CULTURAL MAPPING: THE SEMANTIC WEB AS A SURVEY TOOL FOR THE CONSTRUCTION OF THE CULTURAL PLAN

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The research falls within the studies of the methodological approach to the cultural planning. In particular, we have focused on how the technique of cultural mapping, which is currently considered the first phase of the construction of the cultural plan, might be considered the key to identify the potentialities of the territory in the framework of urban development. We suggest an idea of cultural mapping as a process of gathering, recording, analysing and, finally, synthesizing information. We mean a method to describe and depict resources, networks and links within a group or a community. In our scientific approach cultural mapping is not only used as a mere tool of gathering information, but it becomes also a means of consultation, in order to highlight the cultural traits of a community or a city, involving citizens in the decision-making. All this is possible thanks to new technologies.

Introduction

This study is emerging from a more general research which focuses on cultural planning. In particular, our research group aim to contribute to the ongoing debate on the prospects of potential instruments for the future development of this discipline; prospects that will be studied over next years. The start point of our research is the assumption that cultural mapping[5] is a key element of the cultural planning. In fact, cultural mapping, in addition to be one of the most suitable instruments for cultural planning, is now considered one of the first moments to be considered for the construction of a cultural plan. However, the concept of "cultural mapping" is not a new one. Over the time it has evolved as a means to understand and present the history of indigenous people or to describe their traditional activities within a given territory[6]. Nevertheless, unlike other analysis the object of study includes both assets and tangible and intangible resources, such as identity, relationships and possibilities. Therefore, an initial phase of quantitative evaluation of cultural

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[5] "For planning you need mapping", said Patrick Geddes hundred years ago, the founder of Town and Regional Planning in the UK. This is the crucial part of a planning process, it is the moment you can better imagine what you tend to.

[6] The mapping technique has been used by agencies such as UNESCO (United Nations Education, Scientific and Cultural Organization), ASEAN (Association of Southeast Asian Nations) to direct interests such the land rights deriving from the traditional land use (tenure mapping) and the languages preservation.

resources is followed by a subsequent one of deepening through the qualitative analysis of resources, activities and policies. By UNESCO cultural mapping is considered an indispensable tool for humanity: useful for understanding natural and cultural landscapes. Furthermore, it is used for myriad of aims. The use of cultural tools and cultural maps oriented in this direction are essential to UNESCO as a crucial first step in achieving the protection of cultural diversity. *"Cultural mapping involves a community identifying and documenting local cultural resources. Through this research cultural elements are recorded – the tangibles like galleries, craft industries, distinctive landmarks, local events and industries, as well as the intangibles like memories, personal histories, attitudes and values. After researching the elements that make a community unique, cultural mapping involves initiating a range of community activities or projects, to record, conserve and use these elements. …the most fundamental goal of cultural mapping is to help communities recognize, celebrate, and support cultural diversity for economic, social and regional development."*[7].

The cultural mapping as a moment of survey

According to what was said in the paragraph before, the cultural mapping in its primary shape is used as an investigative tool. Within the cultural planning an initial phase in which we make an inventory of cultural resources through a direct survey - which can be combined or omitted in case of previous analysis - is followed by a second phase of qualitative analysis which refers to the characteristics of place, lifestyles, social relations, etc. All these aspects, by their nature, need to be treated in a qualitative way. This second phase is the most pertaining to the cultural planning. Thus, the cultural mapping - the primary instrument of research - here becomes also a means of consultation, in order to highlight all of the traits that define the culture of a community or a city, as well as to engage citizens in decision making. In view of a social democratization and a democratization of culture the cultural mapping can be seen as an instrument of social and political inclusion of individuals or communities involved in the definition of cultural offerings and social services.

It is the instrument through which it is possible to realize a participatory policy by involving actively the community and citizens, in order to make them not only objects but also subjects of the planning process. In this way community and citizens are involved in the discovery or rediscovery of their values and resources for political and cultural development[8].

