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## Narrative, Ontology and Knowledge

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We intend to contribute, with this paper, for a more complete understanding of narrative's use, when applied to the built process of a Knowledge Base (KB). When we try to accomplish this process (built the KB) a set of variables influences the approach settled. A conceptual model to optimise the KB suggests automatically identify the key-words that we'll feed the KB, and afterwards his reuse, starting from the narrative in evaluation. After identifying the problem and studied several solutions, we suggest as a proposal an approach as the one presented by Tom Gruber [1], with one exception. The main objective of this approach is not to search the KB, but built it. According to this the proposal it's necessary to conceptualise a semantic web where it will be specified the possible entities and eventual relationships. As a complement we suggest the definition of a multi-agents system that interacts over entities defined into the semantic web. This ontology should be applied to the narrative we want to analyse, and getting the support from Data-Mart techniques catches the contents and concepts relevant to populate the KB. The ontology, in generalization, we'll be halfway between the direct speech narrative and the KB requested

**Keywords** Knowledge Based systems; Ontology; Data-Mart; Semantic; Multi-agents system.

### 1. Introduction

In the beginning, the mankind has developed through the creation of gods, spirits and an amount of fairy tail stories. The human being on their time ask himself where the life begins and where they should go after death. According to Deno Kazanis [2] in "The scientific basis for mysticism" people live in a contradiction of astronomical proportions. On one hand we are a single individual on a planet of nearly people, in a solar system, which is one of billions in the milky way. This scientifically valid fact makes us seemingly insignificant. On the other hand we are the only consciousness we can experience, and we are centred from which our consciousness views this universe. How can these two vastly different perspectives connect?

Typically, when people meet face to face, "the progress towards consensus and a shared understanding of the viewpoints comes about outside the formal meetings, over coffee, arriving early, walking to the station or having a glass of wine and a sandwich afterwards"[3]. But it is these social interactions that allow trust and relationships to emerge which are usually absent in the communication, collaborative and narrative environments?

Our perspective intend to describe the many and different stories of how busy executives, citizens and people in general, from different backgrounds and different perspectives, were surprised to find themselves converging on the idea of narrative as an extraordinarily valuable lens for understanding and managing organizations in the twenty-first century [4]. This paper intent to give a contribution to a better understanding about storytelling (narrative), conceptualisation (ontology) and data-mart (knowledge). Combining these elements could be a powerful tool in the world of organizations in an initially intuitive perspective. The power of narrative and storytelling in our own global experience working on knowledge management, change management, and innovation strategies in many worldwide organizations must be the purpose in next future.

## 2. Knowledge Acquisition

Intelligence needs knowledge. The fact is knowledge are voluminous difficult to characterise with correctness. Knowledge gets excited constantly (it has a permanent evolution) distinguishing itself from the data (in organisational terms) in such way that it is generated in the same way as is used but there are possible realities coming to be demonstrated. The acquisition of the knowledge becomes using some methods and intelligent techniques of form that represent generalities. They are understandable, they can be modified easily and be used in much situations. Even admitting that the methods are not total necessary and complete they are applicable and useful to the welfare state and all the individuals.

Currently, two concepts exist that are valued; the innovation (act or process to invent or to introduce something new) and the talent (spirit sharpness; aptitude notable; the great intelligence). The new technological challenges are centred in artificial intelligence, in the neural nets, in the cybernetics, in the robotics, in the virtual reality, among others. The appearance of the computation came "to facilitate" the study and the inquiry, although sometimes existing the conscience that tomorrow more is compromised.

## 3. Content and Concepts

It is from tacit knowledge that becomes the innovation. Is necessary to transform the work relations, creating an environment where "to dare" either the rule, with incentives to the allotment and the exchange, guaranteeing benefits not only for the company, but also for its talents. Methodologies as the proposal of Tiwana [5] basically bet in the technology of support and the analysis and existing knowledge audit, supported for tools of Data Mining and Workflow.

