# Towards a New Digitalized Human Knowledge Paradigm

December 20th 2003
Juan Chamero, CEO Intag

## Abstract

We propose a new Digitalized Knowledge paradigm that takes into consideration the People's intelligence as users of Cyber space. If the discipline that actually handles Human Knowledge is KM, Knowledge Management, our aim is to create the basement of an enhanced management system that handles (K + K') instead, where K corresponds to the actual formal established knowledge and K' corresponds to the up to now "informal" People's knowledge. We discuss in this document some conjectures to build a body doctrine that enables us to define symmetries in both cognitive domains, namely the Establishment Domain and the People's Domain, in order to facilitate the building of an enhanced and evolutionary Human intelligence.

As a first step an intelligence skeleton is proposed for the K side that enables us to see order in the huge reservoirs of Human Knowledge documents, as the triad: Logical Tree of the Human Knowledge, Thematic Thesaurus of the Human Knowledge, and documents. As a second step we try to define an equivalent and symmetric triad for the other side K'.

To check some conjectures we have built a Prototype that "prima facie" demonstrates that this new paradigm works well in Web space performing the (K + K') logical addition process that involves a continuous equilibrium between K and K' enabling the transfer of intelligence from one domain to the other, and vice versa.

The Digitalized K Domain is well known but on the contrary the K' Domain as depicted in this document is almost inexistent today; we only have people interacting against K, and now a set of conjectures under which (K + K') works. Under this new paradigm the progressive creation of the K' triad is feasible, providing us a new way to enhance knowledge management. Examples of this enhancement will be: the building up of high resolution search engines with the capability to locate precisely almost everything hosted in the Establishment Domain in a few queries; to know as much as possible the people's behavior patterns, what they need and what they want; and at the same time to know as much as possible about the K' intelligence as a whole entity. Both sides interacting harmoniously could strive towards a human welfare optimum utopia

# Index

# Epistemology of Digitalized Knowledge

December 20th 2003
Juan Chamero, CEO Intag

.

## Introduction

Let us refer to the part of Human Knowledge contained and flowing inside digital media, basically speaking, a collection of zeros and ones. Knowledge is an asset that resides within people, be it physical or juridical persons, and on documents. There are persons considered "Authorities" as well as documents considered as such because their contents have been created or guaranteed by these human authorities: "Authorities-people".

People constantly experience knowledge simply by living, being alive and active and express it as a subtle form of energy closely related to information. A craftsman that creates furniture implicitly irradiates knowledge by the simple fact of building a wooden box, and somehow synthesizing all possible description, features, and opinions about that particular piece of furniture. Works "speak for themselves". A dancer can transmit through a mere gesture not only emotion but also knowledge. In Oriental Arts, this is how knowledge transmission occurs in master_to_students sessions, and particularly in master_to_disciple mode, as masters used to say "from heart to heart", where practically without words knowledge is precisely transmitted by gestures.

Another form of knowledge that we must consider are "people's opinions". People are continuously issuing opinions almost about everything. These opinions are listened to, amplified, deformed and broadcasted according to the importance assigned to them by people and to the authority of those who express them.

## Information as a basic nutrient

Man needs information as a basic nutrient to satisfy his curiosity, to grow in knowledge, for his welfare and to survive. Let us see how he achieves his purpose. When a nutrient is needed and the environment doesn't offer it, man must look for it outside and find it. The purpose of academic institutions is to satisfy in an orderly way a set of basic cognitive needs. Once the human being nurtures itself from these knowledge fonts, normally in his early years, he obtains further knowledge from books, massive broadcasting media, conferences, other institutions and authorities. People express their needs or curiosity through gestures or by speaking. Leaving gestures aside (for the moment, at least), let us see how need is expressed through "words".

People have cognitive needs according to their roles in society. Let us imagine a medical doctor, specialized in gastroenterology, is following an IT course. As a medical graduate he is interested in anything related to gastroenterology and related topics at its deepest level meanwhile as an IT student he is interested in basic knowledge on computers. But suppose he is also a University Professor in his specialty and a member of his corresponding Professional College. The concepts expressed within his classes, as an authority, are surely structured in a syllabus of his discipline and supposedly he is convinced and sure of what he is teaching. Something similar occurs in his role as a professional. If for an instant we were enabled to "see" the sequence of his reasoning while he teaches we would observe that it is quite lineal and foreseeable. If, on the other hand, we imagine him as a computer student, attending classes in a classroom or virtually with distance learning, we would observe a rather chaotic and unforeseeable sequence of reasoning.

Note: This vision should be understood statistically that is asking oneself which would be the probability an experimented observer could state the process observed is lineal and foreseeable.

## Possible mechanism of cognitive integration

Whoever inquires to satisfy his curiosity or to integrate knowledge is building his own cognitive edifice, according to his background, his vocation and his needs. In our previous example, we had a gastroenterologist for whom computers would be just a tool. What he incorporates as knowledge will depend on his preparation and his natural talents such as his capacity of abstraction.

The most we can infer is that the person who satisfies his informative needs through questioning does so in a convergent way, as much as possible, diminishing his uncertainty until he is completely satisfied. If for a question A he obtains, lets say, an uncertainty of 10000 (measured in amount of possible answers to his needs), he will elaborate a second question B that will probably reduce his uncertainty to, for example, 1000 and so forth until he finds a satisfactory answer of an uncertainty equal to 1 that indicates certainty: he finally found what he was looking for.

Human beings develop with time their own "search strategies" to satisfy their cognitive needs. These strategies are dependent of the individual and can change along the time. To find the same information a person won't always use the same strategy; it can vary according to the flow of questions and answers of that specific questioning process, or even according to his current mood.

## Opinions – Subjects

When we consider opinions, people's reasoning looks equally complex. If people act reflectively, answering elaborate questions according to a determined and established order, and somehow under some external surveillance their opinions will be conditioned to a certain degree. People express opinions freely inside intimate circles or when they consider it a right or a duty. Many times people don't express their opinions verbally but act consequently and opinions can be inferred from attitudes.

What opinions do people express: We said in our introduction that people express opinions on anything, which seems quite ambiguous. We can be more precise saying that people express opinions on specific "subjects", topics or affairs. Dictionaries are also quite ambiguous on the different acceptations.

A subject is a concept of interest, i.e. it is a concept, but not every concept is a subject. Subjects are either subjective or collective. For example, "keywords" are concepts and as such are perfectly definable. A knowledge discipline can be defined by its keywords and by its subjects, both intimately related to each other. As we shall see, documents of a specific discipline can be imagined as a linear sequence of keywords and "words of common use", belonging to a specific "Jargon". Perhaps the most suitable acceptation for keyword would be concept because it could be a sequence of one or more common words. Keywords are made up of commonly used words that by convention have acquired a special meaning. For example, parallel and process are both common words, but "parallel process" can acquire special meaning within computer-related disciplines.

Previously we sustained that subjects are keywords that acquire special significance according to the interests they awaken. When referring to interest we speak of the interest for people, in their role of person or authority. Authorities and the documents they edit refer to subjects expressed as

authorized (formal) opinions. Subjects, that are also keywords, can be new keywords or can be made up of one or more existing keywords.

Let's clarify this with examples. "Parallel Processing in Distributed Networks" is a subject, made up of the keywords "Parallel Processing" and "Distributed Networks". We could, on the other hand, define it by an acronym as "Propardist" that defines a new keyword. Keywords generally have precise definitions, while subjects are a matter of opinion that can nonetheless be expressed by authorities. Keyword definitions are presented in an orderly way in "Thematic Glossaries".

# Subject Trees – Logical Trees

Subjects are normally ordered within each Discipline or "Major Topic" of knowledge. If we consider knowledge opening into different disciplines that cover it completely with a certain degree of overlapping amongst them, we can equally consider each discipline opening into several subordinate disciplines of different levels. This is equivalent to sustaining that human knowledge – seen on the side of Established Order- could be imagined as a Logical Tree with hierarchies decreasing from root to leaves. This is not always true; however it can be a reasonable convention as were the Dewey Decimal Classification Systems, and the Linnaeus System for the animal kingdom. It would be more accurate to say that knowledge and its convenient set of disciplines is a graph closely interrelated among them that in a given moment, according to the importance people assign to its major subjects, shows dominant trees and pseudo trees.

In this evolutionary model we can observe that subjects and keywords tend to appear and disappear. At the same time, progressive changes of the graph are possible, such as branches that ascend in its relative importance or hierarchy, branches on the other hand that descend in hierarchy or start depending of other branches, branches that become leaves or leaves that become branches and even new roots (as is the case of Genetic Engineering within Biology or Nanotechnology within Physics).