According to Amareswa Galla, the cultural mapping aims to create a "*more sustainable and lively community, more cohesive community networks, a greater confidence and direction based on a sense of oneself and of the place and an enhanced capacity of the community to address their own needs. Pursuing*

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[7] Keynote speech, Clark, Sutherland & Young 1995. Cultural Mapping Symposium and Workshop, Australia.

[8] Mercer C. (2006), *Active citizens, local cultures. European politics,* paper presentato al Barcelona Working Meeting, 22 Settembre 2006.

this aim, it requires an inclusive structure which recognizes the cultural aspirations of different community groups, included those who otherwise might be culturally, socially and economically marginalized" [9].

Thus, the cultural mapping helps to understand and share the culture, to rethink the history and promote creativity and development[10]. Therefore, it creates a new perspective and prepares the ground for an effective cultural planning through the use of a versatile and highly communicative instrument, even thanks to its graphics (the map). It seems both a technique to shape a community and a tool for the integration of cultural diversity for social and economic development. Cultural infrastructures can be mapped and used in the social and economic development processes to encourage and preserve cultural diversity. This is a key element in strategic planning and a survey instrument suitable for cultural planning.

Considering that the cultural mapping is a ductile instrument, malleable to the needs of use[11], it shuns a concise and precise definition, detached from the context. Concerning cultural planning, Marcia Langton considers the cultural mapping essentially a process of gathering, recording, analysis and synthesis of information, a method of depiction and description of resources, networks and ties in a group or community[12]. Therefore, she describes it with the following words: "Cultural mapping evolves the identification and recording of an area's of indigenous cultural resources for the purpose of a social, economic and cultural development. Through cultural mapping, communities and their constituent interest groups can record their cultural resources and practices, as well as other intangibles, such as their sense of place and social value. Subjective experiences, varied social values and multiple readings and interpretations can be accommodated in cultural maps […]. The identified values of place and culture can provide the foundations for cultural tourism and planning and eco-tourism strategies, thematic architectural planning and cultural industries development"[13].

Culture and experience shape the belief systems, the type of education, media, tourism, community development, planning and creative industries, which in their turn affect people's perception of places. This is essential to understand the factors that influence people's perception of places, with particular attention to the personal and community interpretation of culture. So, cultural mapping is declined both in literal and in metaphorical meaning, as it goes beyond strict maps aimed at understanding the territory; at the contrary, it includes even the information related to other cultural resources recorded with alternative techniques. Cultural mapping spheres are wide and varied; there are different kind of resources (for instance anthropological, sociological or archaeological; linguistic, topographical, botanical or of musicology).

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[9] Galla A. (2003), *Culture in Development: Subaltern Perspectives,* paper presentato alla "Stockholm 5+ Conference", Stockholm: Swedish National Commission for UNESCO, 4 Maggio 2003, p.4

[10] 2010 Legacies Now, *Creative City Network of Canada* (2006), op. cit., p.43.

[11] 2010 Legacies Now, *Creative City Network of Canada*, (2006), op. cit. p.35.

[12] Legacies Now, *Creative City Network of Canada* (2006), Cultural mapping toolkit, <www.creativecity.ca>. p.19.

[13] Langton M. (1994), *Valuing cultures: recognising indigenous cultures as a valued part of Australian heritage*, Council for Aboriginal Reconciliation, Canberra: Australian Govt. Pub. Service, pp. 19-20.

Collected data can be represented through a variety of formats - such as maps, graphs, diagrams, aerial photographs, satellite images, statistical databases - and, in our case, made sources of knowledge with semantic interoperability, able to break down cultural differences and with a high accessibility typical of the web.

From all this, the global view of cultural resources can be archived and documented data will serve like invaluable information for developing national strategies useful for accurate analysis on people, places and environment. From this point of view, the potentiality of cultural mapping as a means of social inclusion, as well as analysis and consultation, are amplified. In general, cultural mapping can be used by all the stakeholders interested in developing solutions to problems regarding culture. Its strength resides in the fact that it is a cooperative process which aims to ensure national and regional cultural objectives as well as the inclusion of cultural policy as a key component of development.