It's enormous the amount of data that daily is generated in organisations, that is not used to advantage or is occult, without being either converted into information or knowledge (concept of Business Intelligence) for taking decisions in all kind of business acts. Being Business Intelligence (BI) a category of software that allows organisations to accede, analyse and sharing information, for one better understanding and performance of its business, turns possible analyses that supply excellent information, which, one time distributed through the organisations support the decision making and impacts in brand new knowledge. One of the problems that have appeared is arrested with the fact of the BI system is faced as a software tool and not a solution of management in the capture of the knowledge. Today, the existing types of BI are based on multidimensional systems (based in the verification) and systems based on discovery. The structure of a BI system allows the capture, select, cleanness, transformation, storage and distribution of data (Datawarehouse). At the very beginning a Datawarehouse (DW) is composed for data that have resulted from other data. The level of knowledge demanded in the companies and organisations for taking strategically decisions, business, yield, among others, it is not filled only by a DW solution. A DW is a data collection guided to a subject, integrating variables with time, not volatile and utility to help the processes in the taking of decisions. Being a dynamic system, the totality of the data originating multiple sources must be stored in databases, integrated and coherent between itself, preventing in this way logical dysfunction's.

A BI system is the implementation of a system DW being that, later analysed and worked to a metadata level, and they characterise systems Decision Support System (DSS). Drawn and a well construct BI system validates solutions with a reliability next to 100 %. DSS systems are specialised systems of information offering operations for data analysis, habitually as support to decisions taking. When an organisation lacks on a system of support to the decision, the dedicated times to construct the required information are changed exactly into a problem in itself. The data that they get are scratch and is necessary transforming it into information. The decision support systems deciding this problem facilitates the access to the information, users and technicians. As information system a DSS process join some components: source databases, a DW, OLAP (On Line Analytical Process) tools, multidimensional databases and other accessing information tools.

The Data Mart (DM) technology is a data system with identical characteristics like a DW but with some differences that interest to identify. The DM is used to decide a specific problem of a department, part of the organisation or in the taking of a prompt business decision. Its implementation is cheaper

comparatively DW. A decided time, one determined problem and the DM leaves to have utility and, in general, it will not be reused. A DW can, in this way, to dissolve itself in small DMs. With base in these necessities duly identified, companies specialised in this TIC sector, conceive a DM whose purpose is to add all the customers characterisation, implementing the processes for its feeding and the treatment of the quality of the data of some entities. Once the DM is loaded, the models of prediction for the campaigns of interaction with customers are successfully drawn. It is considered that the integration of the DM, total adapted to the specific characteristics previously identified, allied to other projects like CRM (Customer Relationship Management). These aspects will get success in campaigns that if they intend to carry through, guaranteeing the possibility of ROI (Return on Investment) adjusted.

The data analysis for the taking decisions highlighting another KB technology. The Data Mining concept. The solution pass through automation tools for repetitive tasks and systematic analysis of data, tools of aid for the cognitive tasks of analysis and, still, its integration in systems that support the complete process in the knowledge discovery. The extraction of knowledge from a database is the process of an identification of valid standards, new, potentially useful and understandable, inlaid in the data. The systems based on the discovery (Data Mining) are capable to find information and knowledge, occult and not obvious, in great volumes of data and one it automated forms.

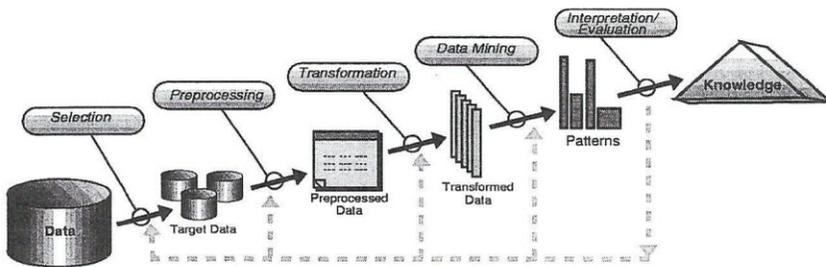


Fig. 1 – Creating Knowledge with Data Mining Techniques .

Other technologies like Web Mining, Group Ware, Workflow, e-Learning and methodologies for construction of portals that, being important equally, could be developed and boarded in future works. The following expression à  $BI = DW + DSS$  (OLAP... Data Mining... Web Mining) looks for resume and summarise the meaning of this (meta)computation alliance to knowledge.