## Specificity

The keywords_whithin_subjects are generally treated in a specific way where specificity refers to its level within the tree. If the subject is near the root of the discipline we must suppose that the authority-documents that deal with it use keywords that are related to the subject's level. It's something like saying that books that introduce a discipline, as for example General Economy, treat economy at a global level, understandable to all those that want an overall view of the discipline and using keywords according to such level. On the other hand, if we speak of an authority-document of a subordinate and very specific subject, it is expected that the author would use keywords that unequivocally corresponds to this level, and that eventually could be properly defined within the document.

If we would have at hand all the keywords of a given discipline and all its subjects ordered as a tree, and a significant sample of authorities dealing with the discipline at a certain level of redundancy, we could imagine an assignation algorithm that makes the "specific" assignation of keywords to subjects, level by level. Each level should have assigned the keywords that originate specifically in this level, neither upwards nor downwards. This specificity suggest a feedback to editors: avoid as much as possible the use/mention of upper levels (too general/too trivial) and lower levels keywords (too specific/unnecessary detail).

## Thematic Thesaurus

The set of keywords of a discipline and its related logical tree is called a "Thesaurus". We refer to "Thematic Thesaurus", and not to the classical Thesauri, that are collections of words and their synonyms. The Thematic Thesauri are, as we shall see, the intelligent structures of the Content Reservoirs of different disciplines or collection of documents that treat specific topics of importance. A Catalog of automobile or airplane parts (components) is an example of a topic of great importance that should be associated to a Thematic Thesaurus.

Knowledge could be defined by the Triad [Thematic Thesaurus, Logical Tree, and Collection of Authority Documents] that represents knowledge in an acceptable level of quality and completeness. Evidently Formal Knowledge is more than that, depending on the meaning of "acceptable level of quality and completeness". Just as a way to clarify these ideas, let us play a bit with numbers. Let Medicine be the discipline we choose and let's estimate that its Thesaurus contains approximately 100.000 keywords, associated to a tree of 1.500 branches and leaves. If we are looking for a significant sample of medicine in a specific language, as for example English, a possible documentation selection criteria would be to find 10 authorities for each subject of the discipline's tree with which we would have 15.000 documents, ( not bad for a non repetitive library of 15.000 books, essays or technical publications!).

Yet, this is not enough nor sufficient to speak of an evolutionary paradigm. To do so it is necessary to have access to "All" possible authority documents expressing pros and cons about any established subject in a specific moment. This is perfectly possible if "All" or "a substantial part of" that digitalized "All" is accessible. Fortunately that occurs today on the Web and could be complemented by enormous reservoirs of digitalized knowledge.

## Access to knowledge

Once the intelligent structure of established order is known, we can easily access that All. How? Finding "similar documents", defined as those documents that for each subject, in a similar literary style, share the same technical jargon and above all the same keywords or nuclear set of them. This is still a conjecture to be proved. Nonetheless, experience shows that this is a much discriminated criteria. In effect, if a specific discipline is treated by 50 million documents of the Web, there are very few documents that share such a similar structure, at the most some tenths.

Stated the knowledge this way, we would have a K Domain where the formal knowledge is hosted, being the Establishment knowledge, structured and identified by its Thematic Thesaurus. Documents, being authorities or not, could be indexed versus this Thematic Thesaurus that has about 10 million keywords correlated to a cluster of 200 Logical Trees. We would have now in the Web space nearly 8,000 million hosted documents and an undetermined but comparable volume hosted in huge private and public data reservoirs.

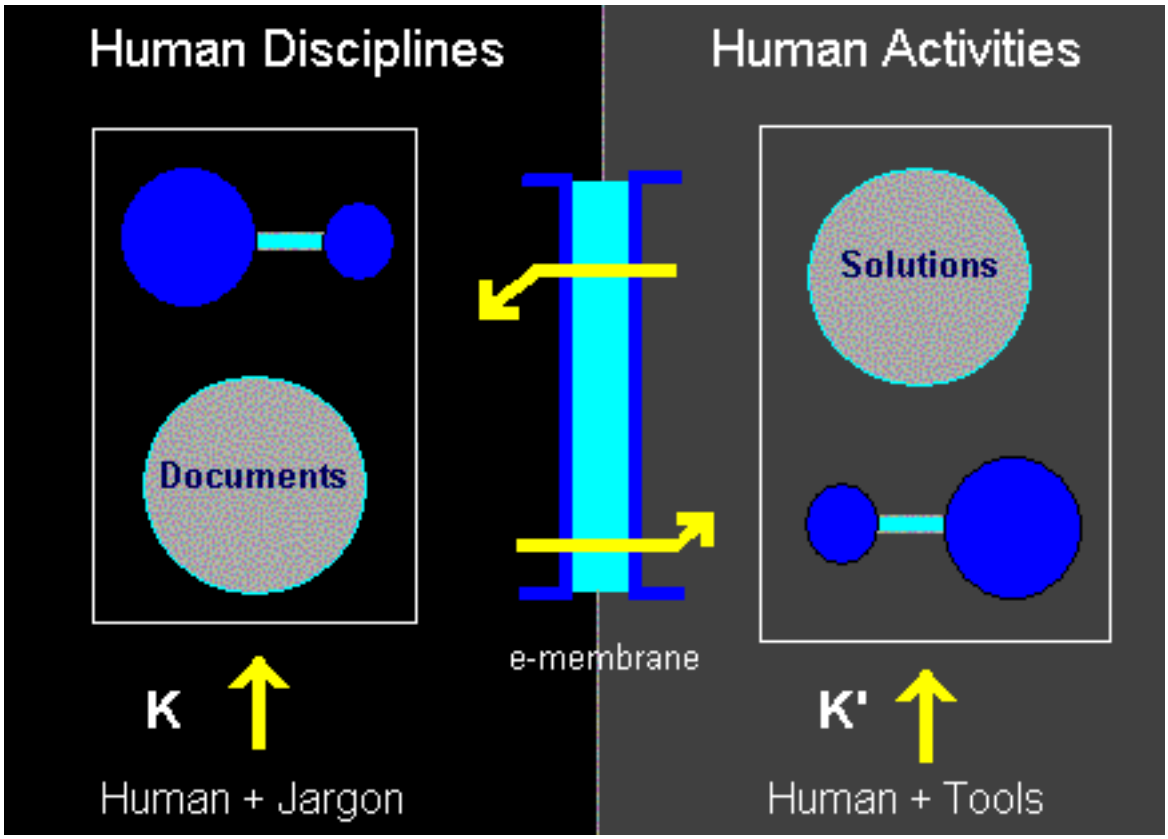
## Towards a new model of Digitalized Knowledge

To this relatively stable knowledge, with highly stable disciplines like Philosophy and Religion, and other highly volatile like Arts and Entertainments, hosted in K Domain we may imagine opposed a Domain K' essentially unstable, fluid, transient, where people interact. If these two digitalized domains were always opposed and in equilibrium, we may imagine a semi permeable interface, a sort of digital intelligent membrane, or e-membrane, between them enabling that

knowledge flows freely in both senses. With this e-membrane in between K and K' we may think of an evolutionary knowledge that takes into account K and K' domains collective talents.

Formal knowledge K is, at large, a collective, somehow representing the global knowledge of authorities as physical and juridical persons. K' knowledge is essentially a collective knowledge that follows other rules. The term collective is not used here as opposed to individual. Individuality, the responsibility, remains, at both sides but our approach points to know more and better the collective traits of both domains.

In the "Cognitive K Domain" we define the Thematic Thesaurus, stated as pairs [keyword, subject]. If we may define pairs [keyword, subject] in the other "Cognitive K' Domain" we would be in the presence of an interesting symmetry that enables us to extend methodologies and algorithms that works well in one domain to the other, and vice versa. If the knowledge in one domain is K and K' in the other our purpose is to state the basis of a new paradigm (K + K') that overcomes K and that enables us the analysis and management of traffic K => K', and K' => K, and their equilibrium conditions.




Global equilibrium between Knowledge realms K and K'. At "establishment" side we talk of Human Disciplines meanwhile we talk of Human Activities at the "people's side". The symmetry could be imagined as follows: Thematic Thesaurus and its corresponding Logical Tree at K side integrate with core documents the intelligent K triad. Symmetrically at the other side we found the Triad Users' Areas of Interest and its corresponding Users' Thesaurus, being solutions the equivalent of documents. This is understood as follows: Humans plus a given Jargon in a given language edit authoritative documents. On the other side people performing their activities provide solutions to the society that is to say via humans aided by tools (and machines). Users ⇔ people at K' side issue search strategies meanwhile side K answers with the necessary information to provide solutions at K' side. Everything operates throughout an e-membrane.

