Handbook on cultural web user interaction

First edition (September 2008)

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Digitising Content Together

Ministerial Network for Valorising Activities in Digitisation

eContent

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edited by the MINERVA EC Working Group
"Quality, Accessibility and Usability"

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Foreword

"User needs" are at the core of the MINERVA project's approach to the themes of the quality and accessibility of cultural institutes' websites. "User needs" highlights the main focus of a communication tool that, since 2002, has had users as its central reference point.

Since 2002, following an extended process involving analyses, studies and research undertaken and carried forward thanks to the commitment of many experts from several European countries, representing all types of cultural institutions, a series of tools, handbooks, guidelines and recommendations have been produced.

These outputs have all had the objective of helping and facilitating institutes to create high quality, accessible websites that effectively represent and communicate the quality and excellence of the European cultural heritage: the *Handbook for quality in cultural websites: improving quality for citizens* and the *Principles for quality of a cultural web application* with the relevant *Handbook.*

A prototype of the cultural website "Museo&Web" was prepared on the basis of the first MINERVA manuals. For cultural institutes, this site forms a further work tool that illustrates the use of the contents of the first handbook, both in the design and the implementation of a website.

A further stage in the MINERVA process, achieved within the sphere of the new MINERVA EC project, is represented by the work within this handbook. It deals with the relationship between user and web application in the light of the developments and new online models that have emerged in recent years. This is a practical manual focusing on interaction with users on the web, that also investigates the current Internet trends, strongly orientated towards collaborative functionality, user interaction, social networks and sharing, the evolution of the Web 2.0 and the new challenges of the Web 3.0.

In presenting this work I wish to thank all those who have cooperated in the MINERVA initiative, the authors of the texts and the many colleagues who enriched the debate with suggestions, comments and proposals.

Rossella Caffo
MINERVA EC Project coordinator

Introduction

This handbook has its origin in three statements, often reasserted in past MINERVA activities:

- the quality of a digital cultural project reflects decisions that are taken at the earliest stages;
- most cultural digital projects should be available to the widest number of users. In 2001, the Lund Meeting conclusions identified the "lack of simple, common forms of access for the citizen" as one of the main barriers, while two years later in Parma digitisation was highlighted as an essential step to providing "improved access for the citizen to that heritage, enhancing education and tourism";
- In order to meet the users' needs as much as possible, and to offer easily-used online facilities, digital cultural applications must be user-centred from their very inception.

Since the beginning of the MINERVA activities on web quality, we realized that central to these three aims is one core issue: **user interaction** and **satisfaction**.

In the first steps of MINERVA work we concentrated our attention on the dissemination of best practice and the generation of essential guidelines aimed at cultural institutions about the web as a *new* medium of communication and interaction. We suggested that websites shouldn't be separated from other activities of the cultural institution, that technical issues may be easily faced by using standard vocabularies and widely accepted rules, that quality must be conceived as a continuous intersection between cultural content and its use, and that quality can't be taken as a static question.

During the second phase of the project (MINERVA Plus), we condensed the issues on quality websites into ten essential principles, offering some tools to their interpretation and application. But we remained aware that we had not yet sufficiently focused on an essential factor of cultural web quality: the **user**.

The questions we mentioned but left without a satisfactory answer included the following:

- What do users want?
- How do users behave?
- How can we understand their use of our web applications?
- Do effective methods exist to ask users about their expectations (before) and their degree of satisfaction (after)?

The World Wide Web has changed since 2002, and it is changing everyday, giving more attention to the client side of the game. The web (so different from that of the 90's to be named "version 2.0") is becoming far more participatory, and there are now many more opportunities for individuals, in addition to institutions, to make their own voices heard.

European cultural institutions started to test the new tools and to re-think some of their applications in the light of this evolution, even if most of their resources were devoted to the building of common platforms and cross-domain access points, which had been identified as a core goal since the Lund Conference in 2001.

This handbook intends to be an additional resource for cultural institutions and companies, to be read together with the other MINERVA products: the *Principles for quality of a cultural web application: a handbook* and the *Handbook for quality in cultural websites: improving quality for citizens.* The **target users** of the handbook are all the cultural entities and projects concerned with tangible and intangible culture, planning to develop new web applications or to update and improve their existing applications, taking into account the users' point of view.

First of all, the handbook begins with a concise panorama of users and cultural content providers on the web (**chapter 1**), drawing a distinction between the state of the art of "traditional" cultural web applications (websites and portals, chap. 1.1), and the emerging trends in web services (Web 2.0-3.0, chap. 1.2). Both

sections apply to all the different types of cultural institutions, museums, archives, libraries, temporary events and so on, making a small number of core best practice suggestions for each category.

To effectively treat the broad spectrum of information in the handbook, from human-computer interaction to new trends in web user activity, from content selection to interoperability between applications and the models of common access gateways, we needed to benefit from different points of view and knowledge traditions. Our main sources came from the ICT field, from usability and accessibility experts, from the marketing and advertising fields, from cultural sector experiences, and of course from the web user community.

The second part of the handbook aims to integrate the elements of this knowledge spectrum, with the principal goal of guiding our readers in the practical application of what was discussed so far. A series of guidelines are offered to assist the reader to focus on user needs and to reflect user opinions about the use of web applications.

Chapter 2, divided into six sections, answers some basic questions:

- Who am I?
- What are the kind of web applications I may choose to develop?
- When is it especially important to take into account the users point of view on my project?
- What do we mean precisely by "web user": is it a single person, a type, a role, a profile, an account or what else?
- What interactive web services and procedures may I offer to my users? And most of all:
- What are the current systems for monitoring and evaluating user needs, behaviours and satisfaction?

Moreover, the handbook offers **two practical tools** for cultural subjects who want to evaluate the users' point of view (**third chapter**).

The first one is a **self-evaluation questionnaire** for planning a user-centred web application. This questionnaire follows a similar pattern to that used in the *Handbook of quality principles*. It is particularly addressed to cultural institutions which are developing a new web application (or want to update one which is already on-line) and which wish to evaluate user expectations, user satisfaction and the potential for advanced forms of user interaction. The self-evaluation questionnaire may be used not only in the initial stages of the project, but also in the subsequent phases, including the maintenance of the on-line application.

The second practical model is the websites and portals **feedback form**: a standardized interview model to be distributed to websites and cultural portals users. The questionnaire is built on the basis of what was explained in the "Finding one's way" section of the handbook, and bears in mind similar efforts already available on the web. It can be used as a reference for the construction of a personalized questionnaire which reflects the requirements of one's own web application.

Moreover, as we develop web resources, we need to consider a basic issue: the importance of using tagging and metadata to grant visibility and *findability* to our contents. The **fourth chapter** of this handbook focuses on this topic, and presents some practical tools for addressing it. Even if in some environments, such as libraries, the metadata standards are well known and used on a daily basis, we believe that a brief overview of the *Dublin Core* metadata element set may be useful for everyone. In addition, this chapter also includes some information on syndication techniques and languages and on the next step: the semantic web.

References to relevant documents and studies from other institutions and European projects are included throughout the text of the handbook.

Monika Hagedorn-Saupe
MINERVA EC Working Group
"Quality, Accessibility and Usability" coordinator

1 Users and cultural contents on the web: state of the art

1.1 Users and services in cultural web applications: websites and portals

In keeping with the Lisbon strategy[1] of March 2000 that refers to a "society founded on knowledge", cultural institutions are called upon to deploy the most effective tools of communication available: this has led in recent years to a renewed focus on the user and a consequent review by online cultural institutions of the manner in which services are offered to the public. In this context, the creation of an interactive environment, dedicated to the transmission of information, knowledge and culture, is of fundamental importance. It must clearly communicate the identity of the institution and its mission and demonstrate a commitment to high quality. The website of a cultural institution that offers well organized and clearly structured content clearly demonstrates enthusiasm for innovation and change. Any such website must take into account strategic marketing and usability, must include functional graphics, must offer simple routes for access to content and must deliver services that can be personalised for each user[2].

A website or portal which is effective and user-friendly is a central objective for those who decide to use Internet as their "virtual desk". In the case of cultural institutions, libraries, museums, etc. this objective is reinforced by the realisation that such a web resource is an institutional source of knowledge and a tool for propagating such knowledge. The opportunity to offer users a selection of contents in a clear and efficient manner is a requirement of the highest priority.

At the present time cultural institutions must address the need to create websites that are not just a virtual "double" but also a strongly recognizable, identifiable and credible space where information must be available to all users, from the neophyte to the online expert. Constructing the website of a cultural institution (be it a museum, an archive, an individual library, information centre or network of libraries) is an operation that must take a variety of competing factors into account. Among these are the needs and characteristics of the users and the peculiarities, values and mission of the institution. The identity of the institution and the value offered to the end user must both be retained.

When we speak of converting to digital we don't just refer to the change of the infrastructure that transmits information but to the information dimension and the intrinsic value of that information. The *mission* of a cultural web/portal site (CWA[3]) is becoming increasing-

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[1] "Become an economy based on the most competitive and dynamic knowledge of the world, able to achieve a sustainable economic growth with new and better jobs and a greater social cohesion", in: *Declaration of the European Council of Lisbon*, 23rd and 24th March 2000.

[2] Cfr. MINERVA, *Handbook for quality in cultural websites: improving quality for citizens*, 1.1.1.1 *Identity*, http://www.minervaeurope.org/publications/qualitycriteria1_2draft/cap1.htm; MINERVA, *Cultural Website Quality Principles*, especially the principle "User-centred": "taking into account the needs of users, ensuring relevance and ease of use through responding to evaluation and feedback", http://www.minervaeurope.org/publications/tenqualityprinciples.htm.

[3] "A Cultural Web Application (CWA) is considered to be every Web Application where the content deals with cultural and/or scientific heritage and its ramifications, and where at least one of the following aims are realised: 1) supplying and spreading cultural and scientific information; 2) existing as an instrument for education and scientific research. A Cultural Web Application is one of the most effective instruments available to the Cultural Entity for fulfilling its mission and satisfying the needs of the widest possible number of users. A CWA must reflect the identity of the Cultural Entity and at the same time guarantee technological standards that raise its quality", http://www.minervaeurope.org/publications/qualitycriteria1_2draft/cap1.htm.

ly complex, as the information expectations of the online user become more sophisticated.

Knowing users' expectations and trying to satisfy them is a "universal mission", that applies both to the individual cultural institution building its own site and to more complex bodies that use a site not to represent their identity but as a vehicle for the knowledge and services that form their reason for existence. There are however some peculiarities that permit us to deliberately use the term "website" rather than "portal": to say "**website**" means refer to a cultural entity[4], even a temporary one, that is not solely a tool for transmitting and organizing knowledge but is also the manifestation on the web of precise cultural objectives. According to Wikipedia "a website [...] is a collection of web pages or a hypertextual structure of documents that are accessible with a browser through the World Wide Web on the Internet".

When, on the other hand, the use of the term "**portal**" is preferred, it is clear that reference is being made to the concept of a "service provider", an entity which adds value with respect to the offerings of individual sites: that something extra that sets aside the identity of the cultural subjects and deals directly with *customer satisfaction*.

According to the Open Directory Project Initiative, to be considered a portal, a site should have the following characteristics:

- Search Engine / Directory
- Groupware and collaboration
- Knowledge management
- Content Management
- Workflow
- Multichannel facilitation
- Personal signature
- Business intelligence and applications integration
- Integration with identity management
- Infrastructural functionality

Within the cultural sphere, from the user perspective, the differences between a website and a portal can be summarized as follows:

Influence of the identity of the source on the perception of quality*:* a user who accesses a site such as that of a public library, museum or other cultural institution gives due consideration to the identity of the specific institution as well as to the site content. The perception of the site in question will be determined not only by the cultural content that it offers, but also by the history of the institution it represents, by its *mission,* by its functional organization and by its internal and external relations. In this sense the user interacts with the site content while remaining conscious of the identity of the institution that is providing the site. On the other hand, in the case of a portal, the quality

[4] According to MINERVA, a cultural entity is "An institution, organisation or project of public interest in all sectors (archives, libraries, archaeological, historical-artistic and scientific, architectural, intangible ethnographical and anthropological heritage), whose stated aim is to conserve, organise and give access to culture and cultural heritage. Cultural Entities are repositories for basic materials and half-products", http://www.minervaeurope.org/publications/qualitycriteria1_2draft/cap1.htm.

perceived may be determined more simply by the degree to which the content satisfies the needs of the user, without any influence from the identity of the portal.

Simple versus complex organizational model: while for websites the organizational model usually reflects a single organisation being responsible for all aspects of the site and its content (even if outsourcing all or part of the editorial and technological services), for portals a more complex model may apply. In fact, the information and technology resources which underpin a portal may be numerous, often decentralized. An important part of any portal is its ability to sustainably integrate content provided from disparate sources, and to offer a seamless user experience without compromising the rights of the content owners.

Diffusion and organization of knowledge versus content searching and service provision: by the term "site" we usually mean a structured collection of web pages that provides content and services, even without the addition of advanced tools for navigation or research. The term "portal", on the other hand, refers to an application that mainly offers services for more complex interaction with users, usually based on content present in other cultural web applications that can be chosen by users through a (more or less advanced) search engine and/or directory.
Personalisation and user profiling are often important elements of portal functionality. A core objective of any portal is to add sufficient value to encourage the user to return and use the portal on a regular basis. In order to achieve this, the portal should enhance the navigation and content discovery process for all users. It should also offer, as much as possible, options for the customisation of the user experience.

	Website	Portal
Perception of quality	Derived from institutional identity by: 1. Drawing on the history of the institution 2. Reaffirming the institutional mission 3. Delineating the institutions' own parameters and specific content	Derived from the aggregation of institutions across the portal by: 1. Identifying the common history or thematic character of the portal 2. Reaffirming the shared mission of members in the portal 3. Recognizing the synergies between sister institutions and commonalities of content
Complexity of structure	1. Defined by the singular characteristic of the institutional authorship and content 2. Managed and maintained by a specific institution 3. Distinct user-base 4. IP managed by institution	1. Defined by the multiplicity of authorship and content 2. Decentralized management by both institutions and portal managers 3. Seamless integration of disparate user-bases 4. IP managed by portal managers while recognizing the rights of the institutional content owners.
Knowledge management	1. Structured collection of web pages for content and services incorporating local tools for navigation and retrieval 2. Familiarity with the institution and its collections allows users to find what they are looking for with simple searches using a site-wide search engine.	1. Complex services and interaction with users incorporating advanced navigation and retrieval tools 2. Personalization and user profiling amplify the portal's functionality and allow for the customization of user experience for different kinds of users

The potential of portals

In spite of the tremendous potential of a fully-integrated portal, once aggregated, the wide variety and complexity of a portal's content and multiplicity of services may become truly daunting.

At the same time, clearly cultural portals are targeted to the very same user base as are individual institutional websites, and, in doing so, appear to act as competitors, rather than facilitators of content in a battle to attract the user's interest and loyalty.

However, once institutional websites and cultural portals are coherently integrated. both entities stand to gain as a result.

While individual institutional websites foster long term relationships with those users who are already familiar to them, their content may not be known - and therefore not found - outside of their traditional user base. By aligning themselves to a municipal, national or pan-national thematic portal they are greatly extending their visibility and in doing so, their accessibility to new users outside of their traditional user-base.

