseudometrics space. Thanks to that dictionary, it is possible to "surf" continuously, and in a orientated way. That is to say, we know where we are, where we are going, and/ or how far we can go; although destinations are still unknown (possibility of prediction, in this purpose about concepts, how any science leads to it and makes it possible).

Giving that a Universal Dictionary (= "UD") obviously includes in a classified structure all the foreign languages/ dialects/ slangs, we will be able to associate each concept with a completely controlled tree of equivalent designations, corresponding to each one of all the languages/ dialects/ slangs we can think of. This way, with this UD, translation simply amounts to a correct interpretation of words and sentences. Moreover, an automatic/ immediate criterion for translation of concepts which do not exist in other languages is developed: whereas the designation has not been translated, all the interactions which generated it have been translated into the other language.

A UD adds a third prospect linked to concept (= the third space), which are the designations, a correspondance between the intrinsic (= concepts) and the extrinsic (= pre-established linguistic signs). This difference between the intrinsic (thought) and the extrinsic (culture) enables us to achieve a scientific processing of language and communication, and to clarify doubts and ambiguities which occur about them.

Locally, i.e concept by concept, perception also has its own representation, by means of a small generic tree of perceptions/ associated perspectives. It can be easily noticed that children instinctively use a tree, as soon as they were able to form concepts. By the action of Perception, i.e that of subjectivity, we can point out the objectivity of Conceptuation.

As far as data processing is concerned, a DataWarehouse (=DW) is a good reference for a universal Dictionary, which can be also defined as a "global and intrinsic Metadata", or as a "understandable and intuitive DW, whose data are the representation of all the knowledge."

From the concepts and the simple knowledge, thought structures any other more complex element, either of language, reasoning, logic,... Every "thinking", and every linguistic construction can be decomposed in a structure more or less complex, made of concepts and relationships, by means of a limited number of operations in diverse and different levels. These operations correspond to what I call "evolutive interactions" between two structural levels, in this case, levels of "thought". But this is situated "below"/ "above" syntax, and by not considering it, we pretend that the extrinsic/ agreed syntax explains and solve some problems which are intrinsically mental. For example, the analytic strategies "top-down" or the synthetical ones "bottom-up" remain at the surface, in the formal, and taken alone, they do not lead to any part; this is obvious and we can repeatedly observe it.

Through the possibility of overexplaining and separating :

- the extrinsic brought by languages, and
- the subjective from perception,

a universal Dictionary based over a Conceptual system can stress the different relationabilities, which are the evolutive interactions between the different levels of thought. This allows :

- the development/ sensibility of relationability from the user ;
- its application to concepts by means of duality, with the derivative correct generation of concepts in the different levels, of single and composed knowledge, of reasonings,...
- the development of intelligence, which is basically a relational faculty.

What is at the root of this complex pyramid made by thought? A simple knowledge is: two concepts with a relationship between them, and a relationship is an element from the dual characteristic of concepts. Finally, we can bound to concepts such as the most basic element from any structure of thought. Without the correct conceptualization, we will never be able to guarantee the perfection of a "thinking" of any kind, its unequivocal construction, nor its correct interpretation. The conceptual imprecise things, or the mere different conceptualizations between two persons, lead to imprecise things and equivocalities which become progressively bigger, generating part of the causes of incommunication between individuals, despite they speak the same language.

As far as "divide and conquer" is concerned, we can say that if we solve the problem of conceptualization, we could cope more easily with other problems from upper levels which are more complex, such as, among others, language, teaching, understanding, optimizing the efficiency of thought, etc etc. Particularly, this could also provide an efficient alternative to "semantic Networks", correcting the ambiguities from Logic, and empowering the logical programming (PROLOG,...), which represents the base for the pretended 5th computer generation.

The prospect of this structuration of thought makes the understanding of what Conscience is easier: a self-application complexation parallel to Thought, but which includes only two levels, and historically very previous. Both of them are intimately linked ; seeing their unequivocal differences results then more difficult.