# How to face the new KM paradigm

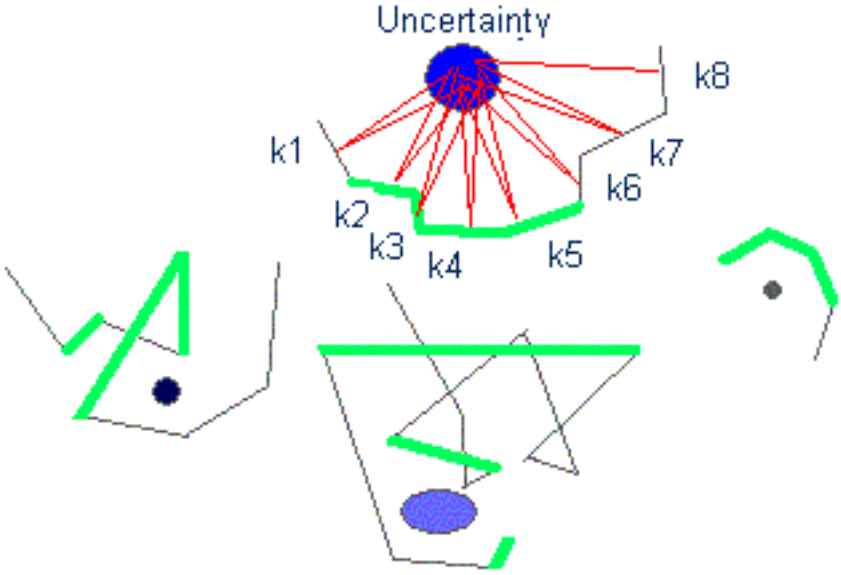
December 20th 2003
Juan Chamero, CEO Intag

## K' Domain

What's then in the K' cognitive region?. Basically we may find people's opinions and questions. As an analogy if K behaves like a "permanent memory" K' looks like a collective "short term memory". Concerning the Web this analogy works rather well with opinions as those issued in special Websites, Chats, Forums, and Portals that eventually could be automatically stored as documents. However most questions are only accounted for statistics, and "lost", left abandoned as worthless history.

## Users' Query Strategies

As seen from inside




In the figure above we depicted a set of users' query strategies. Each user has his/her own "uncertainty", ignorance about something he wants to know, represented by circles and ovals where colors and sizes would represent different levels of relative uncertainty and "skills" to locate what they "need". The user that appears on top has held a "session" of 8 questions, k1, k2, k3, k4, k5, k6, k7, k8. We, as "observers", normally ignore how many "searches" a user performs, that is the same as to say that we ignore how many "needs" he/she is trying to satisfy in each session: for instance k1, k2, could be issued to satisfy need1, k3, k4, k5, k6 to satisfy need2, and k7, k8 to satisfy need3. Let's take a close look at his/her possible reasoning mechanic. In red we were trying to represent this brain reasoning track: Given one need he/she issues (through a complex reasoning we are not going to analyze here, depending of the knowledge this user has, his/her temper and state of mind, and many other individual and contextual factors) keyword k1. Once the Cognitive Offer existent at the other side of the Cognitive "e-membrane" (see Darwin-FIRST) gives its answer, it is receipted by the user's brain, analyzed and pondered whether the

"need" has been thoroughly satisfied or not. If it has not been yet satisfied user proceeds issuing another keyword k2, and so on and so forth either till satisfaction or to the end of session.

## Free Flow of interactions

Under the non-interfering premise

As our premise is an absolute open and free communication scenario users will never be questioned about their needs. So at the "owners' side" the real users' needs and users' satisfactions, in the absence of an intelligent screening mechanism, will be ignored. Owners are only allowed to know strings of k's. That will be the only available intelligence they are enabled to retrieve in order to infer what users are really looking for. However owners may know many interesting things about their "users' behavior" considered as a rather homogeneous group of people, namely "market". For that it's important to make some suppositions under the form of "Conjectures".

We were talking along our reasoning about people questioning, either explicitly or implicitly, by pairs [k, s] where k stands for keyword and s by subject, namely by "acceptations" or meanings for a given keyword. So a search query strategy has the form of a string of pairs [k, s] instead of k's. To make the things close to reality pairs could pertain to different disciplines instead of running within a single one.

## Set of Auxiliary Communications Conjectures

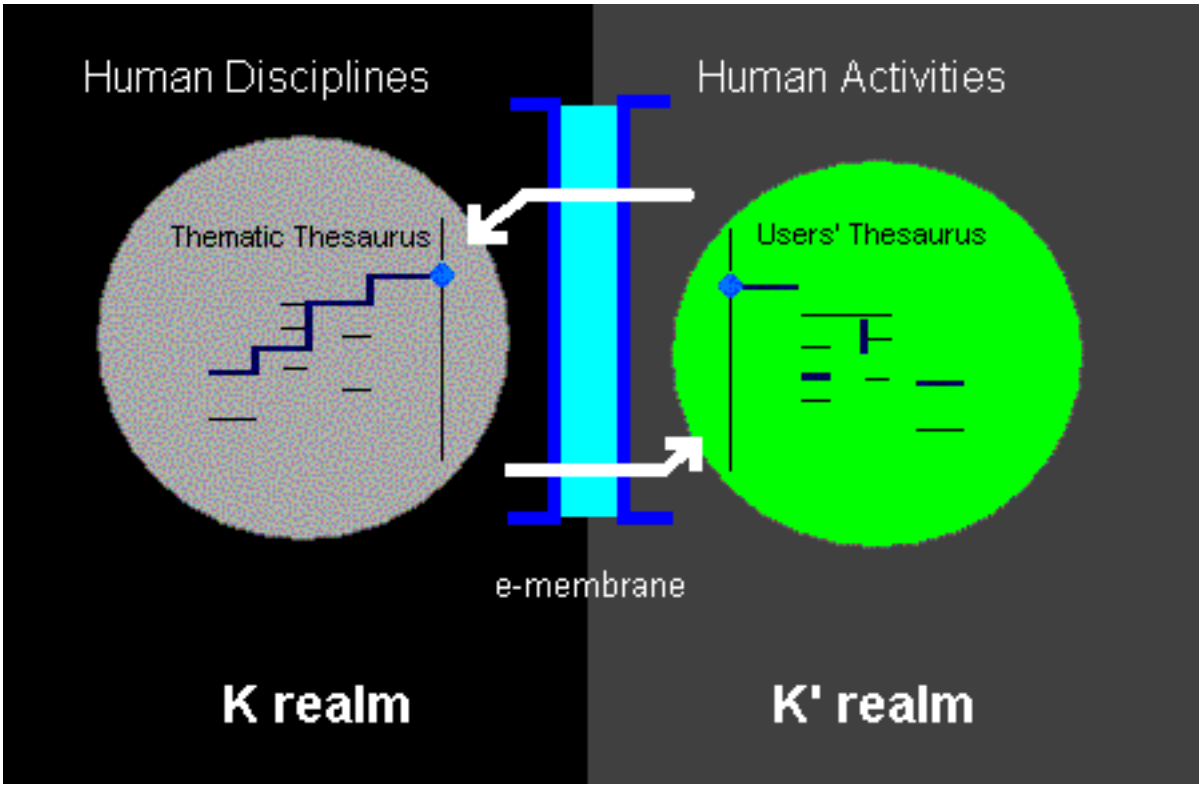
We make reference to a set of auxiliary set of communication conjectures to differentiate them from the Darwin-FIRST set of Conjectures that make this methodology adequate to manage the new (K + K') paradigm.

- Auxiliary Conjecture 1: usually people search one need at a time via "search strategies".
- Auxiliary Conjecture 2: as a corollary of Auxiliary Conjecture 1, search strategies are a sequence of pairs [k, s].
- Auxiliary Conjecture 3: we (at the owners' side) have no way of knowing when and where a search strategy starts and when and where it ends.
- Auxiliary Conjecture 4: the massive presence (detected at the owners' side) of certain strings suggest behavior patterns.
- Auxiliary Conjecture 5: the higher the presence (of strings) the higher the probability to pertaining (the strings) to a common search to satisfy a common need.
- Auxiliary Conjecture 6: the higher the pairs' heterogeneity (pertaining to different disciplines) the higher the probability to be the string a behavior pattern.

Note: These set of conjectures lead us to detect and differentiate collective search strategies. From our experience strings of three or more keywords have a high probability to be a behavior pattern.

## How the K' Domain looks like

Let's go now a little farther concerning how people knowledge is organized in our society. We live in an era of intensive and extensive "micro specialization". The trend is a society of professionals and artisans with well defined "licensed" activities. Each license is characterized by a set of prerequisites and/or benchmarks to be filled by candidates, and a set of permitted activities or applications of the licensed talent, at large a combination of knowledge and practical mastering of it. Each person may play different roles, as professional, as a family member, as a citizen, as belonging to religious and political groups, etc.




This figure depicts both Knowledge Domains as interchanging information throughout an e-membrane. At Establishment side we have the K Domain of Human Disciplines with its Thematic Thesaurus. At the other side, we have the K' Domain of people with its Users' Thesaurus. People issue queries under the form of keywords strings (threads), and K issue their corresponding answers. Threads are related to Human Activities. At K side the Thematic Thesaurus is well defined meanwhile at the users' side the users' Thesaurus is a continuous build up transient process.