If a portal targets a broad user-base to include all citizens across geographically disparate regions, this demands the development of strategies; such as advanced search and retrieval mechanisms, special navigation routes, multiplicity of language, etc. at a level that is often beyond the scope of the individual institution. Through the development and implementation of these kinds of shared resources, a portal will reach a much larger user base than any singular institution could ever hope to reach on their own. In addition, methodologies developed at the portal level; such as the harvesting of user profiles, responding to the demands and expectations of users through evaluation and feedback mechanisms from a critical mass of users may be pooled for the benefit of all members of the network, thereby enhancing visibility and accessibility to cultural content at the local level.

Even straightforward access to institutional information such as location, opening hours, etc.: in addition to the shop window onto the cultural heritage they steward, means that more people will be able to find a specific institution, exhibition, collection or single object and be able to make their plans to visit, or simply browse accordingly.

In conclusion, pooling resources in this way, not only quantitatively increases the reach of the collections available to the individual user, but also amplifies the qualitative depth and breadth of cultural content for students, young people, tourists and researchers, providing them with the tools that allow them to discover content intuitively; and in their own language. Access to content they seek may then be granted where ever the user is located, while acknowledging and preserving the local cultural and intellectual distinctiveness of the richness of the content at its source.

1.1.1 Libraries

The main objective of a Library institution is to be a transmitter and source of knowledge, aimed at the largest possible user base. Libraries perceive a great opportunity in new technologies especially for reaching new user populations.
The intrinsic characteristics of the web encourage libraries to offer digital reference services that can promote the birth and growth of a remote user base. Such a remote user base is difficult to characterise; as a result it is challenging to establish and measure user satisfaction. If improved services are to be offered, and satisfaction to be increased, libraries must identify who remote users are and what type of requests they make. A focus group activity, one of structured interviews as well as a careful analysis of the data offered by registrations can contribute elements which support making the right choices.

It may first of all be possible to draw up a profile of the user base divided into levels of expertise. On the basis of this framework, websites can be planned that achieve *user satisfaction* for all users by applying suitable mediation levels. For cataloguing we can give the following definitions:

- *traditionalist* users: users that are deeply bound to traditional research tools who find it difficult to use the Internet generally
- *beginner* users who wish to develop an expertise with regard to new technologies and only rarely use OPACs (Online Public Access Catalogue)
- *skilled* users who normally and preferably use OPACs for overcoming geographical barriers and make use of a strongly customized service.

Good practices
1.1.8.1. British Library
1.1.8.2. New York Public Library

1.1.1.1 Digital libraries

A digital library is a library in which collections are stored in digital form (as opposed to print, microform, or other media) and accessible by computers. Both the physical and the digital library offer a service to their users, in that they both make collections available through specific kinds of search and retrieval systems. The digital content is normally accessed remotely via computer networks. A digital library, from the ICT point of view, is a type of information retrieval system. Librarians may consider a digital library as another space of cultural mediation and conversation, similar to a library but in a digital environment.

There are three fundamental components in a digital library:

- The **collection**: this is made up of text, images, video, sound and metadata (see 4) and includes both a permanent collection and temporary collections with a specific life span
- The **access services**: these must enable the user to rapidly and easily find all that he or she seeks and to extend the search to linked documents. The access systems include the user interface, the research and identification systems and the systems for navigation and connection to the information desired. In the first place the users' requirements must be determined through the use of feedback mechanisms (see 2.6)

- The **user**: users act alone without intermediaries, and they are not limited by space and time. Because the user is an active agent, a digital document may be dynamic, and has a life cycle in relation to different users at different times.

There are numerous creations at the current time on the Web defined as digital libraries, including:

1. thematic or academic repositories accessible on the Web of documents/publications (based for example on the open-source DSpace platform)
2. digital repositories characterized by a prevalence of content items born and collected within the project
3. collections of publications or multimedia material that were originally in analog form, made accessible on the web following their digitisation
4. lastly the websites of libraries, archives, museums and other cultural institutes may be defined as digital libraries in that they offer documentation, publications, as well as multimedia.

Good practices
1.1.8.3. Gallica
1.1.8.4. Project Gutenberg

1.1.2 Museums

Unlike the nature of the services required for a repository of books (both for the physical or digital library), or even to some extend the way an archive is conceived by its users, museums are perceived, first and foremost as locations of physical artefacts; housing objects that are usually characterised by their authenticity, pecuniary value, and their uniqueness.

Digital artefacts, in contrast, signal endless clone-ability and a built-in temporality. After all, unlike the self-evident durability of the material artefact, once the electricity has been turned off, the digital object simply disappears. Why then bother to locate the digital object in the museum that encapsulates science and culture for posterity, when the object that is being scrutinised simply fades away at the end of the day? The very intangibility of the digital object inevitably becomes a provocation to the museum ethos of materiality and stability, and, through its ethereality, a challenge to the very core of the museum mission.

In addition to this fundamental challenge to the museum ethos is the idea that with the digital artefact in the museum, there is no longer an 'original', and, to confound things even further, as these objects are replicated and disseminated just as easily outside of the museum as they are in the gallery, why would the visitor even bother to come into the museum in the first place?

These are the kinds of questions that not only concern museum curators, but also the museum public when encountering an online presence of the physical museum. However, in spite of these very rational concerns, electronic museums are, and will continue to become more and more visible over electronic networks, and, as they evolve, visitors and users will discover the richness of the collections, even as they are mediated beyond the museum wall.

While there is a disparity between the leading museums in Europe who have build themselves impressive mirrors of the physical museum in terms of making their collections available online in meaningful ways, most of the small institutions across Europe have made do with modest websites; offering information such as ticketing, group bookings; perhaps with an online gift shop and a showcase of the highlights of their collections.

However, even with the most impressive of museum websites that are able to disseminate the depth and breadth of their collections online (see 1.1.8.5 and 1.1.8.6) the virtual museum will clearly never be a replacement for the 'real thing' and the experiencing of seeing the material object in the physical gallery with ones own eyes.

A separate analysis may be required for the users of online museums especially with regard to the question: does the real user base coincide with the virtual one? That is to say, is there commonality between those who physically visit a museum and those who visit its website, or. are the two experiences totally separate? The virtual route could be seen as an introduction to, and not a substitution for the real one; it can be used as a preparation for a future visit or as a review of a past experience (see in-depth, p. 19).

Clearly there are still barriers to visiting a real museum; the prohibitive cost for some families for example, the distances need to travel to a particular institution, or a sense of alienation from a cultural institution.

Institutions, such as museums embody powerfully coded experiences, where Bourdieu suggests one needs a studious comprehension of iconography of the many schools and styles in order to gain intellectual access to art[5].

Some people, in fact may even perceive the museum as a highly intimidating space, particularly when they sense they don't have the cultural capital to take part in the experience, they may not wish to come into the museum at all.

Virtual museum, on the other had are free, easy to navigate and accessible to all and may, in fact be attractive to those who rarely vist museums, other than in their own home town, or even never to have gone inside of to a real museum before.

The role of the virtual museum may be thus summarized:

- To act as an opportunity to prepare for a real visit
- To evoke the pleasure of a museum experience after the visit
- An extension of the knowledge gained from a visit
- For an opportunity to engage with the museum community between visits and to stay connected
- For those users, who for various reasons may never visit a particular museum but who may wish to access exhibitions or collections remotely.

[5] Pierre Bourdieu, *Distinction: A Social Critique of the Judgement of Taste*, R. Nice (trans.), Cambridge: Harvard University Press, 2000, p. 217-219.

In addition to benefits the web presence brings to the physical museum outlined above, the web museum may also offer the following advantages:

1. When the digital artefact is embedded in an educational context, it may act as learning object in its own right, serving to document and contextualise the physical collection in new kinds of learning scenarios.

2. As the digital museum acts as a pre or post-visit reference, this enables new kinds of hands-on, minds-on interactions with the collection that were not possible during the physical museum visit (rotating an object, collecting and comparing different artworks, magnifying a miniature work of art, etc.).

3. When works of art, and new media expressions are born-digital, they represent new kinds of artistic practice, art forms and interfaces. This kind of artistic practice, (web art, net art, interactive art, etc) is dependent on the web and in fact cannot be represented outside of the web architecture.

Nowadays there are many museums that offer collections over the web; in many cases there may be thousands of works presented online. These collections are organized according to descriptive standards, are codified on the basis of an historical-artistic tradition and are catalogued appropriately by museum professionals across the hundreds of different kinds of curatorial departments. These systems are the responsibility of the museum curator, whose professional service is appreciated not only by the layman, but also by experts, researchers, and colleagues in the field.

Drawn from the museum tradition of the thematic exhibition, new kinds of narratives can now be spun over the web and the examples of story-telling (see 2.5.6.7) can now re-contextualize collections as virtual narratives that are both compelling, and inspiring.

As web interfaces move towards Web2.0 platforms, innovative ways of renewing the relationship between the museum and their publics are now possible, and we are witnessing how these new opportunities to re-engage their audiences with the museum are being taken up with a passion both by museums and their public all over the world.

Good practices
1.1.8.5. Louvre
1.1.8.6. Hermitage - Virtual Academy
1.1.8.7. Every object tells a story

IN DEPTH

The research studies of the CHIN (Canadian Heritage Information Network) are very interesting: since 2001, the year that the Virtual Museum of Canada (VMC) was put online, the needs of the web users in relation to the users of the physical museum institution are being studied. "There is anecdotal evidence to suggest a link between the two, suggesting that on-line content actually increases the interest in visiting a museum. One of the most common uses of museum websites is for visitors planning a visit to the physical museum".

In 2003 a research study was planned that foresaw two investigations to be carried out in parallel:

- Analysis of the real users of a network of Canadian museums
- Analysis of the users of the Virtual Museum of Canada

The investigation showed that 81% of the visitors to the "real" museums used Internet for work or pleasure and 22% of these had previously visited the website of the museum in which they were now for better planning their visit. The information is interesting if we consider that to the question "why did you not consult the museum website before visiting it?", 31% answered that the experience of visiting a museum is spontaneous and free and isn't planned, 28% answered that they already knew the museum very well and 21% got the information necessary through other media.

The research experience highlights the strong cooperation that can exist between museum institutions and their websites, by addressing various audiences with a range of requirements. The most interesting information that emerged is:

- Users consult the website before visiting a museum in order to plan the visit and to have all the practical information necessary for reasons of organization.
- Users consult the website after having visited a museum to deepen their knowledge about the works and the content that they found most interesting with an aim that is definitively exploratory and to increase their knowledge.

Lastly 70% of those who had navigated the website before the physical visit to the Museum stated that they had visited it for organizational reasons and a good 30% said that the virtual visit encouraged them to visit in person. 57% of the real visitors to the museum stated that they were encouraged by consultation of the web pages against 43% that stated they were not influenced. Nobody stated that the web visit was counterproductive or that it discouraged them from visiting the Museum.
As regards the visitor profile, we note some differences: while the real visitors of the museum network in question were composed of 47% men and 53% women, in the case of the website the percentages are 43% men and 57% women.

As regards ages as could have been expected, in the case of web users the over 55 group decreases (13% against 20% of real users), while the young and very young visitors increase (23% against the 15% of the 25-34 group and 10% against 8% of the 15-24 group). As regards visitors over 65 the percentage of the web users falls to 5% against 16% of the real visitors.

http://www.chin.gc.ca/
http://www.virtualmuseum.ca/

Source:
Wendy A. Thomas, Sheila Carey, *Actual/Virtual Visits: What Are The Links?*, Paper presented at Museums & the Web 2005, http://www.archimuse.com/mw2005/papers/thomas/thomas.html

1.1.3 Archives

In common with libraries and museums, archives play a role in the conservation and development of cultural heritage. Traditionally however there is a different relationship between archives and users, linked to the nature of the archive material and access to it and type of research that it is possible to carry out.
Archives differ from libraries in several ways. Traditionally, archives:

1. Preserve primary sources of information (typically letters and papers directly produced by an individual or organization) rather than the secondary sources found in a library (books, etc.)
2. Have their contents organized in series rather than as individual items. Whereas books in a library are catalogued individually, items in an archive are typically grouped by provenance (the individual or organization who created them) and original order (the order in which the materials were kept by the creator)
3. Have unique content. Whereas a book may be found in many different libraries, depending on its rarity, the records in an archive are usually one-of-a-kind, and cannot be found or consulted at any location other than the archive that holds them.

Access to the contents of an archive is typically overseen by specialized personnel and relies on the use of special mediation tools, the *finding aids*, because the archive document, contextualized as it is in an order peculiar to the originator (bodies, families, people, etc.) cannot easily be found and used without knowing how to navigate the archive itself. This makes a considerable impact on the way in which archives address their users. Traditionally archive users were people who were expert and aware of the peculiarities of archive order, although over time the archive audience has extended to “non specialized” users, guided by practical and administrative interest or indeed by curiosity.

Thanks to the spread of international descriptive standards and the digital treatment of research tools and documents, it is increasingly common to deliver archive mediation via web interfaces: archives have assumed the character of research space and virtual knowledge, in which the degree of mediation in their use between user and document is reduced. Within this context, in addition to offering a guide, tools and digital documents, it is becoming increasingly common for archives to experiment with bringing the world of archives closer to web users. Thus, the educational value of the content (the document or the archive series) is enhanced by its presentation via the user-friendly web environment.

Moreover recent trends in the so-called participatory web – or web 2.0 – are beginning to filter through to the online archive world, enriching the research and use of the documents in systems of folksonomy and social tagging (see 1.2.4). The adoption of these tools means that archives respond to user requirements by:

- facilitating access
- helping users to more easily identify the archive documents that meet their requirements
- sustaining their interpretation
- providing information over and above the classic information of the archive description, so that users can better interpret the archive documents.

Good practices
1.1.8.8. National Archives of Australia Virtual Room
1.1.8.9. Public Records Office - Just for kids

1.1.4 Temporary events

The websites of temporary festivals, events and exhibitions primarily carry out the function of "advertising window". These are coordinated with other marketing avenues to make an event known and so bring the greatest possible number of people to visit the exhibition. For this reason a section of such websites may often be dedicated to operators of the world of information, such as journalists and press agencies.

The creation of these "instant websites" is often entrusted to professional content creation and marketing agencies who are external to the cultural entity. Such creation may be supported by mixed "consortiums" (cultural entities, sponsors, etc.) who collectively promote the exhibition.

Special care is given to the presentation of basic information about the event, including a programme with complete and current information on the content of the exhibition or event (subject, curators, promoters, agenda, etc.), on the location where the exhibition is being held (including geographic coordinates, means for getting there, etc.), the opening dates (including possible extensions), times, costs, etc.

Another important function is that which deals with the services for users both on-line and on-site, such as bookings, on-line ticket offices, guided visits, multimedia, catalogues, e-shop, café, cloakroom, video streaming, photo gallery and press releases.

The topic of the conservation of the contents of such ephemeral "instant websites" is now becoming an objective in its own right. It is frequently addressed by the establishment of an archive of such ephemera that can be consulted along chronological lines.

Good practice
1.1.8.10. Berlinale - Berlin International Film Festival

1.1.5 Research and education services

In an online context, the leading centres of research and education are well known to those involved in the sector, be they students, research scholars, experts or simple net users searching for information about learning opportunities. Public and private bodies often appear integrated into a single entity that provides web services at 360 degrees.