Cultural mapping is important because it allows us to respond to great geographical and social issues. Maps are useful to understand and identify spatial links and to explain concepts in a visual way and, in other words, easy to understand. Cultural mapping by its nature is considered a technique able to help in decision making exactly because of its unique property to make visible invisible things; thus, it provides a real awareness of people, history, identity and produced knowledge; so, it contributes to promote the spirit of cultural pluralism.

Besides, cultural mapping becomes today a strategic tool for identifying and highlighting local potentials, unique resources and perspectives in local development processes, especially where cultural-led approaches are chosen to deal with issues of competitiveness, specialization and socially sustainable development.

It becomes crucial in small and medium-sized towns where – in order to draw growth trajectories and to face the pressures exerted by the magnitude of great cities – mobilizing the rich and variegated cultural heritage, boosting the local capabilities in producing culture and finding innovative approaches and tools could be key strategies for the next future. These towns have often had a long history and a strong tradition as poles of cultural production and diffusion, thus, in a moment in which their traditional self-sufficiency is questioned, cultural planning through a permanent assessment and mapping of resources and potentials allows to re-think their role within the increasingly connected networks of towns and cities.

Through cultural mapping we also obtain:

- *Documentation about cultural resources*: the map serves as a container of knowledge and local resources. In the without borders contemporary society it is useful to be able to document local traditions and historical sites that are disappearing from collective memory or are deteriorating at an unprecedented rate;

- *Community empowerment*: the cultural mapping is more effective and useful when the local community is involved in the identification and mapping of resources considered significant by the community itself. This participatory approach often generates a shared/common sense of belongings and fosters pride in their cultural roots, increases the community decision-making power and instils a deep sense of cultural identity;

- *Effective management of cultural resources*: in the cultural mapping process it is expedient for local people to exercise some control over their information. Bearers of immaterial knowledge and holders of material goods, they determine what kind of map can be produced or what method can be used in managing these resources. In this sense, a high degree of control by the community on its cultural resources should be encouraged;

- *Economic development of the community*: in cultural mapping systems of knowledge deriving from arts and traditional crafts or farming practices are rediscovered and made known to the community and other users. These ancient practices as well as skills can be reinserted into the system, taught revitalized, and applied to new creative ways of production aimed at the sustainable development of the community. New job opportunities can be created;

- *Transmission of local knowledge systems*: when cultural elements are recorded according to tangible and easily understanding manners, it becomes possible to pass on information and cultural heritage from one generation to another and from one country to another. Needless to say that expressions and oral traditions have the same importance and validity, but tangible and visible knowledge, values and spiritual forms are more relevant and credible evidences to affirm one's identity and rights on local or international scene;

- *Promotion of intercultural dialogue*: different heritages and histories are identified; they are stored and shared in time and space, creating a significant support for the expression and emancipation of different cultures, enabling intercultural dialogue.

There are various techniques for creating a cultural mapping. A map of the culture may not contain all the cultural events of a place. It must rather communicate clearly and show a limited number of objects. It is an approach used to identify, record and use resources and cultural activities for the development of communities. It is shown what is important for the community, such as what you want to keep, what you would like to change, the potential tourist sites or the roads. It develops an imaginary representation which combines the instances of the different aspects of a culture, maximizing the creative potential of a community.

The set of tools can be applied to different fields:

- Within an overview of regional or local cultural policies; especially as a framework within which it is possible to identify the different cultural policies;

- From a strategic point of view it is possible to include cultural planning among the means to pursue one or more objectives of a strategic plan;

- Moreover, it can also be applied in policy and planning of small and medium urban realities, to encourage active citizenship, to restore lost values or to identify priorities within a plan in a degraded or in decline environment;

- Finally, the cultural planning and, in particular, the technique of cultural mapping are useful to identify those that Amartya Sen defines basic capabilities within an urban community or an entire urban environment, working within macro-categories in a sustainable development view.