When did Chemistry develop and why its development was so late ? : a little more than 100 years ago, when it was possible to distinguish Atoms from Molecules, and Molecules from Substances (Mineral, Alloy, Fibre, Organic matter, ...), and to know the elements of the first mentioned level, from which the two successive ones can be progressively synthesized. When was one able to study fully and intervene/ alterate heredity characteristic ? : when the electronic microscope distinguished ...

AN EXAMPLE: THE CONTINUOUS LEARNING OF CHILDREN AND ADULTS

Once he had been able to reconstruct/ interpret sensitive pictures, the child begins to identify these pictures. The visual pictures appear after a few months in his life and with difficulty. But, until this moment, many other ones have been appeared during the intrauterin life, by communicating with his mother. The identification or trivial conceptuation is what I call level "0". The arthropods have been doing it for 600 million years. The fact of simulating it is one of the finalities of what we incorrectly call "Artificial Intelligence".

After many identifications, and following the first words/ names, the strict concepts appear, which were all previously sensitive/simple. By means of the association of equivalent thinkings, the process consisting in the construction of a succession of exact short successions, converging with concepts such as "Tree", "Pine", "Palm", "Car", begins. Thanks to it, it is guaranteed that the resulting space will be complete. This is the level "1", which perhaps began to be reached by the vertebrates more than 300 million years ago.

Concerning this long period which has been run until now, the reason why animals have not overspread this level until a little time ago, with humans, is not due to the intrinsic limitations of the faculties of thought. It is as surprising and intrinsic as the fact of no having been able to/known how to use sensitive linguistic symbols/signs sufficiently distinguished to achieve its representation and its subsequent communication.

Then, because he hears successive words, each one having the same interpretability as that he has of the simple ones, the child is used to this convention/ ability consisting of operating concepts, provided these operations are made of basic faculties of thought. This way, the concepts, not those that are not totally sensitive but those that are progressively more virtual, appear. Due to this virtual characteristic, they oblige us to refer to adequate sensitive denominations (\Rightarrow semiology and intrinsic semantic). At least, the monkeys Lana and Koko reach this level "2", without no hesitation and despite the nefast semiology. This way, "domestic Animal", "the History of science", "social Services" appear.

Then, a new group is being formed. Moreover, in this one, like in the former level "1", a BOOLEAN algebra can be defined. Its namesake BOOLE was, as my point of view, an imminent psychologist, but whose work was, until now, only claimed and only in part, by mathematicians.

I mean : strictly speaking, the nucleus from the level "2" of conceptuation is not a BOOLEAN algebra. In the contrary, this algebra exists because "Union", "Intersection", and "Complement" are operations to which the more basic abstract process of thought can have access. In its "Laws of thought", BOOLE did not discover a mathematical structure, but something much more important : he discovered/ recognized three basic and fundamental faculties of human thought, those that allow to increment considerably the level "2" of conceptuation. This way, "Organoleptic" (union), "Indochina" (intersection), "Acephalus" (complement), appear.

The no instinctive relationability of thought slowly appears from the dynamic, i.e the phenomenological perception. Its maturation progressively structures the strict knowledge, i.e the level "3". I refer to the comprehensive/ understandable level. On the contrary, what I thus call the "factual Knowledge", that of facts, from which the Consciousness is derivated, they are phenomenological Identifiers only, closely linked to feelings and perceptions, and which conform the sublevel "01" of the level "0" of Identification.

As it occurs with BOOLEAN algebra, we can also understand that the algebraical duality is not a mathematical invention, but it is merely a manifestation of an ignored relational faculty, of general use, which could be called "Dualization of thought". This allows thought to conceptualize and assume relationability, and in the same time structure knowledge in a general way. And particularly, it has made the establishment of syntactic conventions possible. What a verb is? : one of the possible dualizations of a concept in a isolated perspective, i.e, extrinsically (love \rightarrow to love; taste \rightarrow to taste; smell \rightarrow to smell; feeling \rightarrow to feel; painting \rightarrow to paint;...). The verb is used to be applied to other concepts that we connect from the scheme/ convention of syntactic proposition, i.e, as a phenomenological Identifier.