## K' Domain of Activities

People subjects ⇔ Areas of Interest

Let's take a look at the "Homo Faber" role, that is to say the universe of Professions, Arts and Crafts and Industrial and Services labor activities. It is a huge graph of thousands of working activities and for each one we may imagine a Tree of Subjects, being a subject something the worker has to master in order to wisely perform his/her work. A Medical doctor learns in a university where a formal knowledge was successfully transferred to him/her but in order to work as a medical doctor in the real life he/she has to know a lot of other things, for instance about medical services, about praxis rules, about marketing, about doctor-patient relationship, about insurance, about treatments, etc. Even concerning his/her medical specialty he/she have many information and knowledge needs, and uncertainties. Many of these subjects –"Areas of Interest"- are pretty well typified in each specialty but much of them are identified but not typified.

Let's go with another example. Boy scouts need to master some abilities like making knots, how to pitch a tent, how to live and survive in the wild, how to preserve nature, how to make signals outdoors, and many other things. All these military type abilities are precisely documented and arranged as logical trees as well. Activities to be ruled also need of certification protocols structured as logical trees. Some activities like those derived from rural economy, are apparently unstructured but they are rigorously coded.

Now people have to face the following problem in order to satisfy their information needs. The establishment where the formal knowledge is held works via keywords as we have seen till here. When someone looks for information about some ability the search must be performed via keywords. The establishment data is organized by subjects that differ from users' Areas of Interest subjects. Users issue search strategies (as strings of keywords) to locate useful information about their interest subjects.

In open and free communications environments, on the owners' side, users' activities in the sense discussed hereto are "a priori" ignored, being at last an intelligent task to perform. The only perception about how users are trying to satisfy their information needs would be the knowledge of their search strategies, under the form of "n-ads" strings of keywords. These threads of one, two, three… n keywords "should" be related to the users' Areas of Interest subjects mentioned hereto. Here we get to a crucial problem: how do we make that correlation?. When the K's Domain is truly known we will have access to all People's Activities Logical Trees and in that case the correlation would be facilitated. However whether K' Domain be truly known or not we may still gain some insight by human intervention. Let's see how.

Once we –on the owners' side- have at hand a thread suspected of becoming a users' pattern behavior, a human being could establish possible correlations to possible well known users' activities (or Areas of Interest).

Note: This "anthropic" weak link could be afterwards replaced by a special agent.

Note: One way to accelerate this exploring task is to progressively pervading the K' Domain facing users, ethically and respectfully as follows:

> Dear user: We have detected that you are extensively using the following search strategy [a, b, c..] In our humble opinion that search suggests us that probably your activity is related to these areas of interest: Area x, Area y, We have created a private Forum where all people that share your same search strategy may communicate among them, interchanging experiences and information. We invite you to be a full member of this Forum.

So we have defined a certain type of symmetry between K and K' as was our purpose. In K we have a Thematic Thesaurus related to a Logical Tree as the structural core of the intelligence of the Establishment. On the other side, we would have a Users' Thesaurus of "threads" (search strategies) that behaves like pseudo keywords and Users' Logical Tree of activities for each human role. Initially both, Thesaurus and Logical Tree at users' side, are empty.

## The Symmetric Cognitive Triad

Let's go back to the figure that described how the model of Digitalized Knowledge works because we are in condition to fully understand it. People are socially organized in activities. Humans play different roles and in each role their aim is to provide solutions throughout activities. Activities are performed by making use of specific talents corresponding to specific areas of interest. The graph or Logical Tree of any activity depicts the talents and/or abilities of it. People look for information to enhance their abilities via "threads" of keywords belonging to K Thesaurus, as "search strategies". Users' Thesaurus is defined as a collection of threads that point to the Users' Areas of Interest.

# Universal and Integrated Content Management System

## Darwin-FIRST Technology

December 20th 2003

Juan Chamero, CEO Intag

Darwin-FIRST Technology belongs to Intag, *Intelligent Agents Internet Corp*, an American Corporation that has created a convincing Demo of its possibilities as an Universal and Integrated Content Management System, under an Agreement with *CAECE university* from Argentina. The aim of this technology is to provide efficient solutions to most of the problems within the Knowledge management spectrum.

If the Web is imagined as a huge reservoir of Human Knowledge in permanent evolution, Darwin-FIRST's aim is to "see" its order and consequently to manage it. To perform this task it's necessary to make its structure come to light at any moment and not remain hidden to a common human observer. Intag states that this hidden structure is the Web Thematic Thesaurus, where its keywords' space is related to all subjects of the Human Knowledge organized as a Logical Tree. This is the answer to the Tim Berners-Lee Web Thesaurus conjecture stated in year 1995, not trivial because such a Thesaurus has about 10 million keywords associated to a Logical Tree of 200,000 components.

Intag, with CAECE's advanced students' collaboration, has created a prototype of this Web Thematic Thesaurus for a single discipline, Computing, Information and Telecommunications, selected because of its Hub type connectivity with the rest. This particular Thesaurus has 53,000 keywords related by "specificity" to a Logical Tree of 1,600 components. Using this thematically structured thesaurus it's possible to clearly distinguish the Web order, as to precisely locate "authorities" at the reach of only one click of the mouse.

Via these special "glasses" agents could generate and/or retrieve data and intelligence from the Web at will, as from any digitalized reservoir. To go from this prototype up to the whole Web Thematic Thesaurus is only a problem of scale.

This is an example of an application that will shake the search engines' market, but the beginning of a fan of many other applications, mainly within the KM Knowledge management spectrum, because within this open and flexible architecture agents could be created and trained to generate Thesaurus oriented type of order, for instance People's Thesaurus, and Corporate Thesaurus. Once the set of conjectures upon which Darwin-FIRST architecture is based are accepted, it must be also accepted that the detection and classification of people's behavior patterns is a "real time" computable problem. The clue of Darwin-FIRST architecture rests on its e-membrane, a semi permeable like a bio membrane that separates people as users from the machines that serve them, supposedly to satisfy their needs in terms of information. These membrane messages, inquiries, answers, and navigation instances flow back and forth through it open and freely with an intended minimum to null interference with the aim of maximizing the intelligence transfers on both "sides".

For all this reasoning, Darwin-FIRST systems are apt to successfully face most of KM problems, and at the same time, as a "byproduct", go to the other side, to the "People's Realm", complementing the classic knowledge K, first term of the KM, with the K' factor, the People's Knowledge. Then the best approach to the Human Knowledge should be (K + K') instead of K, where the sign (+) should be understood as a very peculiar and complex logical sum operator. Agents, under a peculiar FIRST Expert System supervision, and under the "by exception" Chief Editor intervention (a human being), are enabled not only to generate and retrieve intelligence but to "know" and "learn" as much as possible from people.

In real time mode they detect and classify users' search strategies and users' navigation instances, and build an edifice of Users' Activities Thesaurus that in the long run enables both sides of the e-membrane to know (K + K'), and at the same time enhances their respective knowledge domains. The detection of Users' Jargons and Users' behavior patterns are by products of this complementation process.

This reasoning also satisfies well enough the common sense and the up to date KM Web and networks experience. However the set of 10 conjectures that are the basement of the Darwin-FIRST architecture are to be investigated and scientifically tested. That is the role of universities and in this direction CAECE University, a pioneer in this type of undertakings, is currently working through its AI-Lab.

Intag and CAECE University have agreed as a joint effort to launch an Artificial Intelligence Lab that will have as its first task to perform the tests of these conjectures in order to become the fundamentals of a (K + K') Theory. Darwin-FIRST stands for: Distributed Agents to Retrieve Web Intelligence and Full Information Retrieval System Thesaurus respectively. Darwin makes reference to a net of "intelligent nodes" whereas in each of them a FIRST system is hosted. Darwin-FIRST architecture has a family of local agents and a family of distributed cooperative agents. All nodes are controlled by a Chief Editor via a Desktop and the whole Darwin net by a Super Chief Editor via a Super desktop.

# Darwin-FIRST Conjectures

December 20th 2003

Juan Chamero, CEO Intag

**Conjecture 0:** the triad Logical Tree, Thesaurus, and Cognitive Objects unquestionably identifies any type of Knowledge

**Conjecture 1:** Website Owners "speak" and "think" rationally in terms of their objectives and in terms of their matchmaking policies.

**Conjecture 2:** Users "speak" and "think" rather chaotically in terms of their passions, desires, their necessities at large.

**Conjecture 3:** Users' interactions along sessions are strings of semantic molecules of two types, users' keywords, and navigation instances. The sessions' strings are the representation of the users' strategies to satisfy their needs.