Mapping network

The original concept of cultural mapping, expressed by Marcia Langton and quoted above as a method of representation of resources, networks and links in a group or a community with their own geographical location[14], has evolved as a consequence of the development of informatic technology, settling finally the extension of cultural mapping to the Internet.

Here, an object (a resource) is characterized by an additional "network" coordinate, in other words, an address (URL) that uniquely identifies the object on Internet.

The network mapping offers extraordinary opportunities since it connects the intelligence to current web structure. The web we know today, the resources are connected by a physical infrastructure (the Internet), but not from a semantic point of view. Carrying out a network based on concepts, and not only on physical connections and keywords, can be a great advantage as real "intelligence networks" can be achieved even though they are limited to specific areas of interest[15]..

Towards semantic interoperability

Sharing knowledge on the Web means that you can have at your disposal tools and technologies which allow to express the contents and to structuralize and adequately show them. It makes explicit the semantic and allows everyone to enjoy information, regardless of particular cultural background and technological context.

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[14] Where objects have coordinates that identify the position on the territory

[15] An interesting example from this point of view is the SISC project (Semantic Information System for Culture), being developed by the University of Venice IUAV and culture sector of the Veneto Region, with whom he is developing a semantic web aimed at testing cultural workers in the Veneto. The network operator is the product of a first phase of the work done by publishing on the web, each operator cards "available to the machine" and developing an ontology and linking the content of these cards. Cultural assets are not counted and not defined a priori universe bid; vice versa cultural operators are enabled to pro-pose each freely what they offer and to enter the network according to the canons of collaborative networking.

In the field of cultural heritage, in which tradition and cultural settings coexist and are difficult to change, it is important to achieve the semantic interoperability, breaking down cultural differences, without forcing anyone to give up his/her own.

This problem seems to find possible solutions within the context of the research "Semantic Web", which combines skills and different interests, pursuing the objective of creating a Web in which the interaction between machines takes on great importance. Furthermore, the information, enriched by metadata, can be used in a more effective way by intelligent software agents. An essential feature of the cultural heritage sector is the deeply multi and inter-disciplinary approach. Cultural objects are not isolated entities. At the contrary, every piece of information should be placed in its spatial, temporal and cultural context, according to associative paradigms based on space, time and semantic relationships between concepts and, sometimes, on their combinations.

The approaches commonly adopted in other application environments are not always adequate, for example, the temporal aspect has a particular valency as both geography and the meaning of some terms may change over time, and a lot of dates are known with approximation. As a consequence, it is necessary to define a suitable temporal algebra which allows to manage correctly the dates (punctual or durative), their order and any superimposition or disjunction of time intervals. In a broad and decentralized context such as that of the cultural heritage and the Web, the integration of information is particularly important. In this process the role played by a core ontology is essential: its aim to provide a global and extensible model in which data from disparate sources can be put in correspondence and integrated.

This canonical form is able to provide a single base of knowledge for tools and cross-domain services (resource discovery, browsing, data mining). The existence of a single model reduces the combinatorial complexity that arises from the attempt to put in correspondence the individual formats of metadata or ontologies. The distinction[16] between a core ontology and the definition of core metadata (eg Dublin Core) is thin but important. Although both seek to integrate information, they differ as to the importance attribute to the comprehensibility by a human reader.

Metadata are compiled and used primarily by humans, while a core ontology is a formal model used by tools which provide integration of various data sources and perform many other different functions. Consequently, while human factors, particularly the readableness, are a key element in the definition of core metadata, a core ontology can accept a greater level of complexity, focusing on the completeness and logical correctness and not on human comprehension. All data are fitted out with metadata, whose semantics is coherent with that one adopted by the conceptual model of the domain. The possible relationships between descriptive