#### 4. The use of narratives

Opposite to the approach proposed by Tiwana [5] is the perception of tacit knowledge, resulting from working knowledge, which is moulded and crafted through re-representations, creating a genealogy of historical sediments of layers of knowledge representations [6] The tacit knowledge depends on factors as the social interactions and relationships, work experiences, inside motivations and sharing ideas. Most of them turn explicit in the right moment, like a lightning in a storm. But the biggest part of this tacit knowledge remains inside the actor, never coming to day light in a useful way.

Stimulating a share of experiences, as we can get in a community of practice, permits a valuable understanding how knowledge is formed, created and circulated. Only few organizations worldwide follows a model similar to the proposed by Andersen [7], creating the infrastructure, the culture and the systems that could support these communities. Even not having real figures to confirm the feeling, we will say that even less actors inside the Organizations took real advantage from these environment. People working in teams, with well defined objectives and metrics, to achieve them are obliged to work so, confirming Lam [8] "knowledge is generated and stores 'organically' in team relationships and the mode of coordination is human-network based. This type of knowledge amenable to systematic codification and can only be accesses and transferred through intimate social interaction".

And these techniques and environments are quite recent, leaving outside this reality those info-excluded by age, culture or principles. How to interact with these actors, specially if they are already retired or very close to it? Should we loose the knowledge they accumulate for a working life time? Should we ignore all the experience and added-value they brought to the Organizations during decades? Should we strike out the good and bad (specially these ones) actions taken along the years?

In the assertion the use of narratives could be an exciting and successful way to capture and reuse the existing tacit knowledge. Leif Edvinsson [9], affirms that Knowledge Management is a small amount of Intellectual Capital, which can be divided into Human Capital (intelligence, capability, aims and potential) and Structural Capital (processes, clients, systems and business units). The Human Capital is the focus of our investigation project, specially connected to the info-excluded workers, as defined above, and the one that more difficulties presents to be captured.

For years several investigations have been looking for models that allowed the enrolment and transfer of knowledge. One of them, at the very beginning, rule based, sets boundaries to the creativity when trying to explain and normalize knowledge concepts, something that has no pre-defined rules. If we associate the concept of Knowledge Engineering (KE) to the Knowledge capture we could find answers for models, supporting complex information problems, hard to observe and distinguish, in specific domains, connected to tasks we should realise. Remains, at least, one problem! We should not accept the concept of KE as a data mining inside people's brain. The main idea is to find models helpful for modelling different aspects of Human Knowledge, laying in narratives as first step for collecting knowledge.

### 5. Narrative – how to get value?

The knowledge work is not static and is achieved from a concerted and highly heterogeneous effort with actors, artefacts and other externalised sources of knowledge [10]. The identification into the organisations and society the main actors, whose expertise will be helpful depends upon the goals we intend to achieve. It could be an expert as an electrician, as a teacher, as a doctor... The domain is different. Even so the method to capture the tacit knowledge supported by narrative should be the same. As the source quality control. A story teller, by definition, adds personal facts to a story. To guarantee quality and usefulness to the narrative, the source and the story must be credible and irrefutable.

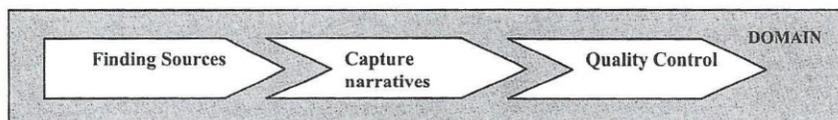


Fig. 2 – Collecting narratives

To start this conceptualisation we recall the concept of ontology as assumed by Gruber [1] in the context on knowledge sharing – a specification, a description of the concepts and relationships that can exist for an agent or community of agents. For what we want this ontology? We need in some way to connect the collected narrative to a knowledge domain and to a set of objects that will represent it. This ontology will define a vocabulary and semantic, with which we can interact with the narrative – queries or assertions, the relationship among objects, but also will be a guarantee of consistency and commitment, needed for reuse.