**Conjecture 4:** Cognitive Objects, documents, are expressed as strings of two semantic molecules, Common Words, belonging to a given Jargon, and keywords.

**Conjecture 5:** It is possible to enable a Full Duplex Type communication between Websites and their users throughout an e-membrane, enabling the free flow of content and its associated intelligence between them.

**Conjecture 6:** Intrusions in communications cause serious troubles that go deeper and further than a local perturbation. The slightest intrusion may invalidate not only the session but prevent users from communicating freely. They distort the static statistics and the users' strategies as well.

**Conjecture 7** –concerning Human Knowledge-: Human Knowledge is bounded.

**Conjecture 8:** Given a LT we may generate automatically its related TH

**Conjecture 9:** Given a Historical Reservoir we may generate its related TH and a collection of its main Subjects and Themes.

# The Human Being roles in the Digitalized Society

Reflections about how the human being nurtures himself of information and knowledge to satisfy daily needs

December 20th 2003

Juan Chamero, CEO Intag

## Introduction

The Human being has different roles within the society and in each of them strives for efficiency. These roles have their own codes, learn by study, training, querying, and above all by the hard way of prizes and penalties the society as a collective being answers their daily activities.

Note: From Merrian-Webster Dictionary we extract for knowledge the following acceptations: ***4 a :*** *the sum of what is known* ***:*** *the body of truth, information, and principles acquired by mankind*..

This knowledge is acquired "formally" in part, either through pre established courses, and seminars and formative workshops issued in Colleges, Universities and Educational Institutions or "informally" throughout personal study and reading. Part of this later acquisition is the access, questions and questioning addressed to recognized sources of knowledge: authority persons and authority documents. Another classic source in Far East –that was also a Western classic till the Renaissance- is the master_to_student transmission, and particularly the master_to_disciple transmission, via the direct teaching "from heart to heart".

Life and experience provide us an open 24 hours all year school. Unfortunately not all the popular knowledge is registered in documents and saved for the posterity. For this reason some important knowledge like the one held by people of the wild and that from indigenous "Shamans" are disappearing. However the actual trend goes towards registration of almost everything even futilities as long as people gain access to public and semi public networks. In a daily vertiginous process we will see distant small communities and the humblest schools integrated to the world cyber space community, providing them a direct way to tell everybody about their needs and opinions.

## The society seen as organized by Activities

Each role is distinguished from others by a series of talents and abilities. Throughout talents and abilities persons produce results and goods. A medical doctor "produces health" for his/her patients, a carpenter artisan "produce furniture" for his customers, a building inspector "produce confidence" for his/her customers, a TV animator "produce entertainment and joy" for his audience. In summary, goods and services could be abstracted in "products" aided by tools and machines. Let's see now how if this reasoning works for not_so_evident_productive_roles such as being a "father". Fathers must collaborate with mothers to form their sons and they have as their main mission "to produce healthy and good persons" for the society –sorry for the simplicity- To perform that they must be endowed with some talents and master some basic abilities. In despite that talent and ability are synonyms for some dictionaries, in our analysis we opt by differentiate them substantially. By talent we mean the creative and artistic aptitude, mental capacity, meanwhile by ability we mean a given capacity to make something that could be enhanced by training and leaning of a set of basic knowledge.

An important concept to be precisely defined is the activity, taking into account that a role could be opened in more than one main activity. Activities generally identify professions, arts and crafts: clinical medical, landscapes painter, carpenter, plumber, buildings inspector, etc. In their turn major activities could also be hierarchically opened in minor activities, as a function of the society stratification and micro specialization levels.

Activities could be in their turn being opened in abilities susceptible of being nurtured. These abilities when relatively important for a society could be typified and even normalized.

## Society and Establishment

Following the discussion, we may imagine society as organized in activities and activities opened in abilities. Let's go to see how humans living in society manage their information and knowledge problems. The Establishment of a society, throughout its educational systems offers information and knowledge under a well defined structure: learning curriculums, cognitive databases, and libraries and request systems. In the Digitalized Virtual Society this aim is facilitated by an intelligence synthesized by the following triad: a Human Knowledge logical Tree, a Human Knowledge Thematic Thesaurus, related to the Logical Tree, and a Documents Reservoir. The Human Knowledge Thematic Thesaurus is formed by key concepts, composed by one o several words pertaining to a given Jargon of a given language, and arbitrarily known as "keywords". The Human Knowledge Logical Tree is formed by the Major Disciplines of the Human Knowledge that in their turn are opened in Subjects. Documents are indexed by the pair [k, s], where k stands for keyword and s designs the subject to which the keyword is closely related by specificity.

Striving for harmony we intend to find in society a sort of symmetric intelligent structure. For that we should find/define an equivalent triad that is to say a Logical Tree and a Thesaurus, People's Logical Tree, and People' Thesaurus respectively. The equivalence of the item documents would be the above defined products. The People's Logical Tree would be the Human Activities Logical Tree, split in its corresponding abilities. Products are created via mastering product related abilities aided by tools and machines. Symmetrically documents are created via thematic mastering –themes pertaining to the Discipline Logical Tree- aided by literary tools belonging to a given Jargon of a given language. This equivalence is attractive and looks harmonious. Now rests to know whether the People's Thesaurus or Users' Thesaurus build up is possible or not making reference to the society or part of the society that interacts against the Establishment in Cyber space.

# Knowledge Management and Digital Epistemology Resources

December 20th 2003
Juan Chamero, CEO Intag

As our aim is to present a new Knowledge Management Paradigm within the Digitalized Knowledge Realm we attach to our paper a list of Selected References and a Bibilography that in our criteria seemed to us as closely related to it. The references are framed within a box textually as they_were.

## Selected References

**Ref 1.** What is 'Digital Epistemologies'?, by Colin Lankshear and Michele Knobel 2000.
**Ref 2.** Paul Pangaro, Ph.D.
**Ref 3.** Aspects of Knowledge Representation in Digital Culture, by Francisco J. Ricardo, Ph.D.
**Ref 4.** How to use Disperse Knowledge: From A Firm-Based To A Community-Based Model Of Knowledge Creation: The Case Of The Linux Kernel Development, by Gwendolyn K. Lee, Robert E. Cole, From: Haas School of Business University of California, Berkeley
**Ref 5.** Betwixt and between: a mixed media expose of the epistemologies of cyberspaces and beyond places: a performance introduction, by truna aka j.turner, Queensland University of Technology.
**Ref 6.** Virtual Reality and Education, by: Giti Javidi,
**Ref 7.** Information, knowledge and learning: Rethinking epistemology for education in a digital age, by Colin Lankshear.
**Ref 8.** Ethical Issues of Online Communication Research, by Rafael Capurro, FH Stuttgart, Hochschule der Medien (HdM), Universtiy of Applied Sciences, Stuttgart, Germany, and Christoph Pingel Institut für Netzentwicklungen im Zentrum für Kunst und Medienthechnologie (ZKM, Karlsruhe), Karlsruhe, Germany.
**Ref 9.** A Knowledge-management Model for Clinical Practice, by de Lusignan S, Pritchard K, Chan T*
**Ref 10.** Development of an Integrated Traditional and Scientific Knowledge Base: A Mechanism for Accessing, Benefit-Sharing and Documenting Traditional Knowledge for Sustainable Socio-Economic Development and Poverty Alleviation, By Ataur Rahman, University of Waterloo, Canada
**Ref 11.** Brilliant Warrior: Information Technology Integration in Education and Training, A Research Paper Presented To Air Force *2025 by* Lt Col Carol S. Sikes, Dr. Adelaide K. Cherry, Maj William E. Durall, Maj Michael R. Hargrove, Maj Kenneth R. Tingman, August 1996.
**Ref 12.** The Entrepreneurial Imperative: Advancing From Incremental To Radical Change In The Academic Library, by By James G. Neal
**Ref 13.** Some Critical Remarks in Favour of IT-Based Knowledge Management, by *Reinhard Riedl*

## Bibliography

## Selected References

**1. What is 'Digital Epistemologies'?**, by Colin Lankshear and Michele Knobel 2000.

Some challenges facing conventional epistemology

While all sorts of variations and complexities exist around the kernel of 'scientific knowledge' (e.g., falsificationism vs verificationism, niceties of validation, representation, interpretation and so on), it seems fair to say that to a great extent the trappings of a long established model of knowledge commonly known as "justified true belief" still dominate research methodology at the level of practice. This is especially true within higher degree research programs.
Knowledge as justified true belief is concerned with propositional knowledge and is typically rendered as a simple set of necessary and jointly sufficient conditions.
According to this epistemology, for A (a person, knower) to know that P (a proposition)

- A must *believe* that P
- P must be *true*
- A must be *justified* in believing that P

The ideas raised above pose some serious challenges for this epistemology and for sediment qualitative research practices that remain to a large extent based upon it. I will identify very briefly five challenges.