This way, little by little, a ten- years -old child can reiterate the same process he started when he was three ; and, using strict knowledge from level "3", in spite of using identifiers of level "0", he is acquiring the first concepts of method. This is the level "4" and the latest. The same procedure/ method, i.e, the same faculties, which allow us to go from level "0" to level "1", are used again to go from level "3" to level "4".

Two years ago, in Lars, I made my little son be aware for the first time and in an understandable way, of its own conceptualization of his first methodological element : "Organization". He was ten, when he used to "organize" his time with his first scholar Agenda. Why is a little boy able to immediately learn with a book, something so vast and so difficult to make, like making an "Aircraft carrier", but isn't able to understand what a "strategy" is, whereas he's been using his tears as a stratagem since he was born ? "Aircraft carrier", indeed, belongs to level 1 and/ or 2, and "strategy" belongs to level 4. The intangible but inevitable difference between a "junior" professional and a good "senior" is that the latter has matured the processes of his work field, up to level "4" of Method, whereas the "junior"'s perception doesn't manage yet to sufficiently discern it.

Maestry, expertise, art as professionalism, ..., suppose to be in this latest level. Erudition, however big it may be, is only associated with the Enumerative knowledge (including Acquaintance, ...), of which exiguous relationability is much below the level of Method. We must also differentiate the capacity of perceiving Method, from the capacity of achieving Abilities and Automatism (= transferred methodological elements). This also contributes to differentiate the level of Intelligence, from the level of Enabling and Automatism, either manual or mental.

This way, it is fascinating to look into the causes of what PIAGET started to describe more than 50 years ago; by observing for many hours the numerous sons her devoted wife was giving him.

Faced with all this, our Dictionaries and Encyclopedias brutally mix concepts from levels "0", "1", and "4". What is worse is that due to "instrumental" limitations, they exclude big part of levels "2" and "3". Less than 5 minutes are needed to check it. With more than an individual, however, two weeks or more would be needed, to explain them previously what these levels are. It wouldn't be rational to pretend that a Roman could understand how we calculate, without teaching him previously the positional number system.

It is possible to justify the fact that pedagogy, like big part of psychology, includes some rules which are as understandable, objective and applicable as determinist science. But for this, above all, like in any science, we have to localize and define concretely the elements we study, which are here virtual and not material nor tangible, and also the interactions between these elements.

To quote only one example, we can define intrinsically a curriculum by adding to some concrete exact definitions the triple condition of continuity:

" any option of continuous progression in the intrinsic trees of concepts, through the intrinsic trees of relationships between concepts, and at the same time, the respect of the progressive levels of maturation/complexation of human conceptualization."

Continuity is something tangible, and even measurable, in so far as the incorporation of continuity in a concrete reality (Trees, ...), as well as the incorporation of other similar "objectivations", allow us to enter the objectivity, separating pedagogy from what is merely judgeable.

But, in order to be able to explain it in a comprehensible way, and to demonstrate unequivocally what is for you obvious, I need a few pages. And first of all, I need some more pages to explain the three used concepts "Trees...", "Trees..." and "level of complexation...", although they do correspond to intuitive processes of thought.

Continuity in the three progressions already commented. A building is made with patience, aligning rows of many bricks, wall after wall, rooms, ceiling and floor or coverings. A child or an adult overcomes a level of a concrete concept, only when he has used it on many occasions and correctly in the precedent level. And seeing that he dominated it adequately, giving the importance of the semiological option (with which it is represented). And this way, concept by concept. Frequently, there are not intelligent persons, there are some children by mere luck, benefitted from the best building materials.

Going deeply in this process, concretely that of relationability, and separating the intrinsic (for example, "the internal game of thought" called from A. EINSTEIN, "the logic and mathematics in the central nervous system" called from J. NEUMAN) from the extrinsic, we can eventually explain why the linguistic syntaxes are merely a rough and egocentric copy of the phenomenological perception that generates it. And, analogically, the fact that grammar, contrarily to instinct, is a mere convention.