[16] Doerr M, Hunter J., Lagoze C., Towards a Care "Ontology far Information Integration", **Journal of Digital Information**, vol. 4, n, 1, article 169, 2003

elements and metadata are contained in a space of concepts (concept space), which is used by software agents to identify possible associations among documents and to implement the appropriate interaction paradigms (space, time, classification, and their combinations). The space of concepts is not necessarily unique; therefore, it needs a translation and harmonization function between a descriptive scheme (data or terminology) and another.
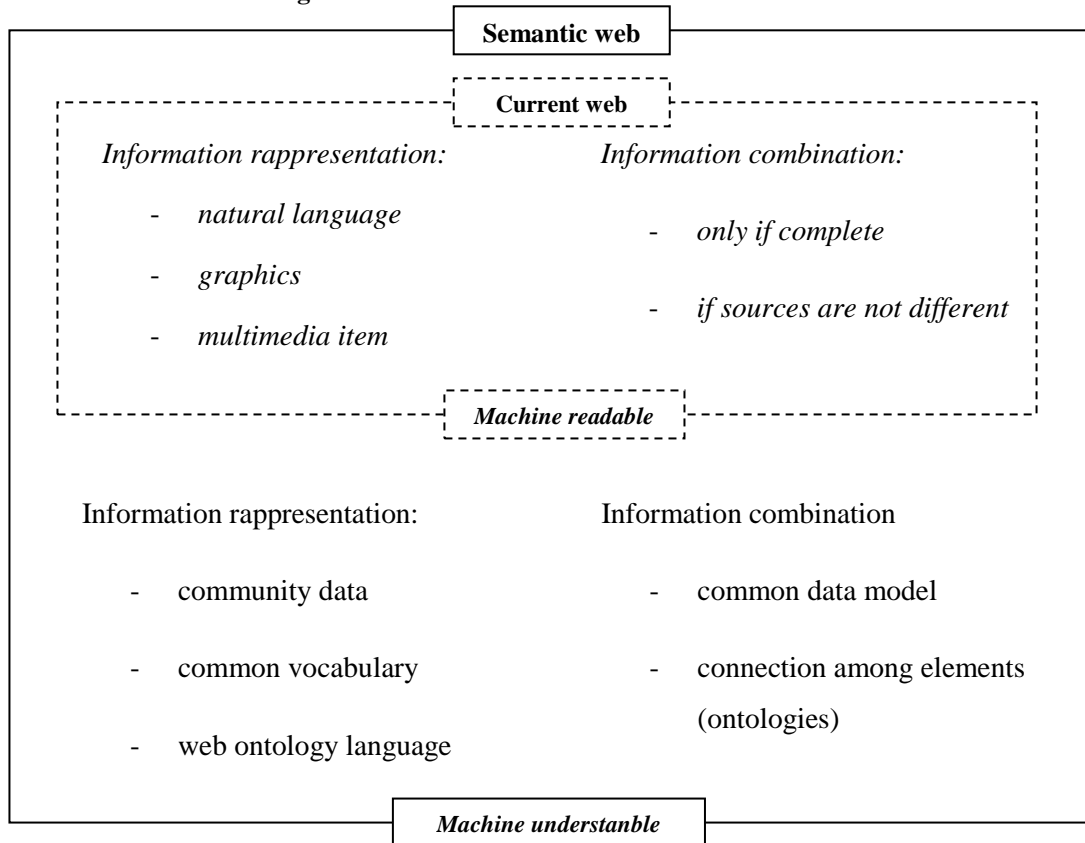
Interoperability is the ability of an informatic system or product to cooperate and exchange information or services with other systems or products in a more or less complete and devoid of mistakes way, with reliability and resources optimization. Thus, the aim of interoperability is to facilitate the interaction among different systems as well as the exchange and reuse of information even among non-homogeneous systems (both for software and for hardware).

Interoperability is on the ground of:

- Diffusion of marking languages in the exchange of structured information among administrations, providing dimensional elements in order to determine costs and possible action priorities;

- Organization and method of feeding a repository of marked and structured information exchanged by governments through interoperability services, or applications services; within the proposal it must be tackled the problem of the optimum modality of relationship between spontaneous agreements and coordination initiative;

- Analysis tools help the marking of documents, as regards their standardization and the maturity of the market;

- Measures to promote the use of XML, designed to improve service allocation/supply to citizens and firms.