1. The standard epistemology constructs knowledge as something that is carried linguistically and expressed in sentences/propositions and theories. The multimedia realm of digital CITs makes possible--indeed, makes *normal*--the radical convergence of text, image, and sound in ways that break down the primacy of propositional linguistic forms of 'truth bearing.' While many images and sounds that are transmitted and received digitally so still stand in for propositional information (cf. Kress' notion of images carrying complex information mentioned above), many do not. They can behave in epistemologically very different ways from talk and text--for example, evoking, attacking us sensually, shifting and evolving constantly, and so on. Meaning and truth arrive in spatial as well as textual expressions (Heim 1999), and the rhetorical and normative modes challenge the scientific-propositional on a major scale.

2. In the traditional view knowing is an act we carry out on something that already exists, and truth pertains to what already is. In various ways, however, the kind of knowing involved in social practices within the diverse spaces of new ICTs is very different from this. More than propositional knowledge of what already exists, much of the knowing that is involved in the new spaces might better be understood in terms of a performance epistemology - knowing as an ability to perform - in the kind of sense captured by Wittgenstein as: 'I now know how to go on.'

This is knowledge of how to make 'moves' in 'language games.' It is the kind of knowledge involved in becoming able to speak a literal language, but *also* the kind of move-making knowledge that is involved in Wittgenstein's notion of language as in 'language games' (Wittgenstein 1953).

3. Standard epistemology is individualistic. Knowing, thinking/cognition, believing, being justified, and so on are seen as located within the individual person (knowing subject). This view is seriously disrupted in post modernity. Theories of distributed cognition, for example, have grown in conjunction with the emergence of 'fast capitalism' (Gee, Hull and Lankshear 1996) and networked technologies. This is a complex association, the details of which are beyond us here (see also Castells 1996, 1997, 1998). It is worth noting, however, that where knowledge is (seen as) the major factor in adding value and creating wealth, and where knowledge workers are increasingly mobile, it is better for the corporation to ensure that knowledge is distributed rather than concentrated. This protects the corporation against unwanted loss when individuals leave. It is also, of course, symmetrical with the contemporary logic of widely dispersed and flexible production that can make rapid adjustments to changes in markets and trends.

4. To a large extent we may be talking about some kind of post-knowledge epistemology operating in the postmodern condition. In the first place, none of the three logical conditions of justified true belief is necessary for information. All that is required for information is that data be sent from sender to receivers, or that data be received by receivers who are not even necessarily targeted by senders. Information is used and acted on. Belief *may* follow from using information, although it may not, and belief certainly need not precede the use of information or acting on it.

5. So far as performances and productions within the spaces of the Internet are concerned, it is questionable how far 'knowledge' and 'information' are the right metaphors for characterizing much of what we find there. In many spaces where users are seeking some kind of epistemic assent to what they produce, it seems likely that constructs and metaphors from traditional rhetoric or literary theory--e.g., composition--may serve better than traditional approaches to knowledge and information.

**2. Paul Pangaro, Ph.D.**

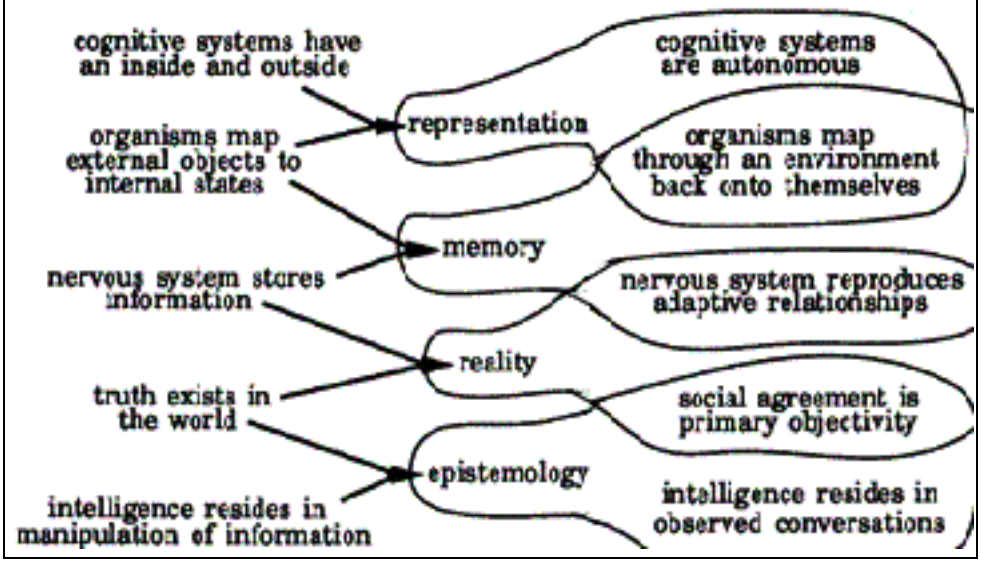
Mr. Pangaro is Responsible for the Sun Developer Advisory Council.

a) Artificial Intelligence and cybernetics: Aren't they the same thing?. Or, isn't one about computers and the other about robots?

The answer to these questions is emphatically, No.

Artificial Intelligence (AI) uses computer technology to strive toward the goal of machine intelligence and considers implementation as the most important result; cybernetics uses epistemology (the limits to how we know what we know) to understand the constraints of any medium (technological, biological, or social) and considers powerful descriptions as the most important result.

The field of AI came into being when the concept of universal computation [Minsky 1967], the cultural view of the brain as a computer, and the availability of digital computing machines were combined. The field of cybernetics came into being when concepts of information, feedback, and control [Wiener 1948] were generalized from specific applications (e.g. in engineering) to systems in general, including systems of living organisms, abstract intelligent processes and language.




b) Limits to knowing

Artificial Intelligence (AI) uses computer technology to strive toward the goal of machine intelligence and considers implementation as the most important result; cybernetics uses epistemology (the limits to how we know what we know) to understand the constraints of any medium (technological, biological, or social) and considers powerful descriptions as the most important result.

The field of AI came into being when the concept of universal computation [Minsky 1967], the cultural view of the brain as a computer, and the availability of digital computing machines were combined. The field of cybernetics came into being when concepts of information, feedback, and control [Wiener 1948] were generalized from specific applications (e.g. in engineering) to systems in general, including systems of living organisms, abstract intelligent processes and language.

c) Observing versus Observed

> In working to abstract concepts common to all systems, early cybernetic researchers quickly realized that "the science of observed systems" cannot be divorced from "the science of observing systems" [von Foerster 1974] --- because it is we who observe. The cybernetic approach is centrally concerned with this unavoidable limit of what we can know: our own subjectivity. In this way cybernetics is aptly called "applied epistemology". At minimum, its utility is the production of useful descriptions, and, specifically, descriptions that include the observer in the description. Cybernetic descriptions of psychology, language, arts, performance, or intelligence (to name a few) may be quite different from more conventional, hard "scientific" views --- although cybernetics can be rigorous too. Implementation may then follow in software and/or hardware, or in the design of social, managerial and other classes of interpersonal systems.

**3.** **Aspects of Knowledge Representation in Digital Culture**, by Francisco J. Ricardo, Ph.D.

a) Specialization

> In one way or another, almost every historically determined specialization has existed for the production of social stability. This need for stability, for preserving the society and state, is what justified the need for the teacher, the healer, the judge, and the soldier. For this reason, all specialized vocations have until the digital age been institutional devices. What is different today is not, we can see, the existence of specialization, but rather its use as a tool for deliberately *destabilizing* society. The modern digital specialist is today involved in realizing a radical transformation of society. Every digital document, every transmission, every line of program code contributes to the creation of a new repository into which society's collective conversation will eventually migrate in full.
>
> The destabilization is not destructive in the typical sense, for what digital culture wants is not to do away with traditional society, but rather to provide a replacement on which its human business can alternatively be done. This transition may take one to five decades but at that time, the tools, means, and media developed by succeeding generations of digital specialists will make it impractical to record knowledge in any non-digital form. But what is to be gained from the migration? The three most prevalent and widely embraced advantages unique to the digital repository will be search ability, sharing, and collaboration. If developed correctly (a long shot at first, but an eventual destiny), all three functions will have the potential to become knowledge-smart and different from their austere and rudimentary appearance today.

b) The Holy Grail

> "With these, we additionally need large-scale epistemic associability in order to attain knowledge-centered searching so that any query can traverse the semantic space of a corpus, although in the information retrieval community, this Holy Grail lies somewhat out of reach at the moment.

c) Convergence

> Convergence everywhere is occurring in epidemic proportion -- the rise of transnational currencies like the Euro; the multinational media corporation mergers -- but the two primary forms of this phenomenon are the rise of super standards like XML, which means using the web browser as the new global content validation tool; and the *webification* of content and services, which means using the web browser as the new delivery medium. In both cases, broad knowledge will on one hand be increasingly piped through a computer front end and, on the other, start to become rarer in its current distinct, nonstandard forms -- print, radio, improvised.
>
> The growth of any Convergence movement, especially one of these proportions, requires a re-architecture of the information infrastructure of whole countries. Laws are being passed everywhere that respond to this internal change -- laws to loosen or tighten communications regulation of companies that are in some cases already operating with monopolistic advantage; laws to permit the use of networks or media created for one kind of standard to accommodate others, so that TV sets, telephones, computers, and integrated consumer devices all participate in a great singular convergence ……..