And going deeply in the Method, in concrete terms in the transferability of its elements, those we call "Technics"/ "Procedures", we also understand that language is a mere ability, the same as the innumerable abilities which are accessible to any "domesticated"* mammal, whenever it is not pretended to make a delphin applaud, nor make a man fly and emigrate.

NOTE: we should rather say "with any mammal with which we can establish a minimal conscient communication."

To believe that speaking, as well as reading, is something transcendent, is a serious cultural mistake. In the present case, the famous "the King is naked" is appropriate. Up to the point that chatterboxes and demagogues speak. And up to the fact that computers already read. To understand is a much more difficult part. We can only start to fully do it, like very early when we are twelve or thirteen, when there are already many concepts of the level of Method at our disposal, and we are able to intuitively percieve/ differentiate this last intrinsic level of thought. That's the reason why the functional illiteracy exists.

It can also contribute to understand better what the current language is, the observation of its historical evolution, from the prospect of those levels, and from what the semiological graphico-visual representation allows to do when used simultaneously :

- The figures from the Aurignacian age (Cro-Magnon; 35 000 B.C [⇒ level 00/ 1]);
- The cave paintings from the Magdalenian age (Altamira,...; 10 000 B.C [⇒ level 01/ 1]);
- The hieroglyphs (Egypt; 3000 B.C [⇒ levels 200 to 202 ?]);
- The Chinese characters (between hieroglyph and alphabet; Yin age; 1400 B.C); and
- The alphabetic script (semites/ Phoenicia; 1 500 B.C [⇒ level 203?]),
- making way for the current speech (Greece; 500 B.C [⇒ level 21]).

WHAT CAN WE DO WITH ALL THIS ? "WHAT YOU WANT TO DO WITH THEM"

The modern genetic and neurophysiological knowledge gives us the total certainty that, as we could obviously suppose, in the brain there is not any alphabetical structure. We thus wonder how it is possible that, at the 2 000's door, we go on arranging concepts as we were used to do more than 3 000 years ago, only with the first letters of an arbitrary convention and which are different in each foreign language, instead of organizing them/structuring them as thought spontaneously and intuitively tries to do ?

The multimedia resources, with all their indisputable advantages and potentialities, are only supposed to be a new support for the same traditional structures/ methodologies of representation, those of the books published before and after GUTENBERG. Today we can look into the case of these resources which could become a support for new virtual/abstract structures, which, instead of being limited due to the precariousness of material supports, can be a support for simulation structures of the functioning of our own thought. A "Universal Access Book" must have a structure similar to the way our thought tries to understand and memorize any book.

And it's more, is it logical that a single letter prevent us from having access to a site in the Internet, with the enormous economic and technological and scientific resources which are relative to this infrastructure ? To introduce the concept of "intrinsic Addresses" is unanswerable. You are probably not interested in knowing my name or that of other persons, but the set of knowledge from which you would exchange more derivative and more specific/profound knowledge. This set, which can be unequivocally represented, would be for you my intrinsic Address, or that of anyone, regardless of names, languages, and even persons.

Personally, I am not interested in WWW unless it can help me to find, without having to look for them, all the persons/institutions/bodies which could be interested in what I'm thinking, what I'm doing, or what I want to buy/sell or barter, at one point. And lastly, I would like to be able to read in some of these addresses IN the WWW, in my own language and through a universal Dictionary, all the specific knowledge the persons have and place at my disposal, an enterprise or a department of University.

That is to say, it can be thought in the form of a world Bank of knowledge, not of advertisement, accessible and understandable to all people. To all this, we can add the universal reading Writings, whose only condition would be to respect the bi-univocity (one-to-one) Concept \leftrightarrow Name, and we can refer to a universal dictionary instead of a spell checker.

Checkers for text content are also needed, not only a spell checker or a grammar checker.

Hypertexts are enumerative and closed. The only reason why we can surf with the same hypertext is that the links are not understandable, but they are determined in a explicit way in each Hypertext. Understandable Hypertexts which can automatically and transitively be linked are needed.