If possible the narrative itself will be collected in direct speech, coordinated by a Knowledge engineer. This one should be someone with some sensibility to the theme, in a way that could get the maximum value from the narrative, conducting the story teller to the reality of facts and actions. It's not necessary that the Knowledge engineer be an expertise on the subject, but someone who has the necessary knowledge to understand the narrative and put the right questions in the right moment. He should be a good listener – opposite to the story teller, who should be a good speaker - conducting the story teller to bring some scientific or technical approach to the story. Some of the quality assurance happens here.

Some story tellers has a preference for writing instead of speaking. This approach must not be put apart. This kind of narratives will have more accuracy and a different style. Should we reuse them? First of all the story is a story, doesn't matter the support. And the knowledge is there to be capture. So the answer is yes, and the ontology must be prepared for whatever mean we achieve the goal – paper, digital, speech or movie. The contents, the issues and the quality are the main concern, as the intellectual property of the story teller.

## 6. Conclusions

Who doesn't like to listen a story? How much of our knowledge hasn't been originated in old stories and more recent experiences we read and listen along our life? Today in a rush and a global society, people tends to overcome the time spend in real communities where the people interaction exists, against the virtual global communities more richness in contents, but where the human interaction is lost. But an important part of society stays aside, for different reasons. And these people have inside richness that will be lost for coming generations, if not acquired.

If we look for the 20th century as the motor for great successes – for all kind of sciences and arts, that century could also be connected with several great wars, new concepts of family, eradications of cultures and human habits. If we saw a new global society emerging, we go on with the real feeling the info-excluded are massive and more and more excluded and poor in mind and in culture. These info-excluded lost the traditions that make them survive for centuries and could not find a new form to achieve well being. A way to overcome this problem is to construct a bridge, that connects the two sides of a deep river. And this bridge can be supported in stories and narratives, that more easily arrives to different people, from different culture.

We propose to capture this knowledge through narratives, supported by an ontology approach which will give the possibility of reuse, search and refine. The technology to support this ontology should originate a KB system where multi-agents interact giving the possibility to acquire and cross different knowledge and cultures. Should this KB system be invoked in Organisational training sessions? Could it give the opportunity to share experiences and provoke discussion, side by side with the introduction of themes and concepts?

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## ONTOLOGY AS AN INTEGRATING ELEMENT IN AN INFORMATION-KNOWLEDGE INFRASTRUCTURE

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Today, knowledge is considered to be the most important resource in an organization. Knowledge is believed to enable innovation and help against the quickly changing business environment and fierce competition. The information-knowledge infrastructure is an interconnected network of information and knowledge processing nodes or elements that forms a whole together with principles and guidelines about the use of such a net. The infrastructure should form a framework that allows the knowledge processes to be performed. Ontology plays an important role in understanding the meaning of various concepts. Thus ontology is crucial for building systems that handle with information and knowledge assets gathered in an organization.

### Ontology

The possibility to share and reuse knowledge is central for any knowledge based system and infrastructure. For this purpose it is necessary to specify a formal representation of knowledge that would serve for the conceptualization of concepts, entities and their relationships in a certain area of interest (Genesereth 1987). Conceptualization offers an abstract simplified view of a reality. Some kind of conceptualization can be identified either explicitly or implicitly in every knowledge base or knowledge base system (Gruber 1983).

The particular specification of a conceptualization is called ontology (Gruber 1983). Ontology is the term borrowed from the philosophy where the meaning is predominantly on the study of being. In the computer science ontology specifies the representational vocabulary with which knowledge-based systems represent knowledge. According to Guarino, ontology can be understood as an intentional semantic structure used to capture and encode the implicit rules constraining the structure. Ontologies are aimed at answering the question "What kinds of objects exist in one or another domain of the real world and how are they interrelated?" (Guarino 1995). Thus, ontology is used to capture knowledge asset objects in the organization so that they can be reasoned about or be otherwise used and processed.

Ontology is based on logical model that enables concepts to be defined as well as described in some declarative formalism such as language. Mostly the ontology consists of description of concepts and other representational terms those are then processes and handled by application with some specific purpose.

The ontology can serve various purposes. Today, the development of ontology is mostly guided by the following intentions (Uschold 1996):

- promoting common understanding among a group of people (experts, engineers, etc.)
- communication support among computer systems enabling interoperability between heterogeneous application with different data sources