Within the public sector there are numerous examples where teaching, scientific research activities and, generally speaking, scientific and technical consultancy activities are carried out by one entity: the centre of excellence. One or more cultural web applications can correspond to the one such entity.

Secondary schools and colleges may provide contents and services for students, teachers and parents; universities often build online digital archives to cater scientific and didactic documents, professors' curricula, and research activities. Moreover they offer interactive service for all university actors.

Portals and websites which focus on centres of research and training are characterized especially by a strong demand for information from the users. The nature of users varies considerably depending on the specific function carried out by the site and so on the composition of the reference community. However, such sites often

adopt communication strategies aimed at the general public, including the provision of overview and editorial content which is expressed in simple layman's language.

Good practices
1.1.8.11. Italian Research Portal
1.1.8.12. UK-student.net
1.1.8.13. Christ's College Finchley, UK

1.1.6 Cultural portals

A portal, conceived as an organization for achieving *user satisfaction*, must necessarily utilise tools that are able to satisfy the demands of the user in such a way that the perceived quality received is high and that allow the user to extend his knowledge, so as to create a strong relationship of fidelity. A portal replaces a site when it adds value to the tools that it users, or when the value which it offers is greater than the sum of its constituent parts. "For the users, a portal is surely only useful if it meets a real need that users have, and in a way with which they are comfortable. As such, the portal needs to do more than any of the current offers being presented. To facilitate this, there is need for continued work on ensuring interoperability of systems"[6].

We must review the idea that metaphorically describes the network as similar to a sea in which it is possible to freely navigate and without any type of limit. Even if the web superficially appears to be freely navigable, it is actually formed of elements (sites) which can guide the user to travel according to established routes. This approach doesn't limit the freedom of the user but rather it emphasizes the influence that sites can have in directing the exploration of online content, thus making the exploration more effective.

If a classic website has the potential to influence the user in this manner, this is even more so the case for a portal, which by its nature orders, addresses, chooses, organizes and facilitates access to the many resources present chaotically and indifferently in cyberspace, ever fuller of non structured data and information that are therefore difficult to recover and hard to believe reliable.

While we recognise the overall heterogeneity of web users, it is reasonable to identify four macro categories of users that a portal must necessarily foresee, as it pursues its mission of delivering user satisfaction:

- **Specialist/educated users** (research scholars, teachers, etc). This user base mainly uses the portal to satisfy a need that is linked to its working and study activity. Acquiring and constantly maintaining efficient know how, checking information, deepening its knowledge and keeping up to date are some of the reasons that drive this user base to use the portal.
- **Scholastic use**: (school and general education). To discover, evaluate, choose, organize and use the information which one considers necessary for educational reasons is the motivation that drives this type of user.
- **Professionals**: professional people and those of the sector. These are users that use the portal as a work and knowledge resource. The portal services should

[6] Cfr. Paul Miller, *The concept of the portal*, http://www.ariadne.ac.uk/issue30/portal/.

therefore be amenable to customization and should allow a rapid and simple overview of all the activities carried out. The existence of a virtual newsletter would be a good idea for this type of user.

- **General/curious users**: users that access the portal driven by curiosity and the desire for cultural growth. This type of user sees culture as an accessible, open, participatory and free resource. These users learn of the portal by word of mouth and are stimulated by different interests. For this type of user we can refer to the concept of attractive quality because, driven by curiosity, they have a scale of priorities that can be quite easily inverted.

The use of cultural portals is obviously closely dependent on the use of the Internet generally and on its penetration both in physical terms (spread of broadband) and in terms of its use entering the consumer mainstream. The Internet has gradually become a familiar tool for a great number of people, with rates of takeup increasing particularly in the last year. The cultural portal may therefore address not only web users but also those of TV, radio, and other media with a view to integration.

There are some very interesting examples of cultural portals that highlight how profiling users is considered central[6] for future planning and development.

Good practices
1.1.8.14. American Memory from the Library of Congress
1.1.8.15. TEL

1.1.7 Cultural tourism portals

To return to the theme of general/curious users, we must consider the phenomenon of cultural tourism[8]. The idea was born in 1970s and was promoted by institutions such as ICOM (International Council of Museums) and UNESCO. It foresees cultural exchange and the promotion of individual cultures through the dissemination of knowledge regarding the architectural, landscape, artistic or archaeological patrimony. Tourism is considered a platform of dialogue and intercultural exchange and in that sense the web presents exciting new opportunities.

When the profile of the user that uses the web to satisfy a cultural tourism requirement is taken into account (man/woman/ between 25/45 years, medium-high social class, used to travelling), it is important to remember some essential characteristics of services aimed at such a user base: availability of infrastructure that makes navigation simple and immediate: simple and rapid access to the Internet; use of the network for various reasons: e-commerce, information search, entertainment, etc. This type of user is certainly quite skilled in using the net, has achieved a middle-high level of education and a fair knowledge of English and is in the habit of travelling.

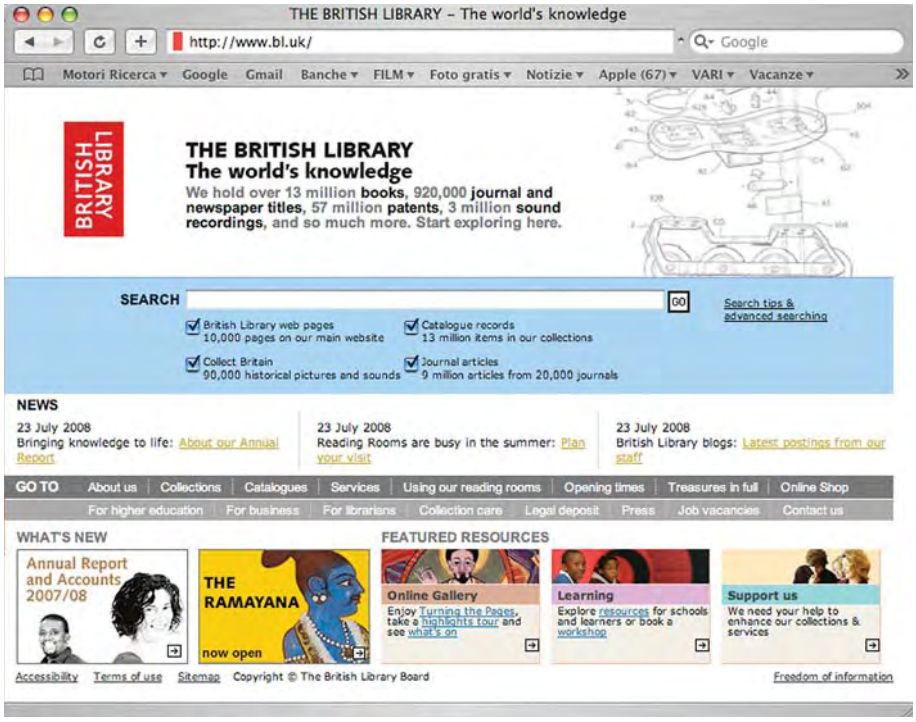
Good practice
1.1.8.16. Spain.Info

[7] Cfr. http:// www.abm-utvikling.no/publisert/aarbok/bib2002.pdf.
[8] Cfr. Ricard Monistrol, Ponencia Seminario Grupo DigiDoc 24/5/07, Proyecto de investigación financiado por el Ministerio de Educación y Ciencia (referencia HUM2004-03162/FILO).

1.1.8 ANNEX - Good practices

1.1.8.1 British Library — LIBRARY

http://www.bl.uk/



This website was chosen as an example of how access to content can be arranged according to user categories. The BL site favours a simple approach that everyone can use (represented by a search form in a central position in the home page) but that at the same time allows the user to identify himself with a precise category and therefore to be able to use additional content and services (represented by one of the two navigation menus).

The British Library is the national library of the United Kingdom: it owns more than 13 million monographs and over 920,000 magazines (information updated to June 2007). The BL site contains all the information on the library and its collections, providing digital resources through its integrated Opac and through specific digital library projects: Collect Britain, Online Gallery, Virtual Exhibitions, Learning.

In recent years, the BL too has had to face innovation in terms of Web accessibility and usability and the inevitable consequent need for update; in 2007 the home page was renewed and the site was completely revised with the objective of restructuring the presentation of its content.

A central element is the search form placed at the centre of the page and highlighted by a coloured frame. This form can be used to search global content that includes the Web

pages of the BL, the integrated Opac, the periodicals and the digital library (understood as the interface for digital collections), Collect Britain, with all combinations being possible. The main search form, that makes it possible to search across four completely different sources, differentiates the results from the various sources by using a colour to represent each source. This distinction is clear even in the visualization of brief descriptions. This method allows any user to copy the descriptions and be able to easily adapt them for other work, because they are presented in a way that is suitable for their reuse and quotation.

Next to the simple search form, we find a link for more advanced research and for the search tips and advanced searching instructions, with detailed explanations on the different sources and the research syntax. If we observe this transformation with a view to profiling users, it appears to be clear that the BL offers itself as a site for everyone, where the logic is the perfect search engine and where there is no need for the user to define himself as belonging to one category rather than another.

At the same time, however, BL offers tightly focused services for four key audiences: through one of the two horizontal menus users can access areas that offer specialized services and contents:

- *For higher education* leads to a section that offers services and resources especially for researchers and university libraries
- *For business* leads to a section dedicated to those who are accessing the portal for work reasons
- *For librarians* has a series of ad hoc structured services (LIS Service, Bibliographic services, Resources for research, Preservation)
- *Press* leads to the press and communications service of the BL
- *Job vacancies* is dedicated to job offers
- *Contact us* is a directory that links the possible questions and requests regarding services, a questionnaire for feedback and a map for finding one's way to the BL.

One of the greatest strong points of the BL is the way that the structure and arrangement of the many research and audience-specific paths tries to derive the maximum end-user benefit from an endless documentary patrimony. The same abundance is found in the special catalogues that allow a specialist to immediately identify the tool that suits him best.

1.1.8.2 New York Public Library — LIBRARY

http://www.nypl.org/

This important United States library, founded in 1895, uses its website to pursue its traditional library mission of choosing, collecting, preserving and rendering accessible "knowledge accumulated in the world, without distinction of income, religion, nationality, or other human condition". Through the NYPL Collection of Downloadable Media you can directly access a wide range of historical and cultural documents arranged in digital collections that include rare manuscripts, images, audio files and video and e-books.

In June 2006 the library launched a new initiative putting on its website the **e-audio**, that is to say, the digital audio versions, of seven hundred volumes chosen to respond to the taste of all types of public.

Digital audio is destined to revolutionize relations between readers and books, putting books on the same level as digital songs, that is to say demolishing what remains of the difference between written and oral culture. To borrow an e-book means linking in to the website, choosing the title preferred and downloading it on to one's own

computer to then open the file and read it like you do with paper books purchased in a bookshop. The digital audio version offers even more: the file that is downloaded free of charge from the site that is accessible around the clock and seven days a week is a recording and can be listened to not only on a portable or fixed computer but also on easy to use latest generation portable high-tech products such as CD readers and digital music readers such as MP3 Players or the ever more popular Ipod. In contrast to traditional audio-books, which are found on sale in cassette form and which can only be listened to on awkward recorders, «e-audio» books occupy the space of a digital file and hundreds of them can fit in an Ipod.

It was in the fact the widespread diffusion of MP3 Players and Ipods among the younger generation that encouraged the New York Library to offer this new service and stay abreast of the times. Library users today are more technologically sophisticated than ever before and the aim of this initiative is to allow them to have access to these volumes in the format that they prefer. Hence the possibility of replacing old style reading with listening to files at any time and in any place with the sole limit of having to respect the ritual and irrevocable twenty-one days of time that the New York Library establishes for public lending. Once that date has passed the digital audio file will no longer be accessible because a “secret key” inserted in the book will close it definitively, making it disappear in an instant from lists and micro-screens. All this is guaranteed by the on-line registration of the reader-customers, each one of which has a recognition code of a maximum of ten digits thanks to which he can access a virtual library in which he will find not only literary classics such as *Moby Dick* by Herman Melville and the *Broker* by John Grisham, but also essays by Theodor Adorno, reports from the war against terrorism, updated studies of electronics, mathematics, economics and psychology as well as dictionaries and language courses.

To supplement the majority of files that are valid for 21 days, the library offers a special catalogue of “always available e-audio” that contains 100 digital titles with an unlimited lending time.

The NYPL **Digital Gallery** section of the website of the New York Public Library provides users with 275,000 low resolution images, with free access for educational, teaching, creative and research purposes. The Gallery is constantly updated data base, containing the results of the campaign of digitisation of the collections preserved in the Library of photographs, manuscripts, Japanese prints, images of New York City, maps, rare documents and much more. High definition images for personal and professional use can be obtained through the Photographic Services & Permissions.

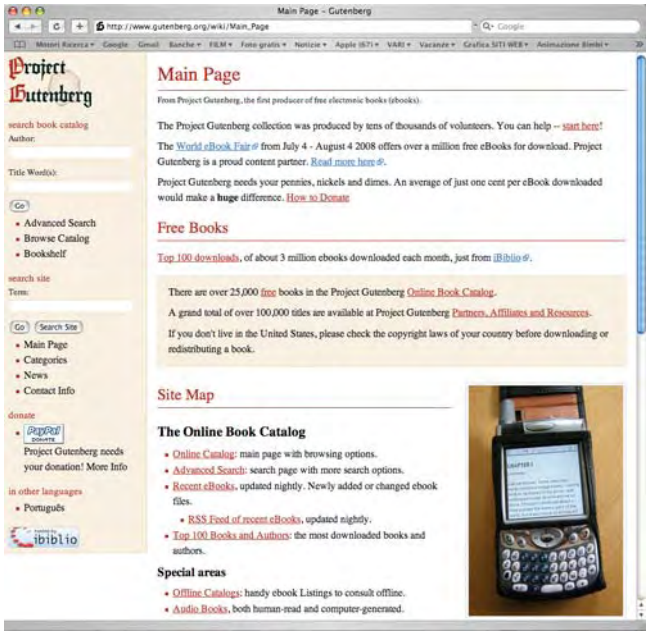
1.1.8.3 Gallica — DIGITAL LIBRARY

http://gallica.bnf.fr

Gallica is the digital library of the Bibliothèque Nationale de France (*National Library of France)*. Established in 1997, it was one of the first European digital libraries with free access. From the user perspective, Gallica is a **multi-target digital library**, open to all types of user, from the most specialized (skilled users, for example, people of the same profession, researchers, students) to the least expert (beginner users, or of the simply curious). For the first type of user, the traditionalists, the obstacle is not the web's characteristics but the Internet medium itself. As well as providing a general service that can be accessed through the use of a non-specialist terminology, Gallica permits the user to find an item in a precise category which means acquiring a profile of his own: the Gallica Classique section, for example, is aimed at a purely scholastic and university audience, whereas by offering a whole set of collections on the subject of travelling, the Voyage section is focused on a public that is passionate about travelling and professionals in the area. A help section provides clarification on navigation, on the modalities of research available and (through a link to the FAQ) a user can send an e-mail with specific questions to the library.