**4. How to use Disperse Knowledge: From A Firm-Based To A Community-Based Model Of Knowledge Creation: The Case Of The Linux Kernel Development,** by Gwendolyn K. Lee, Robert E. Cole, From: Haas School of Business University of California, Berkeley

> Abstract, March 05, 2003: We propose a new model of knowledge creation in purposeful, loosely-coordinated, distributed systems, as an alternative to a firm-based one. Specifically, using the case of Linux kernel development project, we build a model of community-based, evolutionary knowledge creation to study how thousands of talented volunteers, dispersed across organizational and geographical boundaries, collaborate via the Internet to produce a knowledge- intensive, innovative product of high quality.

By comparing and contrasting the Linux model with the traditional/commercial model of software development and firm-based knowledge creation efforts, we show how the proposed model of knowledge creation expands beyond the boundary of the firm.

**5.** **Betwixt and between: a mixed media expose of the epistemologies of cyberspaces and beyond places: a performance introduction,** by truna aka j.turner, Queensland University of Technology.

An example of the mind openness we need when designing AI systems (see also Final Fantasy)

The world of Starship Enterprise
The *United Star Ship Enterprise* is a space ship in the fictional *Star Trek*, a science-fiction setting.

The USS Enterprise was once referred to as the "United Space Ship Enterprise", but ever since has always been "United Star Ship". Since Starfleet is unrelated to the United States armed forces any similarity between this awkward phrase and the American warship prefix "United States Ship" are coincidental.

In honor of Star Trek, a real space shuttle was also named Enterprise by NASA.
It explores digital space as a cultural construct and examines those 'strange new worlds' and their rhetoric as a soap opera, seeking in the process the place where such worlds might be understood as cultural texts.

**6.** **Virtual Reality and Education,** by: Giti Javidi,

a) A Cyberspace vision

"Cyberspace" is not simply a channel within which content flows, but a virtual place to live that competes directly with reality for the attention of many, especially new generation of students. For this reason, charting the strengths and limits of virtual reality is vital for educational technology.

## b) Virtual Reality and Learning Theories

Corresponding to the developments of educational theory and its correlation with technological developments, Winn (1993) claims that, in instructional design at least, there have been four generations of development. The first generation was shaped by behaviorist theory. This theory developed traditional drill and practice tutorial instructional design that focuses on imparting objective knowledge or content to the learner. The second and third generations have been informed by cognitive theory's focus on the processes involved in assimilating and encoding information. The second stage of instructional design focuses on the designer and strategies he or she may use to reduce the cognitive load on students thereby facilitating instruction. The third generation focuses on the relationship between the user and the information presented. This stage would include intelligent tutors that attempt to adapt to individual learning styles by responding to the user's interaction with the program. The fourth generation focuses on the constructivist assumption that the learner constructs the knowledge and is characterized by discovery and experimental learning. Winn (1993) suggests that constructivism has outdated all other forms of educational theory.

## c) LOGO Language

Perhaps the most well known computer application of constructivism is the LOGO Microworld, developed by Papert, which is based on the concept of constructionism learning. Papert (1993) uses the term "constructionism" to label his favored approach to learning. Constructionism is built on the assumption that children will do best by finding for themselves the specific knowledge they need. The goal is to teach in such a way as to produce the most learning for the least teaching.

"Constructionism" differs from "constructivism" in that it looks more closely than other educational -isms at the idea of mental construction. It attaches special significance to the role of constructions in the world as a support for those in the head, thereby becoming less of a purely mentalist doctrine.

Papert's philosophy of learning and his constructionism approach rely on the computer for realization. He imagines a machine he refers to as "The Knowledge Machine" which would allow children a rich exploration of the world. Primitive examples of this Knowledge Machine would include "interactive video", "electronic books" and "virtual reality". It seems that immersive VR is very much close to what Papert has had in mind when discussing the concept of the "Knowledge Machine".

**7.** **Information, knowledge and learning: Rethinking epistemology for education in a digital age**, by Colin Lankshear.

Knowledge as a commodity

> Knowledge, in other words, 'ceases to become an end in itself'; it loses its use value and becomes, to all intents and purposes, an exchange value alone. The changed status of knowledge comprises at least the following additional aspects.
>
> - Availability of knowledge as an international commodity becomes the basis for national and commercial advantage within the emerging global economy
> - Computerized uses of knowledge become the basis for enhanced state security and international monitoring
> - Anything in the constituted body of knowledge that is not translatable into quantities of information will be abandoned
> - Knowledge is exteriorized with respect to the knower, and the status of the learner and the teacher is transformed into a commodity relationship of 'supplier' and 'user'.

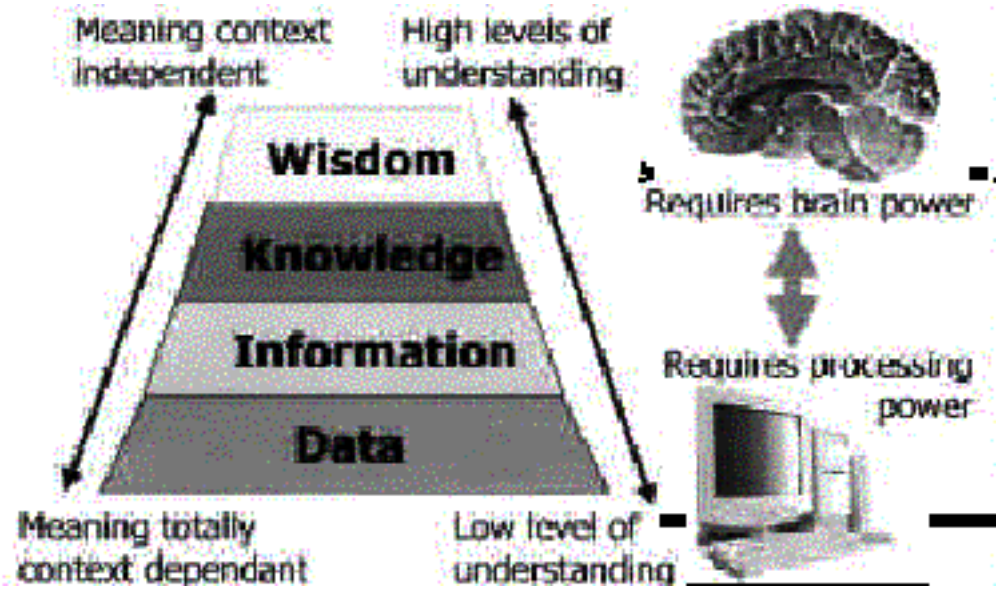
**8.** **Ethical Issues of Online Communication Research,** by **Rafael Capurro**, FH Stuttgart, Hochschule der Medien (HdM), Universtiy of Applied Sciences, Stuttgart, Germany, and **Christoph Pingel** Institut für Netzentwicklungen im Zentrum für Kunst und Medienthechnologie (ZKM, Karlsruhe), Karlsruhe, Germany.

Some considerations about Ethic issues


> **Abstract:**
>
> The paper addresses several ethical issues in online communication research in light of digital ontology as well as the epistemological questions raised by the blurring boundary between fact and theory in this field. The concept of ontology is used in a Heideggerian sense as related to the human capacity of world construction on the basis of the givenness of our being-in-the-world. Ethical dilemmas of Internet research thus arise from the tension between bodily existence and the proper object of research, i.e., online existence. The following issues are being considered: online identity, online language, online consent and confidentiality. We also argue that research ethics in the US follows the utilitarian tradition, while European researchers are deontological oriented. A guideline of best practice in online research ethics is proposed.

**9.** **A Knowledge-management Model for Clinical Practice**, by de Lusignan S, Pritchard K, Chan T*

A case study – Knowledge as new "strata" example




Tacit knowledge is subdivided into our "mental models" of the world and a "technical element". Both the mental model and technical element have a place within the practice of medicine. The mental models include our paradigms, perspectives and schemata. Understanding the paradigm within which a judgment is framed, or an individual's perspective, forms a large part of clinical practice when a patient's ideas and expectations are explored within a consultation. Clinicians regularly use "schema", mental models, formed by images of a patient in a particular circumstance. NeLH-PC takes a different approach, by focusing on the "technical element" of tacit knowledge. These are more concrete know-how, crafts and skills. The term "know-how" describes the technical elements of tacit knowledge, and is primarily about how to apply the EBM that forms the knowledge base.