Figure 1 - the current web and the semantic web

Semantic web	
Current web	
Information rappresentation:	*Information combination:*
- *natural language*	- *only if complete*
- *graphics*	- *if sources are not different*
- *multimedia item*	
Machine readable	
Information rappresentation:	Information combination
- community data	- common data model
- common vocabulary	- connection among elements (ontologies)
- web ontology language	
Machine understanble	

For an ontological scheme

Ontology, a discipline that has always been placed in the philosophic sphere, has now become an "essential element of the information technology studies". This is possible because the meaning of the "study of what is" in reality is not changed; of course, it is changed the way of use. Thus, it is not a dialectic speculation upon being of things, but on how things are related to each other and to the qualities that characterize them. The relationship between the two meanings is really narrow as on philosophical ontology are based the assumptions with which the computational ontology defines the meaning expressed by a dictionary. The computer functions, founded on the representation of reality and on knowledge related to it, must necessarily depend on methodological criteria of "what" and "how" representing. This justifies the double meaning of the term ontology:

- Ontology as a philosophical discipline that allows the interpretation of reality (also called conceptualization);

- Ontology as a specific vocabulary used to describe a certain reality (or domain).

We are interested the second definition of ontology. It derives from the need to refine the results of technological searches taking advantage of the possibility to group objects into classes of concepts and to

define them using ownership terms; so, every element that pertains to a class shares with other elements some specific properties. If these properties, that in our opinion belong to an object, was lacking or even did not exist, the concept we gave to an object could not be included in that class of objects. We conclude that there are prototypical properties (such as space-time dimension that is common to all physical objects) and other properties that distinguish the subclasses.

Therefore, identity is used to identify in a formally valid way the ontological nature of properties and to set out in a taxonomic structure the concepts that define them; this is to draw the roads which link the elements of the domain and to move better between these elements.

At this point, it is necessary to develop an ontological scheme. Otherwise, we are condemned to build applications that are not extensible, too dependent on the particular situation[17]. Building an ontology means to realize a data structure of a domain that contains the relevant entities and their relationships. In short, we can define ontology as a formal representation of one part of reality which contains all entities related to itself as the relationships among them, rules, axioms and specific constraints of the domain. Thus, it is clear that, when there is a specific ontology (which means referring to a single domain), there is the possibility that some computer[18] programs can use the ontology for a variety of purposes, including an inductive-semantic reasoning.

We can have two types of ontology: of either purpose or domain. The purpose ontologies may include even cataloguing and archiving. To create a purpose ontology we must build a concepts structure which describe the filing, highlighting some attributes: author, title, content, date and location and even the archivist. These concepts can be simple strings, as, for instance, the date, then they will report only one value, or they may turn to other classes. The content will aim at an abstract or something similar, the location at a path, etc.

An operation like this seems very similar (and to someone it also appears to be easier) to a simple database, as it is able to manage this kind of links between data.

The difference between a database and an ontology lies in their purpose: the database stores the data, while ontologies, as xml file, want to describe a structure and give the some pre-information about the objects. The domain ontologies are the result of those purposes. In fact, ontologies are modelled in classes. With the inheritance mechanism it is possible to define just once the attributes that classes at the same level inherit from an initiator. The ability to define as an attribute value another class allows to establish any kind of

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[17] For example, to describe the functions of the classes that compose a system you must use a scheme (today used the XML). When we do not need to provide the scheme with a direct access to data and should model complex relationships, the ontology language (such as RDFs) are excellent solutions.

[18] This type of classification of *everything about a domain* can help the inexpert user. These, often, do not know precisely what they search and, in its research, tend to use generic terms of natural language rather than precise concepts. A semantic browsing, which is able to use a ontology specification, can support a navigation based on concepts and relationships among elements of the same ontology. We conclude therefore that, the more accurate and specific is the ontology, the more positive is the result.

relationship among the same classes. These relationships may express the value of that attribute using only instances of the class it points to. There are several ways to model classes. We will follow some notes only to clarify the concepts that are on the ground of a dominium.