1.1.8.4 Project Gutenberg — DIGITAL LIBRARY

http://www.gutenberg.org/wiki/Main_Page



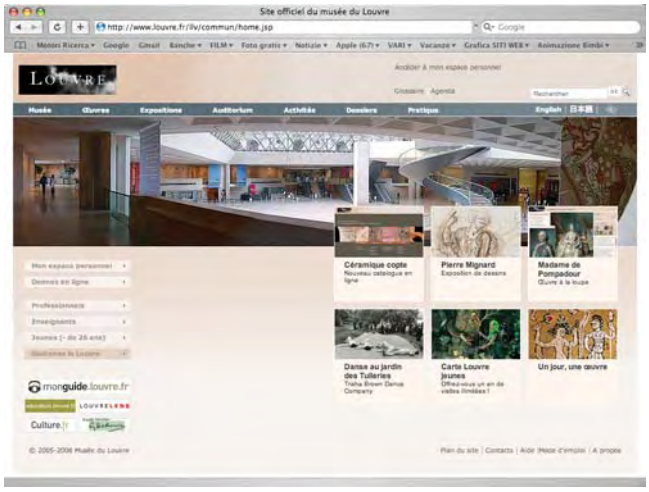
Project Gutenberg is the first and largest single collection of free electronic books, or **eBooks**. The Mission statement available on the Project wiki says that "the mission of Project Gutenberg is simple: to encourage the creation and distribution of eBooks. This mission is, as much as possible, to encourage all those who are interested in making eBooks and helping to give them away. In fact, Project Gutenberg approves about 99% of all requests from those who would like to make our eBooks and give them away, within their various local copyright limitations." Project Gutenberg is not supported by financial or political sponsors, therefore is powered totally by volunteers. The Project Gutenberg Literary Archive Foundation (PGLAF), a not-for-profit corporation registered in the state of Mississippi, USA, is the corporation that receives and processes donations to Project Gutenberg, and pursues fundraising opportunities.

There are over 20,000 free books in the Project Gutenberg Online Book Catalog in more than 50 different languages and dialects. A grand total of over 100,000 titles is available at Project Gutenberg Partners, Affiliates and Resources. The catalog can be browsed by Author, Title, Language or "Recently Posted", or by categories (Books, Audio Book, computer-generated Audio Book, human-read Data Music, recorded Music, Sheet, Other recordings, Pictures, moving Pictures, still). A special version of any eBook can be downloaded and read on Palm organizers or smartphones.

Project Gutenberg is a participant in Yahoo!'s Content Acquisition Program. This provides a search of book metadata (author, title, brief description, keywords).

1.1.8.5 Louvre — MUSEUM

http://www.louvre.fr



The Louvre was one of the first museums to present a digital version online.
Through the site we can discover how the museum is organized in terms of opening times, prices and ways of visiting, so satisfying the requirements of a user that intends visiting the "real" museum and using real virtual tours.

There are facilitated access routes for three different categories of visitor through a navigation menu on the home page. Thanks to these it is possible to immediately see events and offers selected on the basis of the **user's profile**:

- Professionnels (professionals and business people)
- Enseignants (those interested in informing themselves, such as students)
- Jeunes (- de 26 ans) (younger people)

There is a series of services available to users. Among these is the *glossaire (glossary)*, a detailed list of definitions corresponding to terms regarding the works exhibited in the museum; the *agenda,* a selection of appointments not to be missed and a search engine covering museum events that enables the user to carry out a search according to three criteria:

- Period or date: Sélectionnez une période ou une date
- Type of event (Visites guides, Ateliers, Musique, Lectures, Cinema, Concerts)
- User profile (Tous les publics, adultes, enfants & familles, groupes, handicapés).

The Louvre content can also be enjoyed through the aid of an **audio-guide** (both in English and in French) through a slow sequence that can be paused to access the description of the work that is of interest.
There are also an **online ticket office** and a **boutique** that functions like a real shop in which a constantly updated trolley keeps track of preferences and purchases.
As well as representing the achievement of the concept of integration and synergy between the real and the virtual, the example of the Louvre site is interesting because of the way the centrality of user emerges very clearly. With routes for experts, young people, students, teachers and the disabled, the site permits an absolute personalization of the experience.

1.1.8.6 Hermitage Virtual Academy – Virtual Academy — MUSEUM

www.hermitagemuseum.org

The Hermitage site was chosen among the good practice examples because, among its services to the public, it offers the **Virtual academy**, structured in a series of 'monographic' routes that permit the online visitor to the Hermitage of St Petersburg to contextualize by multimedia means the most important holdings in the museum's collections. There are six introductory routes that go from Egyptian to Roman history, to biblical studies, to the 'time of the knights' and to Rembrandt's painting, and also include the history of the Winter Palace.

Each route explores the cultural and social significance of the works that have made the museum world-famous, through a brief introduction that offers general information and at the same time makes a clear connection between the masterpieces of the museum and their respective periods and cultures.
For network users the Virtual Academy offers the chance to get to know the collections, discovering their charm and meaning in this way. It may be linked to a plan to visit St Petersburg, or a moment of interest in the artistic contents at the centre of the 'routes', limited by what is available online, or indeed it may also be an opportunity to reflect and review after having visited the Hermitage.

1.1.8.7 Every object tells a story — MUSEUM

When the collection is created by the users...
There has been particular interest for the experimental initiative *Every object tells a story* promoted by the Victoria and Albert museum in cooperation with the Tyne & Wear museums, the Birmingham museum and the Brighton & Hove museums. The initiative was addressed to museum curators and operators and explores the value of **story-telling** in enriching the museums' collections. The public was invited to contribute stories which relate directly to objects in the collections of the museums. The project applied the potential of **user generated content** (UGC) to create a new way of engaging with artistic collections, driven by the interest of the public.

The mission was immediately clear in the home page: "*Every object tells a story* is a collection of stories about objects written by people like you about objects that interest you. If you are enchanted by your grandfather's watch or if you have a collection of objects that you want to share, send us your stories and discover what others think of them".

How to participate: just choose an object about which you care particularly, upload one or two images and send the title of the story and the text, or the audio or video of the story connected with the object. Special attention is paid by the initiative to **security and copyright aspects**.

The part of the site dedicated to the museums' holdings is not restricted to material produced by the museums' experts; users can **comment on the content** or indeed **publish a new story** linked to that resource. The site thus contains collections of objects, arranged into nine main categories (visual arts, entertainment, fashion, home, infancy, hobbies, nature, beliefs and ideas, science and technology). The collections include objects from within and beyond the museums' holdings, presented and described by the users themselves, as well as by the creators and curators of the collections. The website is moderated and the contributions sent are checked before being published (http://www.everyobject.net: August 2008, the service is not running; video available on YouTube: http://www. youtube.com/watch?v=KB_tapYkW04).

Every Object Tells a Story: family learning through objects in the home and in museums
http://www.everyobjecttellsastory.org.uk/index.html

This project was funded from the University of Sheffield's Knowledge Transfer Opportunities Fund, which aims to turn research into something people can use. The original project was called 'Ferham Families' and was funded by the Arts and Humanities Research Council's Diasporas Migration Identities fund. The project aimed to look at the relationship between objects in the home and the narratives of migration of families of Pakistani heritage. The project involved five families who were able to share their stories and objects with the team. The stories and objects that were collected were displayed in an exhibition in Rotherham Arts Centre in March 2007.

The Dock Museum: Every Object Tells a Story
http://www.dockmuseum.org.uk/Default.aspx?page=298

The importance of objects in the Museum Collections often depends on the local people and stories associated with them rather than what they look like and what they were designed to do. A section of the web-site is designed to show that, when you visit the Dock Museum, there can be more to its exhibits than meets the eye. The sample objects are all on permanent display. Follow the links you may find out more about them, and see some of the other objects in the collections that help tell their stories.

1.1.8.8 National Archives of Australia – Virtual Room — ARCHIVES

http://vrroom.naa.gov.au/

The Virtual Reading Room project was promoted and developed by the National Archives of Australia. It delivers an online environment for perusing the ever-expanding collections of digitised documents from the National Archives of the Australian Government. Virtual Reading Room has a decidedly **educational mission**, so much so that in 2006 it was awarded a prize as the best site addressed to secondary school classes.

The main objectives of the site are to:

- offer an online tool for consulting documents on the most important events and themes of Australian history in the 20th century
- support teachers and students in their research and in the consultation of archival records (digital documents, photographs, maps, posters, films, etc.)

The **profiles of the audience** on which the project focuses are:
- students (of primary and secondary schools)
- teachers and educators

The homepage of the site is very simple and functional. It uses a structure that is very typical of online databases: on the one hand an “editorial window” which captures the attention of a curious user, one without a precise navigation objective; on the other an access point to the resources, more suitable to users with precise information requirements.

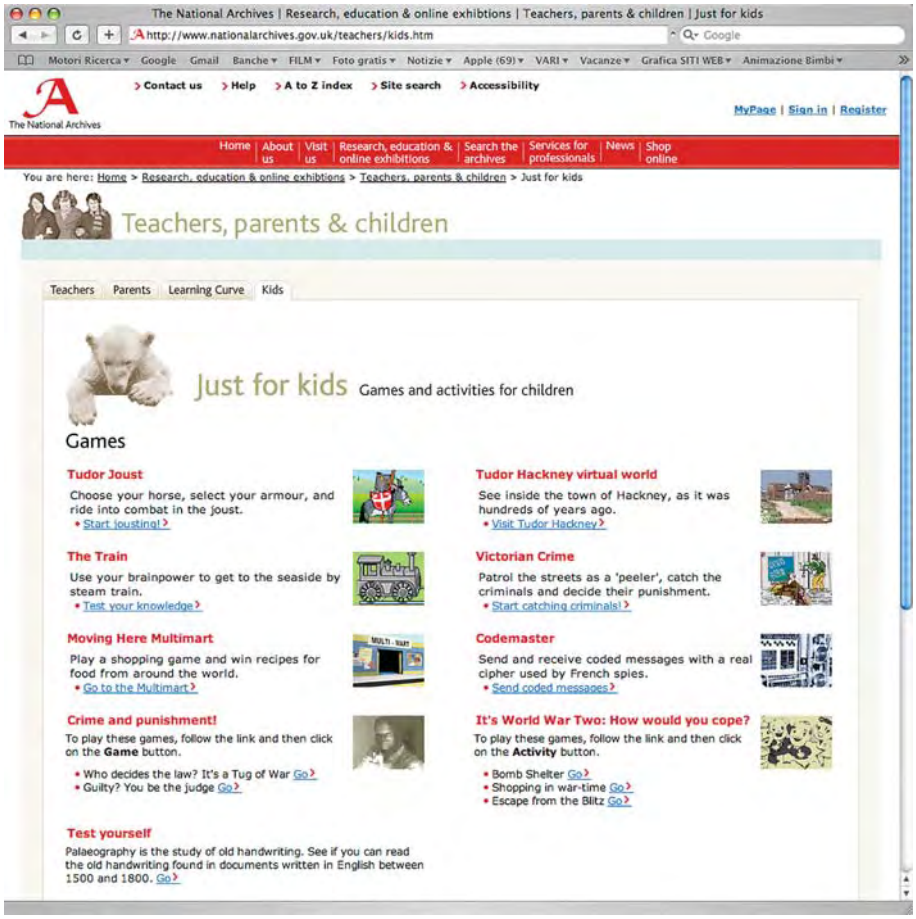
The *Worth a look* section presents in its homepage three archival records that are periodically rotated. These are presented as if they were editorial pieces, capable of interesting a user and capturing his attention.
By clicking on one of the titles (for example “Australia – the land of opportunity”) a user is shown an archival record, consisting of images and descriptive elements. Among these are key words that act as tags, identifying and categorising resources by topic. Some records are accompanied by an “About” page that explores the content of the digital record and increases its educational value; this encourages users to consult the resource and provides additional ideas, dates and information.
Virtual room permits registered users to “save” the record in their **personal area**, adding notes and comments to it for subsequent consultation.

The *Explore* function offers two methods of access:
- navigation of records by topic
- search of records by topic or year

The navigation of records is based on a topic-based classification system. The use of “speaking” tags contributes to making the classification system more intuitive for the user, who can gradually streamline his choices until he reaches the material that interests him.
The research function permits any user to search for resources simply through key words or the date of the documents. As in the case of navigation, the user can filter records on the basis of the presence or lack thereof of educational content relative to the archival record.

1.1.8.9 Public Records Office – Just for kids — ARCHIVES

http://www.nationalarchives.gov.uk/teachers/kids.htm



Within the rich and well-organized site of the British Public Records Office, there is a series of **interactive games** for young children, "*Just for kids – games and activities for children*". These resources form part of the larger project "The learning curve", dedicated to education and long-life learning on historical themes, inspired by the motto *bringing history to life*.

The page that gives access to the eight different interactive resources of *Just for kids* acts also as a presentation of the Public Records Office in simple but effective language.

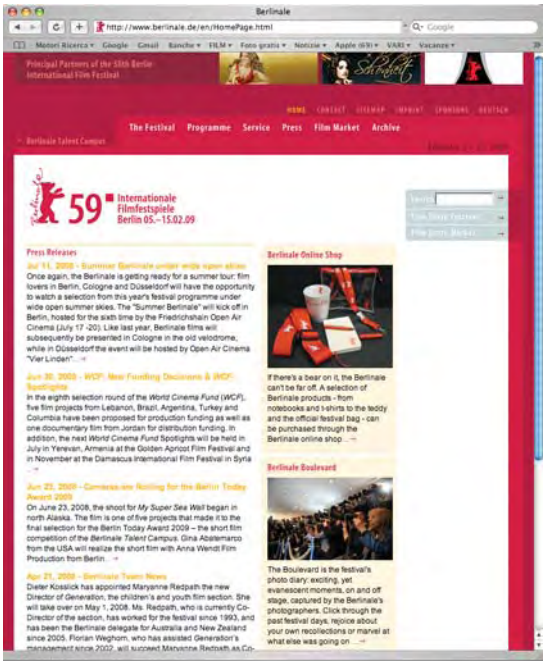
1. **Tudor Joust** permits the young virtual fighters to choose their armour as a knight and participate in a joust. At every stage of the game a herald can give aid and precious information on the words and historical concepts mentioned (heraldry, armour, horses, role of a knight, etc.).
2. **Tudor Hackney virtual world** is a three-dimensional virtual reconstruction of a city, Hackney, at the time of the Tudors, on the basis of historical studies. The site

provides rich information on the daily life, building techniques and typical places of an English medieval city.

3. **The Train** invites young users to make a virtual train run as far as the sea. The train game, inspired by the game 'Trivial Pursuit' only proceeds if questions regarding history and custom are answered correctly.
4. **Victorian Crime** invites users to "Patrol the streets as a 'peeler', catch the criminals and decide their punishment". It takes place in the mid 19th century. As well as being an interactive game (that also proceeds by replying to historical questions) it has some records dedicated to original archive documents regarding crime and its suppression in history.
5. **Moving Here Multimart** invites the user to "Play a shopping game and win recipes for food from around the world". The context of the game is the organization of a big party to celebrate two hundred years since the great migration from England; users are asked to make purchases on the basis of recipes from all over the world.
6. The game **Codemaster** makes it possible to "Send and receive coded messages with a real cipher used by French spies".
7. **Crime and punishment!** is actually composed of two separate games dedicated to crimes, judicial activity and punishment in history. **Who decides the law? It's a Tug of War** and **Guilty? You be the judge,** which can only be accessed by replying to specific questions on these topics. These questions can of course be answered after having read the related educational content and documents.
8. **It's World War Two: How would you cope?** is composed of three different games that take place at the time of the Second World War: **Bomb Shelter, Shopping in war-time** and **Escape from the Blitz**. Here again, the wealth and effectiveness of presentation of the historical questions, supported by archival documents and high quality graphics must be noted.