**10.** **Development of an Integrated Traditional and Scientific Knowledge Base: A Mechanism for Accessing, Benefit-Sharing and Documenting Traditional Knowledge for Sustainable Socio-Economic Development and Poverty Alleviation**, By Ataur Rahman, University of Waterloo, Canada

UNCTAD Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices

a) An important Issue looking at “people’s side”

**Human Knowledge Systems: Scientific versus Traditional**

The study of human knowledge is as old as human history itself. It has been a central subject matter of philosophy and epistemology since the Greek period. Knowledge has also begun to gain a new wave of attention in recent years. For instance, socio-economic theorists such as Alvin Toffler (1990) and Peter Drucker (1993) call for our attention to the importance of knowledge as management resource and power.

In this paper, human knowledge systems are classified into two kinds: formal scientific knowledge (SK) system and traditional knowledge (TK) system. The main difference of these two kinds of knowledge systems is their format. The SK system is essentially in *explicit* format – can be articulated in formal language including grammatical statements, mathematical expressions, specifications, manuals, and so forth. This kind of knowledge thus can be transmitted across individuals formally and easily. This has been the dominant mode of knowledge according to the (Western) scientific philosophy. However, the format of TK system is mostly *tacit* – hard to articulate with formal language. This knowledge is embedded in the experiences of indigenous or local people and involves intangible factors, including their beliefs, perspectives, and value systems.

b) Traditional Knowledge

**Traditional Knowledge Systems: Definitions**

Many definitions have been proposed for TK systems, but all of them are incomplete,
because the concept is relatively new and still evolving (Johnson 1992; Wavey 1993; Berkes 1993; McCorkle 1994; Quiroz 1996; Berkes and Henley 1997). Literature in related fields uses various terms interchangeably to designate the concept of “traditional knowledge (TK)”, “traditional ecological knowledge (TEK)”, “traditional ecological knowledge and management systems (TEKMS)”, “local knowledge (LK)”: “indigenous knowledge (IK)”, “community knowledge”, “rural peoples’ knowledge” and “farmers’ knowledge (FK)”.

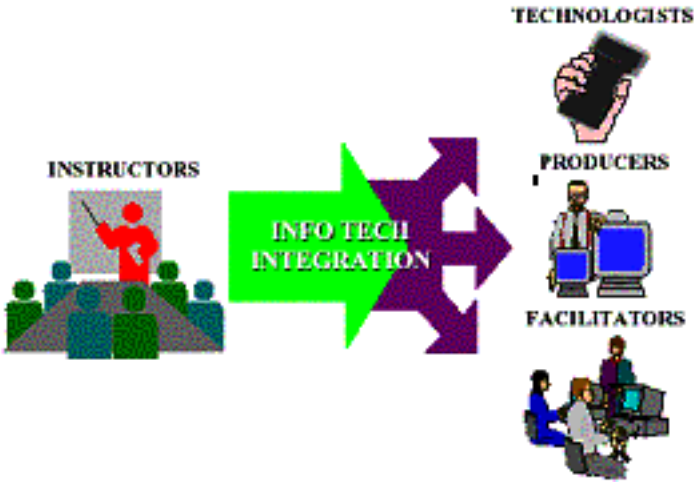
While certain distinctions can be made, these terms often refer to the same thing (e.g., Howes and Chambers 1979; Reijntjes et al. 1992; Warren 1992; Mathias 1994; Roach 1994; Agrawal 1995; Lawas and Luning 1997).

As a summary of various definitions, the term “traditional knowledge” may be denoted mainly as a tacit type of knowledge that has evolved within the local (grassroots) community and has been passed on from one generation to another, encompasses not only local or indigenous knowledge, but also scientific and other knowledge gained from outsiders.

**11.** **Brilliant Warrior: Information Technology Integration in Education and Training,** A Research Paper Presented To Air Force ***2025 by*** Lt Col Carol S. Sikes, Dr. Adelaide K. Cherry, Maj William E. Durall, Maj Michael R. Hargrove, Maj Kenneth R. Tingman, August 1996.

A project aimed to make an ideal Cognition Offer

> The integration of technology for education and training is a balancing act. A balance between doing what is "faster" and "cooler" than before and providing what the learner needs in all its forms. At its most complex, integration is an exploration of the point where human psychology, group dynamics, and science intersect. Ideally it forces the integrator to answer the who, what, why, when, and how questions regarding the application of technology to the adaptive learning environment of the future. If successful, technology integration will provide the best education and training possible for ASF personnel, units, and others. It will employ a variety of delivery media to allow learners around-the-world to engage in education and training activities tailored to their individual needs on demand. It will exploit computer technology to create ultra realistic simulations that enhance training.


**12.** **The Entrepreneurial Imperative: Advancing From Incremental To Radical Change In The Academic Library,** by By James G. Neal

A contribution to Content Value Chain

> QUALITY= CONTENT + FUNCTIONALITY
> VALUE= CONTENT + TRAFFIC
> PRICE does not equal COST OF INPUTS
> PRICE= PERCEIVED QUALITY + VALUE
> SUCCESS does not equal RESOURCE ALLOCATION
> SUCCESS= RESOURCE ATTRACTION

**13.** **Some Critical Remarks in Favour of IT-Based Knowledge Management**, by *Reinhard Riedl*

## Knowledge Management versus Information Management

Knowledge has been a research topic in economics for forty years, but little convergence of scientific opinions has been achieved so far. In contemporary discussions, a diffuse spectrum of meanings is associated with all knowledge compounds, the most prominent of which being knowledge management, which has become a business hype in the last few years. For example, there is a quite popular debate on the distinguishing difference between knowledge management and information management. Some say that there is no difference at all, others present knowledge as Deus ex machina for information management. In its essence such discussions do not contribute a lot to the goal of understanding how knowledge could or should be managed in organizations.

Usually, the term knowledge addresses some kind of understanding how to achieve solutions in a particular problem scenario based on available information. According to that understanding of the term “knowledge”, it tells us how to generate useable information from available data, and this includes the ability to collect and/or process the appropriate data at the appropriate time, and the ability to implement a solution or to achieve a basic understanding of a particular problem context. In the following we shall stick to that basic, common sense understanding of “knowledge”. Consequently, the management of knowledge deals with the problem to provide people with knowledge necessary to solve their(sic!) problems, or rather, with the problem to support them in acquiring the necessary knowledge by themselves. Speaking in abstract terms, knowledge management then deals with archiving, retrieving, and re-interpreting information to be used by others, or provided by others, respectively.

# Bibliography


1. Abrahams, R. D. (1976). Talking Black. Rowley, Mass.: Newbury House Publishers.

2. Foucault, M. (1970 [1966]). The order of things: An archaeology of the human sciences. New York: Vintage Press.

3. Rosenberg, M. J. (2000). E-Learning: Strategies for Delivering Knowledge in the Digital Age. McGraw-Hill Professional Publishing.

4. Castells, M. (2001), *The Internet Galaxy: Reflections on the Internet, Business, and Society*, New York, NY: Oxford University Press.

5. Moon, J.Y. and Sproull, L. (2002) “Essence of Distributed Work: The Case of the Linux Kernel,” In P. Hinds and S. Kiesler (eds.) *Distributed Work*, Cambridge, MA: MIT Press, pp. 381-404.

6. Popper, K.
(1972), *Objective Knowledge*, London: Oxford University Press.
(1973), "Evolutionary Epistemology," *Popper Selections*, in D. Miller (ed.), Princeton, N.J.: Princeton University Press, pp. 78-86

7. Levy, Pierre, Cyberculture, University of Minnesota Press, (2000)

8. Castells, M. (1996). *The Rise of the Network Society*. Oxford: Blackwell.

9. Lyotard, J-F. (1984). *The Postmodern Condition: A Report on Knowledge*. Translated by Geoff Bennington and Brian Massumi. Foreword by Fredric Jameson. Minneapolis: University of Minnesota Press.

10. LOGO Language, by *Seymour Papert*, Papert, Seymour, *Introduction*, in *Constructionist Learning,* Idit Harel, ed., MIT Media Lab, 1990.
Papert, Seymour, *Mindstorms: Children, Computers, and Powerful Ideas.* New York: Basic Books, 1980.

11. Floridi, L. (1999). Philosophy and Computing: An Introduction. London: Routledge.
Goldberg, K.ed. (2000). *The Robot in the Garden: Telerobotics and Telepistemology in the Age of the Internet*. Cambridge, MA.: The MIT Press.

12. Kahney, L. (2000). Video Clothes: 'Brand' New Idea. *Wired Online*. June 7. <http://www.wired.com/news/technology/0,1282,36698,00.html>


.