First of all, it is not worthwhile naming some classes with singular and other with plural names, as each class represents only one category and only an scheme. For this reason you must choose a single way of behaving, that is naming always in plural or always in singular.

Moreover, it is to be considered that the tree of ontology must be balanced in the granularity[19] as it is useful to get the concepts connected to each other, avoiding to build a class with a very high number of children; this is the sign of the presence of a deficit of definition. In order to avoid ambiguity, we must seek common ownership among the various child classes of A, to group them by adding new classes, avoiding the oddities of the modelling of classes with only one child[20]. It also seems clear that, applying ontologies in different domains (which allows to relate even more domains and, thus, to create a constitutive ontology or upper ontology), we are able to represent and share knowledge; in this way, we will facilitate the communication and the exchange of information between different systems.

In Cultural Mapping ontologies are created keeping in mind the predominant specificnesses of the area under investigation. Only through a correct composition of words (both substantive and qualificative) it is possible to map one on the other. In many situations, there are already[21] catalogues of cultural heritage; thus, they can be imported. However, this does not preclude us from a more determined commitment that comes from a developed literary consultation that tell the place, build the story and describe the mutations. From these sources it is possible to extrapolate the ontological vocabulary related to cultural heritage and create logical connections between the sequence of events, such as relations with other specificities, or environmental and natural goods. With this sequence of actions it can be traced to the terms (in use or missing) that more specifically highlight the relationship among nouns that promptly refer to a cultural reality; choosing the areas, which, although different, can be summarized in the following categories: anthropological, sociological, archaeological, genealogical, linguistic, topographical , botanist, musicology, etc. At first, the mapping takes advantage of the mechanism of importing existing ontologies (inventories of museums, libraries, archives, etc.); afterwards, the existing ontologies interact with the new specifications, giving rise to semantic concepts. Through a formal description of classes, concepts and relations among these classes, we want to establish connections among objects which describe a "consistent piece of the world", as they will be useful for the optimization of sharing knowledge processes (domain knowledge).

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[19] If a class A level 5 (because it has on a branch a father 2, a father 3 and a father 4) has as father an object insert in Class B Level 2, it probably means that you are not sufficiently detailed the granularity of the branch of class B.

[20] Splitting a class means to establish that some properties and characteristics must refer to different objects.

[21] The cataloguing that we find in relation to a territory-type database and refer to specific areas of knowledge. Forexample, the lists found in local museums, or libraries.

All things considered, in the development of a semantic search system, we would go to verify its applicability in different situations. In the case of our research, specifically if inserted in the cultural sphere, we should deal with all those cultural institutions that preserve a series of objects that, unlike, witness the evolution of human beings (museums, archives, libraries, photographic libraries, etc.). The same cultural institutions - such as archives or museums, or libraries -take over cataloguing systems supported by sometimes very different organizational logic. And we can not disregard it. The action we undertake aim to produce an ontological vocabulary that takes into consideration and circumscribes the area under investigation, to avoid the creation of those specificities that do not have any other branches. In order to do this, it is necessary that a direct collaboration with operators of those cultural institutions so that we can refine the ontology, to make it as specific as possible within the domain.

PERSPECTIVES IN CULTURAL ASSESSMENT

The examined themes of cultural planning in recent years by the research group are also closely linked to the disciplinary field of evaluation. So, the valuation of assets, activities and cultural policy is becoming an important tool for decision support for policy-makers and practitioners in the cultural sphere. Approaches, models and evaluation techniques change; they depend on

considering culture as general a condition, a factor or the final product. The evaluation of the final product is similar to that of a good (proven, public or quasi-public) to the total costs needed to produce and direct and indirect benefits it generates. The economic approach has to provide a conceptual and technical-analytical support, for the applications which aim to assess costs and benefits of changes in the stock of cultural resources and services offered by the cultural heritage. Defining a system of relations among concepts, an ontology allows to define an object (in our case, a web resource) as an instance of the ontology itself; this takes all the links and the characteristic properties of the class in which it is placed, taking all the implicit knowledge in this system of relations.

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