1.1.8.10 Berlinale – Berlin International Film Festival — TEMPORARY EVENT

http://www.berlinale.de/en/HomePage.html



The Berlin International Film Festival is an event with great cosmopolitan participation: every year apart from the general public more than 19,000 professionals from the world of cinema and 4,000 accredited journalists participate. 400 competing films are projected.

The website has sections dedicated to general information and services for the general public (from the presentation of the programme, the places where the festival will take place, on-line sale of tickets and of objects linked to merchandising) as well as news and services specifically for journalists. Journalists can all the information needed, e.g. for accreditation, making appointments and arranging photographic shoots.
Notable among the on-line services is **My Berliner**, a personal area that can be accessed through registration, where users can manage a personalized space in which to save appointments, information and press releases on the films in competition.

Without registering it is possible to participate in real time through the video streaming of the most important moments of the competition, such as the prize-giving and the press conferences of the producers who took part in the Festival. All film clips remain accessible on the website; in addition, videos of previous festivals can be consulted in the archive.

The Berlinale website can be consulted both through a timeline that starts from 1951, the first year of the Festival, and through a search engine. Information on the films competing, on the juries, press releases, photos and videos of the Festival can all be retrieved.

1.1.8.11 Italian research Portal — RESEARCH AND EDUCATION SERVICE

http://www.ricercaitaliana.it

The National Portal for Italian Research was created by CINECA (Consorzio interuniversitario italiano (*Italian Interuniversity Consortium)*) and promoted by the Ministry for Public Instruction, Universities and Research (MIUR), research bodies and universities. Through it, citizens can identify and contacts researchers from all sectors (national, public, private, scientific, non-scientific), both in applied and basic research. The main objective of the portal, which is aimed at citizens in general and also at special categories of users (such as students, schools and businesses), is to highlight big and small research projects and, above all, those who carry out research in indoor laboratories and in the great natural laboratories (Space, Earth and Sea), from the infinitely large to the infinitely small.

Another objective is to offer a tool for linking and coordinating Italian research activities and to raising their profile internationally. The research projects are described both in Italian and in English. The portal also addresses businesses, promoting engagement and exchange of knowledge between the world of research and the entrepreneurial system. This takes place also through tools that promote technology transfer and spin-off activities from the research domain to the business world.
The main actors involved in Italian Research are the researchers, who update the portal with material and documentation and information about of scientific articles published in national and international specialized magazines.

The portal is managed by an internal editorial staff that presents activities and research studies in simple language, proposing walk-throughs, detailed investigations and interviews to stimulate and assist the user in navigation and reading.

As well as the editorial contribution to the identification of the most important topics within the projects, **text mining** techniques are used to permit the automatic analysis of the data and suitable *information retrieval*. The theme of research is a multidisciplinary one. A simple reading of the titles by subject does not in fact permit a non-expert to see the real topics hidden beneath or to identify interdisciplinary connections. To do this the entire text is analyzed using *text mining* techniques; in particular, the techniques of *clustering* (automatic grouping) aid the editor by making it possible to identify the main thematic groups. The information available is automatically organized by the system into themes and it is thus possible to identify the most important topics in terms of numbers of content items. Connections between topics that are apparently distinct, but have a common terminology, are also highlighted.

The research activities can reviewed in the portal using a ministerial **classification** by technical-scientific subject, by geographical area and, in some cases, by strategic programme. A classification by **level of copyright** has also been introduced in order to facilitate the search for material that interests the business world. Such a classification job, if carried out manually, would require a range of domain experts and a great amount of time. In the case of *ricercaitaliana* it was decided to use automatic classifiers for the texts. An automatic classifier learns to recognize, from a group of pre-classified documents, the characteristics of the relevant categories and is able to reclassify any new document in one of the aforesaid categories.

1.1.8.12 UK-student.net — RESEARCH AND EDUCATION SERVICE

http://www.uk-student.net

UK Student is a British portal, aimed at university students and teachers. It offers a directory of online educational resources for researchers preparing essays or dissertations. The directory offers a substantial collection of articles written by British and non-British scholars, specifically for students. It aims to reduce the **risk of plagiarism**, within the research environment.

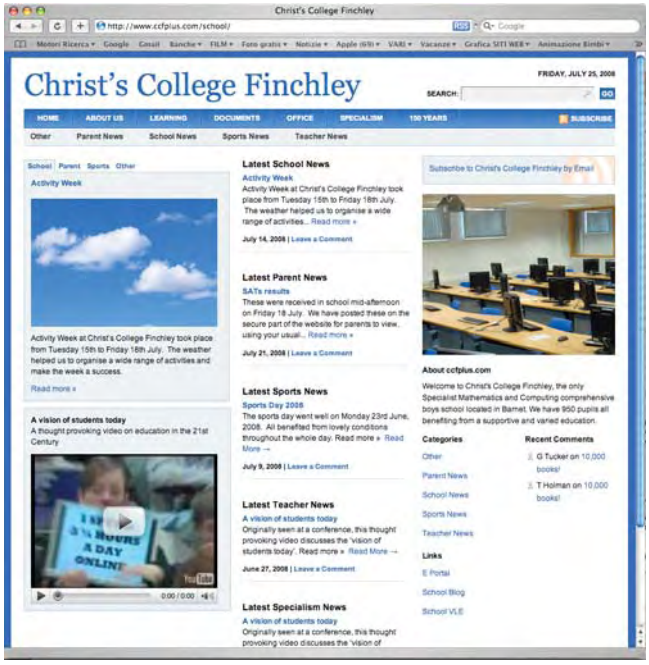
The debate on plagiarism is in fact an important topic in universities and academic circles. According to a "Times" survey, (http://www.timesonline.co.uk/tol/life_and_style/education/article630886.ece) a third of university students admit to having unlawfully "copied" ideas from books or Internet and one in ten stated that they had searched for material for research studies online.
The articles presented in the Academic Directory have been contributed directly by leading international scholars, with the full consent of the copyright holder. Students can study and quote the articles in their graduate theses, certain of the authenticity of the source, rather than opting for "cut and paste" whereby fragments of works found on the Internet are copied and inserted in a new work, which is then presented as an original essay of a student.

A section is dedicated to guidelines and tools on writing style and on how to prepare an abstract, an essay, a thesis or a *curriculum vitae*. The users of the portal can also comment on all the articles and share them thanks to **social networking tools**.
The portal's functions are also important for academic teachers, who can find out through it about the research activities and results of their colleagues. They also gain an important reference source that can help them save time in their educational activity.

1.1.8.13 Christ's College Finchley, UK

RESEARCH AND EDUCATION SERVICE

http://ccflearning.com/school/



Christ's College Finchley is a secondary school with about 1000 students, situated in the East Finchley area of London. The website of the school provides information and services for students, professors and parents. The central part of the site has a frame in which information belonging to various thematic areas is noted. The subjects are listed in the main menu situated on the left of the home page, where the user can choose the section desired from: news, news regarding the college, direction, curriculum, sixth form, life inside the institute, photographs and examinations.

The site also allows users to register for a newsletter and a mailing list.
From the main menu you can access two special services provided by the College: the **Virtual Learning Environment (VLE)** and *ccfplus*.com, accessible by clicking on the item BLOG. The VLE (ccflearning.com) is a software environment that optimises student learning through the use of a group of on-line tools that are useful for assessment and communication between students and professors. Other examples of tools offered by the VLE are: questionnaires, organization of groups of students, uploading of content, wikis, blogs and RSS.

The entire project is aimed at improving students' communication and learning.
In the left-hand column of the VLE of Christ's College Finchley there is a list of school subjects: by clicking and entering one of the courses, if you are registered with the site, you can access material on the subject and information on the teachers, their profile and material that they have inserted in the site.

The central area of the page has a **blog** where comments can be added.
You can see a list of the registered users currently on-line; by clicking on the user name you can view his details. There is also a space for news taken from the BBC and a section where each week the meaning of a word is explained. The extension and development of ccflearning.com (VLE) is ccfplus.com.

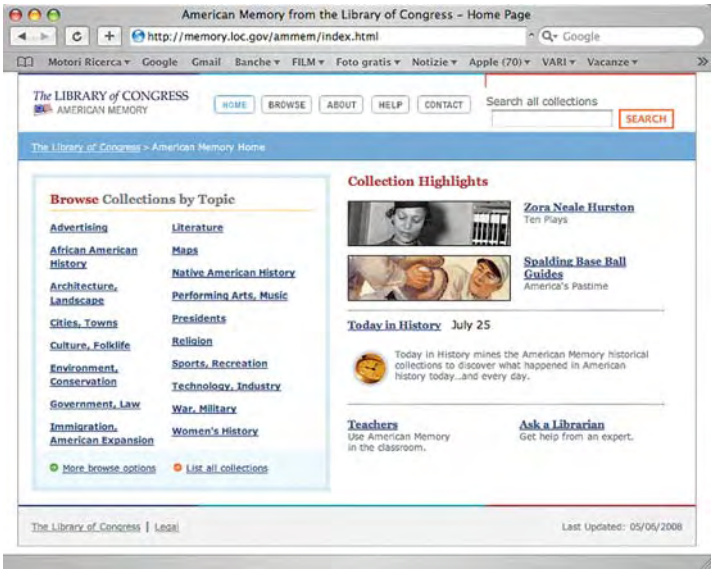
By accessing **iTunes store** you can download free of charge mp3 and mp4 files of a educational nature; there are also blogs in this area on various subjects.
By clicking on the title of a topic you can see a brief abstract and the various files attached (text files, mp3 or mp4) or add a comment.
You can choose the desired topic directly from a list that is available in the home page of the service or by carrying out a free text research..

From this service you can access a page that organically subdivides the material available on-line from:

- The school news site
- The school VLE site
- The school audio + video site
- The school photo site.

1.1.8.14 American Memory of the Library of Congress — CULTURAL PORTAL

http://memory.loc.gov/ammem/index.html



The American Memory project, supervised by the Library of Congress, was begun in 1990 following a programme of digitisation of the book and audiovisual patrimony of the Library. The aim was to construct a "national memory" in digital form. Following a pilot phase, American Memory became a flagship project within the sphere of the "National Digital Library Program". The National Digital Library Programme is supported by the Library of Congress and has the objective of providing free and open online access to the entire digitised patrimony of the Library of Congress and of other public and private institutions. As a testimony to the "American experience", the digitised patrimony includes written and spoken documents, sound recordings, photographs, illustrations, prints, films, geographical maps and music sheets.

With specifically educational and information objectives, the website primarily aimed at:

- Teachers
- Students and researchers
- Non-specialized but curious users.

In order to satisfy the requirements of all three target audiences, the homepage offers three avenues for navigation and consultation of the resources:

- The section "Browse collections by topic" allows the user to consult the resources through a topic-based navigation system.
- The section "Collection Highlights" informs the user about the presence of collections of digital resources of particular interest, so offering real "narrative" navigation routes. This consultation channel, controlled by a central editorial office, carries out the difficult but essential role of assisting a curious, non-specialized, user who doesn't have a specific reason for research or precise consultation objectives.

- The section “Teachers” offers a special access channel to key resources, chosen to reflect “the teacher’s point of view”. From a collection of over seven million digital documents, this section extracts and proposes material that may be useful for classroom lessons.

Topic-based consultation is especially useful, because the user can consult the resources through progressive refinements within a single topic. In the site the categories all use clear and simple language. Topic-based navigation organises the consultation interface according to the (mental) model of **Who, What, Where and When** and makes it possible to adapt to the mental parameters of the user. As well as consulting the resources by topic, the user can navigate by historical period, type of resource and place. The most “editorial” section of the site, *Collection Highlights*, managed by an editorial board, highlights two collections by periodic rotation: the aim is to encourage access to collections and resources that would otherwise be submersed in the vast digitalized patrimony.

The use of a guided ‘editorial’ avenue to online resources forms part of a user centred communication strategy. Particularly in the case of digital libraries, the quantity of information available is so large that a user who is curious, but who is not used to using topic-based navigation or is frightened by the results of a simple search, could be dissuaded from pursuing navigation. The guided narrative dimension inside library sites offers a promising design approach to meet the needs of curious, browsing, non-specialist users.

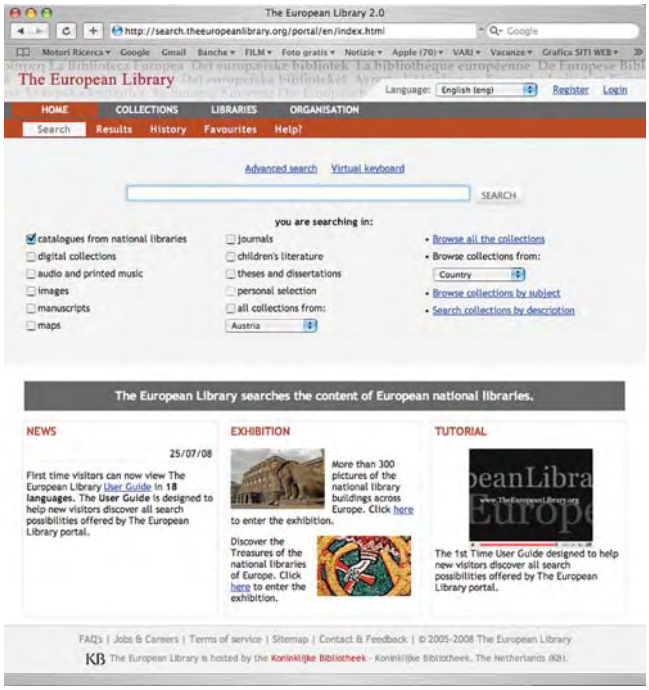
If one of the main objectives of the American Memory project is to facilitate the discovery and consultation of everything that has formed the “American experience”, it is only natural to assist schools, offering teachers tools and material useful for their class work. The “Teachers” section offers a series of functions and sub-sections, aimed at meeting the needs of educators. Didactic routes on topics such as civil history and American culture, prepared by the teachers themselves, are made available to the wider user community. A collection of educational games and play activities are based on the digital resources of American Memory and stimulate the curiosity and learning of students. The links between collections are an effective tool to help teachers to stimulate the critical spirit of their students, by comparing digitised materials. The community and professional development areas are useful for teachers for sharing ideas and material, such as thematic bibliographies or for exchanging information by chat.

Ask a librarian is the usual on line service for helping users in searching bibliographic resources. Through the use of tools such as forms or of synchronized conversation such as **chat**, a remote user can quickly receive assistance.

We would like to point out lastly the very effective system of Help on line, which can be reached both from the primary navigation menu and from within the topic-based navigation. The style of navigation is clear and effective and it offers various help methods, depending on what is needed and on the navigation context: help on how to use the multimedia contents, help on how to use topic-based navigation of resources or the usual FAQ. The “Contact” section offers users the chance to interact with the personnel of the Library of Congress both to request information and to provide comments or point out technical, typographical or linguistic errors.

1.1.8.15 TEL – The European Library — CULTURAL PORTAL

http://www.theeuropeanlibrary.org



The TEL portal gives integrated access to about 150 million documents (bibliographical news and digital documents) of 23 national European libraries, aiming to add value to their knowledge, information and cultural content. The initiative promotes access to information that is open to everyone and the development of the diversity of European cultural heritage.

The presentation of the content reflects these values: the portal tends to emphasize the cooperative and "national" nature and one can easily identify what resources are made available by each library, OPAC and special collections. The different languages tend to highlight the desire to unify, while respecting each country's identity. The home page intuitively invites a simple research with a "Google-type" form, with the possibility to refine it according to very specific categories: Default list of collections, Maps & atlases, Cartography, Photographs, Posters and images, Portraits, etc.

The presentation of the portal aims to be simple and transparent, through a friendly interface, minimal graphics and a generous size of character. A lot of space is devoted to the Organisation section, which gives useful information on the initiative and allows interaction with the users. This interaction is suggested by a range of services, among which are a user guide for users using the portal for the first time, a very detailed FAQ, technical information on the browsers and operational systems supported, access to the bi-monthly newsletter including back issues, and a media service for communiqués and press releases.

Through non-obligatory registration, users can **save their searches** to continue them in future sessions. The Contact &Feedback section is a page dedicated to the staff with photos and profiles that the users can contact for questions or details according to the profile that they prefer. In this case it should be noted that the portal addresses all users, aiming to simplify the research process for everyone, with the minimum use of jargon or specialist terminology. The registration and newsletter service, the beginner user guide and the help sections available at any stage of the research all highlight the user-centred nature of the portal.

1.1.8.16 Spain.Info — CULTURAL TOURISM PORTAL

http://www.spain.info

A portal that has successfully created functions linked to cultural tourism is Spain.Info, the official portal for tourism in Spain (Segitur). It offers a multilingual database of museums and special tourist sites that can be accessed through a simple or advanced form of search, an interactive map, etc.
Through a navigation menu on the right, a central area dedicated to news, and a search form on the left, the user can immediately identify the portal's focus and address his own information requirements.
The simple search form used by a user who is less aware of his requirements is flanked by another form that identifies and organizes the resources by independent community, province and city. When none of these options is of interest to the user, he can also search through the interactive map.

The portal offers a series of **additional services**:

- User registration: through registration a user can receive the newsletter and use the traveller's journal,
- Newsletter: through the newsletter a user can receive by mail news and updates that can be personalized by profile/requirements
- The traveller's journal: an area in which to create and keep track of his journey, with stops, routes, etc.
- Weather
- Roads and routes
- Virtual postcards

1.2 Current trends in web services: Web 2.0-3.0

As cultural institutions developed online, information was traditionally distributed through the broadcast model, where information was authored and published by the institutions themselves, and delivered to many users across the web. Over the last couple of years the web has become more participatory, and there are now many opportunities for individuals, in additional to institutions, to make their own voices heard. Much has been written about the participatory nature of Web 2.0, as it has gradually evolved since the early 2000's. During this period, many innovative projects emerged from cultural institutions – even before the term Web 2.0 was coined[9]. The appearance of what we now call Web 2.0 brought with it the growth of blogs, wikis, and wiki-like tools that enable end users to not only read other's content, but to generate and publish their own micro-data.

Rather than simply describing a new set of standards or services, the social tools and the authoring interfaces that characterise Web 2.0 in fact signify a paradigm shift in the ways we use the Internet. The emerging model can now be understood as a multi-channel model, where the web acts as a conduit, running through distributed networks that make connections not only between cultural institutions and their users, but also from individual to individual.

With the explosion of so much community-based activity taking place on Web 2.0 interfaces, it is time to examine the role of the cultural institution in an information society, and more explicitly, the changing face of the institutions' web presences as they represent the institution online. Further technological progress towards "Web 3.0" may bring with it even more challenges for the cultural institution community. Web 3.0 may be described as a truly semantic web; one that grants deep access to information to the web and opens up portals to new kinds of synthetic worlds. These persistent worlds are immersive spaces which invite people – or at least their avatars – to move into and around buildings and across landscapes; all meticulously modelled in 3D. These sites do not follow the web page metaphor, but instead are ordered as connected islands, where everyone can build their own home, sell their own wares in their very own shop, even construct an entire library or museum for other avatars; all built with the tools provided in the in-world environment.

This section provides a brief overview of the different kinds of Web 2.0 and Web 3.0 experiences, and will describe what it is about them that makes them distinct from traditional Web 1.0 environments (as seen in early 2008). The discussion is framed within the context of the cultural institution (see 2.1), and it will explore the ways in which cultural institutions are mobilised online, and in-world as they make the move from broadcast, to distributive model. Through different kinds of Web 2.0 services, we are now able to publish our own bookmarks, upload our favourite images, share our preferred music and video collections – even open up our online diaries – allowing others to sift, search and access our micro-content, while, at the same time we may access theirs. Web 2.0 now offers many

[9] Susan Hazan, *Weaving Community Webs: A Position Paper, DigiCULT Thematic Issue 5: Virtual Communities and Collaboration*..., http://www.digicult.info/downloads/digicult_thematicissue5 _ january_2004.pdf.

different kinds of opportunities for the *folk* (you and me) to forge new horizontal connections with like-minded colleagues, friends, fans and business partners. Once connected, we can make our voice heard in new, creative ways. Through innovative collaborations we are able to become involved in new kinds of activities that are opening up for the cultural institutions and their public. Against this backdrop we are already witnessing the emergence of cultural institutions who have already staked their claim in their own corner of a persistent world, and, in doing so, have began to reinvent themselves.

Rather than offering an exhaustive report on the technological solutions of Web 2.0 platforms, we focus on the experience from the perspective of the user, and the ecologies of participation. This chapter explores what it means to be an active participant in the authoring and dissemination of personalised micro-content in a relationship with a cultural institution, an institution that has mostly acted – until recently – from within the traditional broadcast model approach.

While other reports have described the different kinds of Web 2.O platforms through a chronological framework, identifying how interfaces have been taken up by adaptation rate[10] this chapter elaborates on Web 2.0-3.0 interfaces through the different categories of YOUser experience – placing YOU, the user fully in the center. The term "prosumer" was coined by Alvin Toffler in his 1980 book, *The Third Wave*, to describe exactly this blurring of the role of the producer and consumer, the newly evolving role which no longer falls into distinct categories in Web 2.0 platforms. Taken with the popularity of peer-to-peer networking, this could be seen as a direct assault on institutions (such as memory institutions) which, before the development of Web 2.0, had mostly applied a traditional, broadcast model approach.

1.2.1 Blogs

The best known of the Web 2.0 platforms is the blog. Having first appeared in 1997, blogs began to become more common in 2001, thanks to the free availability on the network of service management platforms.

A blog is a hybrid between a diary and journalism on-line, characterised by chronological ordering of information: the blog phenomenon has meant that the chance of publishing documents on Internet has evolved from being the privilege of the few (universities and research centres) to the right of everyone (bloggers, in fact). The horizontal network of blogs that are interconnected through the embedded interface is known as *blogosphere*, recalling perhaps an electronic iteration of Jürgen Habermas's public sphere of the previous century.

The structure of a blog is usually established by the underlying publishing program that makes it possible to automatically create a web page. This structure can often be

[10] *The Horizon Report*, 2008, published by The New Media Consortium describes the technological trends for higher education and the creative industry. This report makes a distinction between three periods for the adoption of Web 2.0 platforms; within 1 year, 2 until 3 years and 4 until 5 years. In the 2008 edition, the Horizon report puts Grassroots Video & Collaboration Webs (at 1 year), with mobile broadband (2 to 3 years). In addition they suggest that data mashups, collective intelligence and social operating systems (representing the next generation of social networking) are taken up after 4 to 5 years: http://www.nmc.org/horizon/.

personalized with graphics and layouts called *templates*. A blog allows anyone who has an Internet connection to easily create a site in which to publish stories, information and opinions with total autonomy. Every article is usually linked to a theme (*thread)*, in which readers can write their comments and leave messages for the author. Every article is numbered within the blog and can be specifically indicated through a *permalink*, that is to say a link that points directly to that article. In some cases there can be a number of *bloggers* who write for the one blog. In other cases there are sites that are similar to blogs but they are open to everyone.

There are special types of blogs:

- The photoblog (from photo + blog) is a kind of blog which uses a high proportion of images, as opposed to text. Any text may simply be a comment to images and thus be very short
- The videoblog (from video + blog) is a kind of blog which contains primarily video content. Usually text is just a comment to videos and is very short
- The geoblog makes possible an interaction between a map and stories posted by users. Users add written or audiovisual diaries, connecting them to the geographic maps online.

The blog interface may be enriched by the use of *widgets***,** elements that are typically graphic (such as buttons or checkboxes) that facilitate the user's interaction with the program. They are portions of software that "plug-in" to a blogging platform, thus increasing its functionality.

The advantages of a blog are: reduced initial investment, low management costs, content generated by the user. Because they act outside of the framework of traditional media outlets, a blog tends to offer an alternate voice to the mainstream reporting of events.

There are many good examples of museum blogs, and a useful survey on the take up of blogs in the museum sector was completed in 2006 by Jim Spadaccini from Ideum[11]. Museums, libraries and archives are beginning to find that blogging can be useful. A useful resource that documents the latest trends in cultural institutions and emerging technologies, such as institutional blogs can be found at the Archives & Museum Informatics Conference, Museums and the Web conferences[12], the IFLA World Library and Information Congress[13], and similar annual meetings of professionals dedicated to the latest trends in the field.

1.2.2 Wikis

A wiki (from a term in the Hawaian language that means "very fast"), is a website (or in any case a collection of hypertext documents) that can be modified by its readers. The content of a wiki is developed in cooperation with all those who have access to it. The modification of the contents is open and free, but it is chronologically recorded in order to enable changes to be reversed. The aim of a wiki is the sharing, exchanging, storing and optimizing of knowledge in an atmosphere of cooperation.

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[11] *Museums: 2.0: A Survey of Museum Blogs & Community Sites,* http://www.ideum.com/blog/2006/03/06/a-survey-of-museum-blogs-community-sites.
[12] Museums and the Web, www.archimuse.com/conferences/mw.html.
[13] IFLA World Library and Information Congress http://www.ifla.org/IV/index.htm.

A wiki is completely hypertextual, with a non-linear navigation structure. Normally each page contains a large number of links to other pages; in large wikis there is in any case a navigation hierarchy, but it does not necessarily have to be used. The term wiki also indicates the cooperative software used for creating the website.

Blogs and wikis have some common characteristics: in the way that updates are managed, with facilities to enable readers to comment, and with a common focus on the creation of new online communities.

An example of wiki is the internationally renowned *Wikipedia*, phenomenon that has all but swept traditional encyclopaedias under the carpet. According to the definition posted on their site: *Wikipedia* is a multilingual, web-based, free content encyclopaedia project. The name Wikipedia is a portmanteau of the words wiki (a type of collaborative website) and encyclopaedia.

The key to the success of Wikipedia lies in the collaborative nature of the user-generated content; the material that is authored by those who know enough about, or who care enough about a particular subject to actually sit down to create or edit the content. In the first month of 2008, according the Wikipedia.org, there were more than 75,000 active contributors working on some 9,000,000 articles in more than 250 languages. Founded initially in 2001 as *Nupedia*, and developed through an elaborate system of peer editing, *Wikipedia* has since spawned dozens of spin-offs, who use the MediaWiki software, the open-source program that takes up the wiki architecture to facilitate thousands of web forums and knowledge bases. *Wikipedia* is a registered trademark of the non-profit Wikimedia Foundation, and is covered by the GNU Free Documentation License (GFDL). For the full history see their official site[14].

Museums on the Wikipedia website

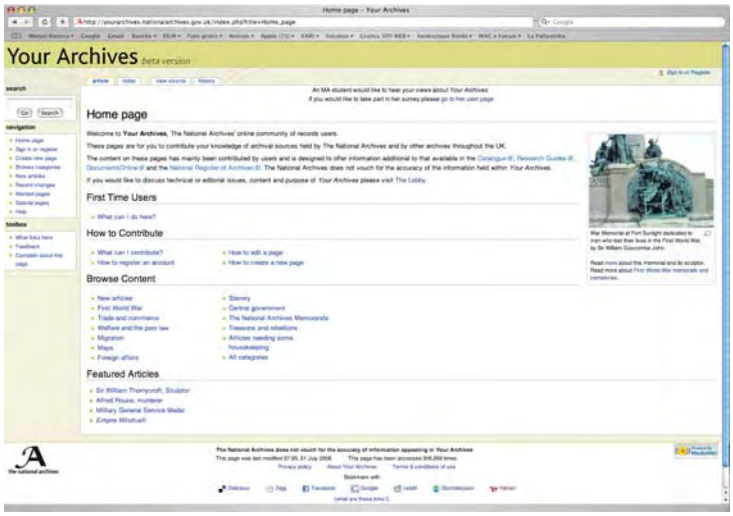
[14] *The history of Wikipedia*, http://en.wikipedia.org/wiki/History_of_Wikipedia.

For cultural institutions that depend on the trust that they have traditionally received from their public, many institutions may not always find the *Wikipedia* editorials to their liking. As the ultimate voice of authority of their own institution, they may not actually agree with a commentary from the public that refers to the collections that are held in their stewardship. It then becomes up to the institution to either intervene, or correct the mistakes often made – in good faith – or to turn a blind eye and leave the spontaneous, and constant editorial progressions up the public. Without repeating any specific editorial mistakes found in the numerous institutional pages, and crystallising them here in print media, a simple review of a handful of cultural institution sites seems to reflect that they have not been written at a standard that might be expected of such an institution.

When content from the trusted and true institutions – such as libraries, museums, and archives came to our notice via the traditional print and electronic broadcast industries and Web 1.0 interfaces, there always was a sense that this kind of content could be relied on with impunity. The knowledge that now emerges from open wikis which have been generated through collaborative processes may or may not be worthy of the same trust. Until these kinds of websites and portals aspire to those same measures of integrity, and professional standards that drive the internationally recognised institutions, sites like *Wikipedia* may not receive the same measure of trust as becomes the cultural institution. On the other hand, a cultural institution, or organisation may well celebrate the fact that somewhere, out there in the world, there are people who care enough about a particular institution to take the time to describe an archive's holdings, a library's collection, or a museum's exhibition.

Some institutions have taken a different approach and have invited their public to make active contributions in their own, institutional wiki. While the strength of the UK based National Archives website has traditionally enabled online users to download their own histories from an authoritative source, here was the perfect opportunity for those very same users to upload their own stories into a public space that is respected by national, and international communities. The impressive wiki interface, *Your archives* is open to all, and it is reassuring to see how its complexity was made simple by the intuitive interface. Even though, at the time of writing the portal still seems to be very much an evolving space, there is clearly an exciting potential for remote users to make their own contributions and to be able to publish them online. This can be seen as a courageous stance as they themselves point out how (according to the website) how "new resources such as *Your archives* are challenging the traditional methods of authorship" and point out how "they allow for information sharing on a scale unheard of before and facilitate the ´democratisation´ of history"[15].

[15] Your Archives, http://yourarchives.nationalarchives.gov.uk.



YourArchives, The National Archives Online Community of Record Users

The engagement with the public through a wiki approach assures that material is intuitively harvested, professionally structured, and fully accessible. After registering, readers/authors may then go on to create, edit and publish pages directly from the web browser. According to the portal *Your archives* builds on content already available in the Catalogue, Research Guides, Documents Online and the National Register of Archives. The Catalogue has a link on each page to *Your archives*, encouraging users to find out more about subjects that interest them, and to go on to contribute their own knowledge concerning a particular record. Subjects have already been identified by the national Archive as worthy of an article in their own right, and readers are encouraged to click on the relevant link, and to upload their own material. This then insures that content/knowledge/stories are directly entered into a highly structured format; which not only extends the professionally entered archived resources, but also acts to enhance, and amplify the archive in ways that inspires, trust and confidence in the institution that hosts the portal.

Your archives is swiftly becoming a user friendly webspace. It welcomes its readers to make their own contributions by urging first time users to come on board, encouraging them make their own contribution for others to read with the friendly invitation: “You may wish to start by making a minor change, such as correcting the spelling of a word. Go ahead and try - you’ll soon see how easy it is. http://yourarchives.nationalarchives.gov.uk”.

1.2.3 Content in a pod

Poadcasting is s system that makes it possible to automatically download documents (generally audio or video) called *podcasts*, using a programme (“client”) that is usually free of charge called a *feeder*. A podcast is a file provided on the Internet for anyone who wishes to subscribe to a periodical transmission that is automatically downloadable from a special programme, called a feeder, and is based on RSS feeds (see 4.4).

To receive a *podcast* you must have: an *Internet terminal* (a PC, for example); a

special client programme (often free of charge); a *subscription* with a podcast provider (often free of charge).

A *podcast* works like a subscription to a periodical publication, using a metaphor: the *support connected to Internet* is the *postbox*, the *client* is the *postman,* and the *podcast provider* is the *publisher*. The subscriber receives the publications regularly, and can listen to them or see them in the manner and at the time best suits him. (from Wikipedia)

With all the range of potential platforms now available over Web 2.0, part of the confusion for authors of cultural institutions lies in deciding which platform works best for their institution. Once an institution has worked out where best to apply their resources there is a wealth of platforms to choose from. One way for an institution to forge a direct and long-term relationship with their public is by offering them syndicated, subscription-based content that comes to them in high quality, bite-sized chunks. Like peas in a pod, these audio or video clips are especially crafted as a series of mini clips, primed for viewing on a small screen on hand-held devices (see 2.5.6.1); iPhones, personal digital assistant (PDA's), or mobile phones. The file is then downloaded, or streamed automatically via an aggregator, or feed reader capable using feed formats such as RSS[16] (see 3.4) or Atom[17] and cast, (podcast, as apposed to broadcast) directly to the user.

An impressive example of these new direct links is the SFMOMA Artcasts program[18] when, during 2007, the museum become the recipient of many, well-earned awards[19]. According to their website 'Artcasts paint vivid audio portraits that extend the SFMOMA galleries beyond their physical space in San Francisco to art fans everywhere. Download the latest Artcast and hear Olafur Eliasson and visitors respond to his mind-expanding exhibition *Take your time*'.

SFMOMA Artcasts

[16] RSS (Really Simple Syndication), http://en.wikipedia.org/wiki/RSS_(file_format).
[17] ATOM (Atom Syndication Format), http://en.wikipedia.org/wiki/Atom_%28standard%29.
[18] SFMOMA Artcasts Program, http://www.sfmoma.org/education/edu_podcasts.html.
[19] SFMOMA Artcasts awards, the 2007 Museums and the Web Best of the Web Award in the "Best Innovative or Experimental Application" category; and the 2006 American Association of Museums Muse Award in the "Two-Way Communication".

An excellent resource for those who might like to learn more about Podcasting in museums may read the article by the UK-Based *24HourMuseum*[20] and to access the Wikipedia list of Libraries who podcast;[21] an excellent resource for the library community. Not only are cultural institutions making excellent use of ths platform, but so too are the traditional media organisations, such as the BBC[22], print publications such as InfoWorld[23] and of course, the thousands of bloggers who find that their text-based diary is simply not enough.

1.2.4 Micro-content: sharing, bookmarking and social tagging

Moving away from user-generated, collaborative knowledge, this section describes those Web 2.0 sites that can be described as micro-content sharing sites (see 2.5.6.4).

Social bookmarking is a service provided on the web, through which lists of *bookmarks* created by users are made available for free consultation and for sharing with other users. Categorisation of the resources takes place through "tags" freely chosen by the user. In contrast to traditional search engines that "place" a resource on the basis of the number of external links that aim at it, *social bookmarking* favours placing of a resource on the basis of its "acknowledged" usefulness, therefore becoming much more interesting for the user.

These are the sites that host, aggregate, and publish personal bookmarks: *Delicious* (http://del.icio.us), *Magnolia* (ma.gnolia.com), *RawSugar* (http://rawsugar.com), *Library Thing* (www.librarything.com) or focus on one particular kind of medium such as the photo-sharing sites; *Flickr* (www.flickr.com), and the video site *YouTube* (www.youtube.com).

Many *social bookmarking* systems offer subscriptions to RSS feeds (see 4.4) based on categories. In this way, the user who has subscribed to the service receives an automatic notification every time other users add new bookmarks in the category that interests him. Many of them also offer services of social tagging to auto-classify the bookmarks (see above).

The content of different objects can be described with the same *tags.* The greater popularity of some objects compared to others can be highlighted in some way (with a specific colour, a size or a different placing). The user can tag a blog post, a photograph, a video, etc. and thus facilitate a search within the tagged content base. Classification using **social tagging** is not based on a hierarchical order of the contents, since the user can insert more than one key word. The more a *tag* is applied by a number of users, the more the term will increase in popularity and precision in categorization. Main search categories will therefore be created in the sites on the basis of the themes that are most frequently accessed and tagged by users. Categorization thus becomes "democratic", not imposed from above but from below, and evolving spontaneously.

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[20] Article on podcasting in the museum on the UK-Based 24 HourMuseum, http://www.24hourmuseum.org.uk/nwh/ART37770.html.
[21] *Libraries who podcast*, http://www.libsuccess.org/index.php?title=Podcasting.
[22] BBC Podcasts, http://www.bbc.co.uk/radio/podcasts/docarchive/.
[23] InfrWorld Posdcast, http://weblog.infoworld.com/daily/archives/podcast/archive.html.

The term **folksonomy**, coined by Thomas Vander Wal in 2003, derives from the words *folk* and *taxonomy*[24]. In this case we talk about *collaborative tagging* or *social tagging*.

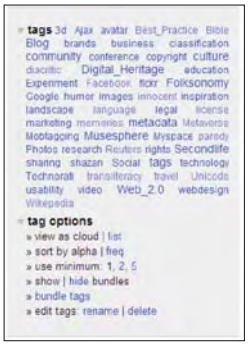
This is a form of **distributed classification**: the same users that view a content item, categorise it and associate tags with it. The tags are not *a priori* structured into categories and sub-categories, according to a *bottom-up* approach.

One of the defects of this system consists in the proliferation of variants for the one term (synonymy, homonym, single/plural use, small case/upper case, etc.). To avoid this problem, techniques such as *clustering* can be applied, where some elements are grouped together, so that different tags are treated as if they were one (e.g. *Folksonomy*, *folksonomy* or *folksonomies*).

The folksonomy system is used when it isn't possible or desired to centrally manage classification and it is desired to enable the public to participate in the classification of the content, making the mental models emerge from below.

The advantages of this system are: a rapid, distributed and shared classification; scalability, that is to say the capacity to increase or decrease in *scale* in response to user requirements; limited cost and time investment for any one entity; serendipity, ease of use; extensive popular following, creation of common mental models.

What is common to all these kinds of Web 2.0 sites is the principal of *tagging*; the simple use of personal 'hooks', or metadata mark-up that is applied to an object.



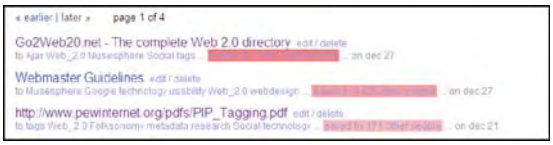
Example of tagcloud

Tags often appear in clouds (**tagcloud**), where the terms become a simple way of displaying the user generated tags in a highly visual form. Terms are typically listed in alphabetic order, and are weighted according to the frequency they are used in a closed environment. If they represent your own list of bookmarks from your *del.icio.us* page, for example, they will enable you to see how often you have used a specific term. The term that has been used more frequently will appear in a larger, or bolder font, and will stand out against the other terms, less frequently used, which will then recede into the background with a lighter, or smaller font.

[24] «Folksonomy is the result of personal free tagging of information and objects (anything with a URL) for one's own retrieval. The tagging is done in a social environment (usually shared and open to others). Folksonomy is created from the act of tagging by the person consuming the information. The value in this external tagging is derived from people using their own vocabulary and adding explicit meaning, which may come from inferred understanding of the information/object. People are not so much categorizing, as providing a means to connect items (placing hooks) to provide their meaning in their own understanding.», Thomas Vander Wal, 2003.

A further advantage of displaying of your own tags in this way is the ability to share tags with others. As individual bookmarks are listed, they are described by a colour-coded reference that shows how many other people have tagged the same bookmark. This is a great way of tracking hot subjects and popular websites.

Other people's tags may also be sorted by **bundles** (aggregations), and by 'most frequently used' and you can also go back to trace what other web pages have been described in the same terms as your own by following a breadcrumb trail to back to other sites that use the same tags. In addition, by exploring who else has been using your kinds of tags, you can easily discover how like-minded people are saving, and describing their own web pages and to go on to track a specific person's bookmarks. In this way you can stay in touch with their travels through the web, stepping into their 'footprints' as they bookmark along their webway.



Viewing the value of bookmarks weighted by number and colour code

The disadvantages are: lack of precision, more useful for exploratory rather than precise searches; proliferation of variants for the one term; excess of information.

In addition, tagging cultural content in this way is dependent on what could be seen as the subjective nature of personal descriptions. For example, even within the same language, the tags I find very useful maybe totally useless for you because of the personalised nature of online tagging. This is clearly due to the fact that we do not really share the same vocabulary and, my terms are so idiosyncratic, that you probably wouldn't even understand why I described an image, or an article in the way that I have. In fact, the premise of a controlled vocabulary; a shared understanding of a professional term, standard spelling, even conforming to the way we use hyphens (or not), the inferred meaning by an abbreviated term, etc. may all be so uncontrolled in the tags we encounter in these sites, that, in reality, my own tags may become totally meaningless to you. Refinements are already taking place, and, as these systems evolve, the commonality, and share-ability of tags may well become more efficient.

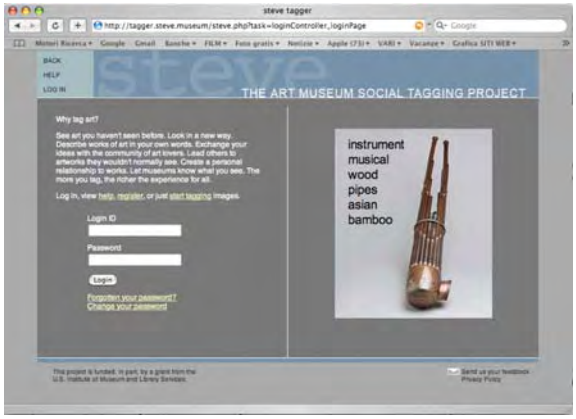
In a compelling article on how these kinds of systems can actually work[25] Marieke Guy and Emma Tonkin draw on anecdotal evidence to support the view that there is a natural tendency towards the convergence of tags, and that there are already strategies that may facilitate this development. They cite Stephen Pinker in his *The Language Instinct* to discuss 'pidgin' (a combination of words from other languages absent of any stable grammatical structure) and 'creole' (a combination of words from other languages with a unique grammar imposed) language. Pinker suggests that 'creole' will come from 'pidgin' if people are given the chance to speak to others, and

[25] *Folksonomies: Tidying up Tags?*, http://www.dlib.org/dlib/january06/guy/01guy.html.

Guy and Tonkin argue that similarly social tagging services create the kinds of environments in which metadata vocabularies could easily evolve in a natural way.

Just as a tagging a photo aims at describing the image for others as well as for yourself, tags that have been added by the public in the context of the cultural institution could be just as useful to describe the object, a book or an artwork in a collection.

Several examples of these kinds of taxonomic experiments have been implemented in cultural institutions. One of the first examples was the Steve Museum project[26].



The Steve museum project

According to Wyman, B., *et al.*, "Tagging lets us temper our authored voice and create an additional means of access to art in the public's voice. For museums, including these alternative perspectives signals an important shift to a greater awareness of our place in a diverse community, and the assertion of a goal to promote social engagement with our audiences" (2006).

In spite of this ambitious, yet admirable declaration, taking into account the different ways people tend to describe an object, website or photo, it does raise many questions as to how any individual, located below the radar of the museum, could possibly contribute a meaningful interpretation of a museum object, other than with his, or with her idiosyncratic description of a specific art work. One way in which this may be resolved could be in the context of emergent vocabularies, as Guy and Tonkin suggest, and, as tags become more popular in the context of the museum, and consequently more meaningful, they may well become attractive.

There are now many sites where the public can contribute their own descriptions. The Powerhouse Museum, in Sydney has introduced the folksonomic strategies[27] to describe their collections in additional to the museum's traditional search mechanisms. This would be an excellent starting point for those interested in seeing how folksonomies work in a cultural institution.

[26] Steve Museum, http://www.steve.museum.
[27] Powerhouse Museum, Sydney, http://www.powerhousemuseum.com/collection/database.

Powerhouse Museum, Sydney, Tagging online

Managing large quantities of micro-content uploaded by the public in reality becomes a truly formidable task, especially where there is almost no taxonomic structure to rely on. In be able to maintain some sort of taxonomic order over their massive image bank, *Google* is currently encouraging users to add their own tags to content[28]. This takes place through an online game that encourages users to "play" with an unseen partner to find similar labels to 10 images that are randomly uploaded for both "labellers" to see at the same time. Participants are motivated by a point system, where the number of points depends on how specific the label is. According to *Google*, you will receive more points for matches with more descriptive labels. In the image of a flying bird used as an example, more points are given to the labels that are qualitatively more expressive. With the term 'sky' you receive 50 points, for 'bird' 60 points, 'soaring' gets you 120 points, while using the term 'frigate bird' gets you an impressive 150 points. The *Google Image Labeller* was originally developed by Luis von Ahn as the *ESP Game*, and was licensed by him to *Google*.

Google Image Labeler

[28] Google's Imager, http://www.images.google.com/imagelabeler.

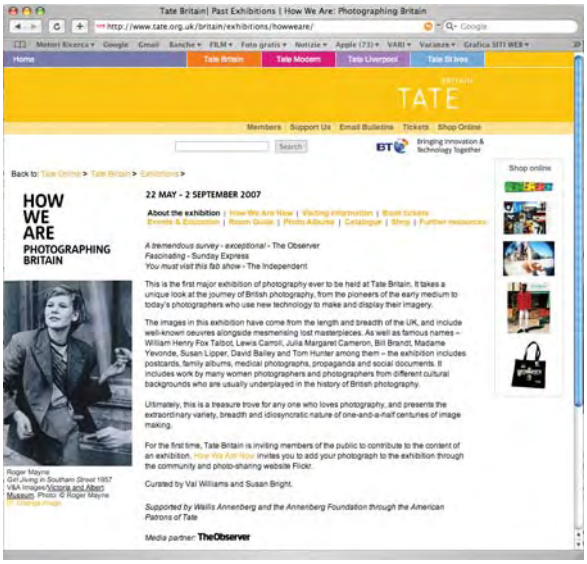
These kinds of online collaborations that take advantage of *the folk* in this way could also be seen as highly exploitative. The collective knowledge that can be harvested through these kinds of voluntary collaborations can be, in fact be highly lucrative, and while many people are happy to contribute altruistically, they may not feel quite so dedicated if they realise that their input, in fact, may result in someone else's financial gain. This has, in fact been identified as a phenomenon in its own right, and, has become so much of an issue that there is actually a term for it – *crowdsourcing* – used by Jeff Howe in a *Wired* Magazine article in June 2006[29].

Cultural institutions are acting within an internationally recognized, non-profit framework, and similar efforts – in this case as the public generation of folksonomies – tend to be seen as well intended collaborative effort, by the public, for the public.

These kinds of developments, which are taking place across the whole Web 2.0 map, are more welcome in the cultural heritage world when they reflect the non for profit mandate, however, where cultural institutions are concerned, what was once clearly marked as "institutional territory" now has librarians and curators peeking gingerly over the fence to see what they can "bring home". One example of this kind of Web 2.0 synergy is the collaboration between the *Yahoo!*-owned *Flickr*, and the Library of Congress, which aims to "facilitate giving people a voice in describing the content of a publicly-held photography collection". The folk, in this case, are invited to help describe photographs in the Library of Congress' collection on *Flickr*, by adding tags, or leaving comments on two collections: *1930s-40s in colour* and to *News in the 1910s*[30]. According to *Flickr*: "These beautiful, historic pictures from the Library represent materials for which the Library is not the intellectual property owner. *Flickr* is working with the Library of Congress to provide an appropriate statement for these materials. It's called '*no known copyright restrictions*'. Hopefully, this pilot can be used as a model that other cultural institutions would pick up, to share and redistribute the myriad collections held by cultural heritage institutions all over the world".

An enterprising contemporary photographs exhibition, launched by the Tate Britain Gallery, UK is *How We Are: Photographing Britain*. During the summer of 2007 the gallery invited members of the public to contribute to the content of the exhibition of British photography via their "How We Are Now Flickr group". It encouraged the public to upload their own works under one of the four themes of the exhibition: portrait, landscape, still life or documentary. The photographs submitted were displayed in an online slideshow and on screens in the gallery, and 40 photographs from those submitted – 10 from each of the four themes – were chosen to form the final display in the gallery from 6 August to 2 September 2007.[31]

[29] Jeff Howe's definition of 'crowdsourcing', http://crowdsourcing.typepad.com/cs.
[30] Flickr Commons http://www.flickr.com/commons.
[31] http://www.tate.org.uk/britain/exhibitions/howweare/slideshow.shtm.



How We Are: Photographing Britain

1.2.5 Social networking sites

Joining the Internet version of a social network is increasingly popular: the network of social relations that each one of us weaves every day in the various spheres of our lives can thus "go online", be organised into a consultable "map", and be enriched with new contacts (see 1.2.5). The phenomenon of the social network has evolved both around the professional sphere as much as it has within the personal sphere.
To enter a social network online, you have to construct your own personal profile, starting from information such as your e-mail address and going as far as interests and passions, past work experiences and relative references. At this stage you can invite your acquaintances to become part of your network and they in their turn can do the same so that the circle of contacts increases continuously. The result is the formation of thematic communities on the base of one's interests or business areas, adding other users to them and creating contacts of friendship or business. Further evolutions come from *Semantic Social Networks*, which interconnect both people and weblogs.

Social networks can be subdivided into:
1. Social browsing (es. Del.icio.us)
2. Interest networks (they are based on sharing interests and passions among users that are distant and different by social-demographic characteristics) (Es. Flickr)
3. Action networks (organization of one's *physical* activities through a website)
4. Personal social network: limited networks.

While there may over 100 sites that can be classified as social networking sites[32] (see 2.2.9) we will focus on three sites that have almost become household names.

[32] Social networking sites according the Wikipedia list, http://en.wikipedia.org/wiki/List_of_social_networking_websites.

According to current Wikipedia statistics, *MySpace* now boasts some 217,000,000 members (http://www.myspace.com) while *Facebook* has currently 58,000,000 registered users (http://www.facebook.com). At the same time, *LinkedIn*, a site for professional networking asserts that they have some 16,000,000 registered members (http://www.linkedin.com).

While the platforms described above all focus on content sharing and knowledge collaboration, and make significant use of collaborative filtering, *Linkedin* is driven more by professional group affinities, which grow through personal recommendation.

Good practices
1.2.8.1. MySpace
1.2.8.2. Facebook
1.2.8.3. Linkedin

1.2.6 MUVEs (Multi User Virtual Environments)

The Web 2.0 platforms mentioned above act within 2D web spaces and mostly take place across linked web pages and mobile phones. While these kinds of social networks encourage participants to take on more active authorship of the web content, they are now beginning to be enhanced by web-based virtual environments; spaces where people 'meet' as avatars, and interact in Multi User Virtual Environments (MUVEs) (see 2.2.11 and 2.5.7). This term refers to online, multi-user virtual environments, sometimes called "virtual worlds". Modern MUVEs have 3D isometric/third-person graphics, are accessed over the Internet, allow for some thousands of simultaneous users to interact, and represent a persistent virtual world.

In the summer of 2007, the *New Scientist* ran a three-part special report on *Second Life*, and around the same time, the virtual world hit the front page of *Newsweek*. These are the worlds that emerged from Neal Stephenson's fictional vision of the *Metaverse* in his novel *Snow Crash* which have now crossed over from being a fringe fantasy for pure escapists, to persistent worlds - worlds that never go away; even when you log out of the community, and continue to thrive even in your absence. This is a place where users log in throughout the day (or night) to interact with others in play, commerce, creativity and exploration. Second Life is a vast grid of islands where commodity exchange, property acquisition, live performances, real time learning and a host of other activities take place 24 hours, 7 days a week.

Our discussion turns, of course, to exploring how cultural institutions can stake their claim in the new frontier. In order to explore the possibilities, this section will showcase a number of cultural institutions that are already thriving in-world.

Good practices
1.2.8.4. Second House of Sweden in Second Life
1.2.8.5. McMaster University Ontario
1.2.8.6. Musée du Louvre on Thompson Island
1.2.8.7. The Staatliche Kunstsammlungen's Old Masters Picture Gallery, Dresden
1.2.8.8. Annual International Museum Day in Second Life

1.2.7 Conclusion

As Web 1.0 laid the rich foundations for cultural institutional websites, Web 2.0 platforms have become far more participatory and interactive. They have not only opened up the authoring of content from meta to micro-content, they also have shifted the sites of knowledge authorship; and, in doing so, have caused tectonic shifts in the balance of power associated with knowledge management. As the traditional wardens of not only the physical collections, but also the knowledge articulated by the collections, cultural institutions now have to pause to consider, both how to navigate web 2.0, as well as how to join in the synergy of social networking. These spaces can not simply be ignored by cultural institutions; they are already taking up vast tracts of the World Wide Web. According to *Technorati* at the beginning of 2008 they were tracking some 112.8 million blogs, and monitoring over 250 million pieces of tagged social media[33]. This represents millions of conversations that are taking place outside of traditional web spaces. As a paradigm shift in the way we think about the World Wide Web, there is no going back. On March 15, 2007, wiki entered the Oxford English Dictionary Online, and as knowledge resources are articulated by wiki environments, we too are becoming accustomed to the fact that it is not always the traditional institution that is stewarding the conversations. The trust in cultural institutions that once drew on the physical presence and the long-standing tradition of trust inspired by the library, museum or archive may now be fading when the public, who is visiting, notices that it is no longer the cultural institution who is writing the narrative. However, on the other hand there are many causes for celebration when the institutions open up their holdings in new ways for its public, and joins in new kinds of conversations.

This brief overview of Web 2.0-3.0 has barely scratched the tip of the iceberg on the intellectual property issues that these kinds of collaborations are raising. To do so in a meaningful way would demand a comprehensive discussion on many different levels. These kinds of copyright issues may well be worked out under the 'Creative Commons license', a subject already being explored in the context of Web 1.0 sites and cultural institutions. At the same time, and in spite of the tangled web of copyright legalities that need to be worked out, these kinds of opportunities could well serve to mobilize collections otherwise locked in their institutional silos. Integrating Web 2.0 platforms into cultural websites may grant access into institutional holdings in new ways, allowing the folk to tag objects in novel ways, and opening up new opportunities to disseminate rich content across networks beyond the institutional walls.

A recommendation that this handbook can offer its YOUsers would be to simply add a widget, (an application that allows you to integrate other applications in a highly intuitive way) that seamlessly allows your visitors to connect to Web 2.0 platforms with a single click. Users who come to your site can bookmark and tag YOUR institution on the fly.

[33]Technorati, http://www.technorati.com/about.

Example of a widget on a museum site

See the widget at the bottom of the museum page BOOKMARK , http://addthis.com/.

This brief overview may have posed more questions than it answered, but, it is very difficult to document the implications and repercussions of Web 2.0 and 3.0 while there is so much evolving around us. This is a challenging time for museums, libraries and archives. As new opportunities are beginning to open up, only time will tell whether the forays that have already taken place by cultural institutions into the new territories have been the right ones. If these journeys into Facebook, Wikis and Second Life succeed in maintaining the same measures of trust, and dedication that have inspired their publics over the years, cultural institutions will be able to extend their activities – that already reach into the past – with confidence and integrity straight into the future.

Roc Fages, Ramón Sangüesa,
Report prepared by ePractice.eu - a project funded by the European Commission
State-of-the-art in Good Practice Exchange and Web 2.0
http://www.epractice.eu

Lee Rainie, Director, Pew Internet and American Life Project,
Interview: Author David Weinberger Describes How Tagging Changes People's Relationship to Information and Each Other, January 31, 2007
http://www.pewinternet.org/pdfs/PIP_Tagging.pdf

A directory of web 2.0 applications and services
http://www.go2web20.net

1.2.8 ANNEX - Good practices

1.2.8.1 MySpace — SOCIAL NETWORKING SITE

http://www.myspace.com

Created by Thomas Anderson and Christopher DeWolfe, *MySpace* was launched in 1999, well before other social networking sites appeared. *Friends Reunited* was officially launched in July 2000, and *Friendster* in fact, started popping up with requests sent via e-mail in 2002. Most of these platforms combine a personal profile, blog, photos, videos, chat room and instant messenger application. *MySpace* draws its revenues from banner ads, and is currently owned by Rupert Murdoch's Fox Interactive Media. The kinds of exchange that take place between registered members across the network revolve around the micro-content authored by the members themselves. This personal micro-content is exchanged throughout the network via both synchronous communication and asynchronous communication.

Museum of London on Myspace

1.2.8.2 Facebook — SOCIAL NETWORKING SITE

http://www.facebook.com

Launched in the spring of 2004, *Facebook* was first conceived as **social networking directory** for Harvard students. As social connections naturally extended beyond the Harvard campus, so their online network quickly grew. The idea behind the network was taken from the printed book of faces that is distributed across campuses. These in-campus publications were designed so that students could get to know one another by reading about one another and to be able to recognise fellow students from their photos. Today, even those without the previously indispensable .edu or .ac email account can sign up and maintain daily or even hourly contact with their own personal network. There are hundreds of mini applications available to embed into the interface. With a simple click you can add hundreds of different gizmos to your own home page, ranging from, ArtShare, Causes, Chat, Crowd Cloud, Events, Free Gifts, Groups, Live Chat, Notes, Photos, Slide Shows, and your own Super Wall to display your very own graffiti – with so many widgets to choose from, no single *Facebook* page will look like another. *Facebook* connects to other Web 2.0 platforms, such as *Twitter* (http://www.twitter.com) a micro-blogging interface that allows you to send "tweets"; text-based posts, up to 140 characters in length. These kinds of sites aim to keep you in touch with your own network; whether you want to know who has been skiing this week, who has split up from whom, or who has just added the latest gizmo to their own *Facebook* page. While for those who are delighted to share their professional and personal lives with a chosen few (a typical *Facebook* network can reach into the hundreds), what concerns our discussion here is what can, or should a cultural institution be doing here?

ArtShare is an application initiated by Shelly Bernstein from the Brooklyn Museum that can be added to your *Facebook* profile. Once added it allows you to select works from the Brooklyn Museum collection, and a few works from the V & A in London and to display them in your own profile at random. The idea is to allow your friends to see what kind of art you like; and if you don't find anything relevant in these collections, you can even create your own artwork. This of course presents serious copyright issues, but applications like these do keep on popping up on Web 2.0 sites, when members of social networks are *as* devoted to their favourite artwork in their museum of choice, as they are to their favourite photos, video clips or bookmarks. Whether they enjoy longevity or not is another question.

The Israel Museum, Jerusalem on Facebook

Another way to take advantage of the network is to create a *Facebook* page for the entire museum. There are several museums that have already done so, such as the Israel Museum, Jerusalem who links their *Facebook* page to the institutional website. There are currently over five hundred 'fans' that follow the museum events and activitie, and at the moment the fan group is growing rapidly.

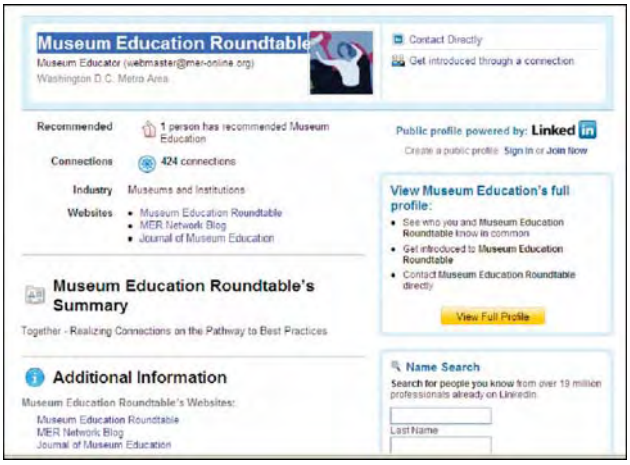
For those institutions who may yet be undecided whether to stake a claim in *Facebook*, there is an online discussion taking place over a *Facebook* group that is called *'Museums on Facebook*[34] where members are encouraged to share their experiences.

[34] Museums on Facebook Group, http://www.facebook.com/group.php?gid=8173798651.

1.2.8.3 Linkedin — SOCIAL NETWORKING SITE

http://www.linkedin.com

Another kind of social networks is those that are framed as **professional platforms**. *Linkedin* works in the same ways as other social networks, but the expressed goal of this platform is to stimulate professional networking. On receiving an invitation from a network member, you are requested to affirm them, while noting the professional association that links you to this person. Although this step can be bypassed, by affirming the connection with your own institutional information, you can gradually see how networks in fact are formed across the world; each within their professional association. Members are encouraged to endorse colleagues, presumable to make them more attractive in the workplace, and potential job opportunities are merely a click away. While members may respond to others within the network, any deeper correspondence requires full registration, and with it comes the registration fee. As with all of the social networking platforms, there seems to be some sort of prestige as to the number of people you can boast on your network. In the case of your professional status, as reflected by your *Linkedin* virtual colleagues, one can only presume that this may help your standing in the international market.



Museum Education Roundtable on LinkedIn

It is of course possible to reject an invitation from any of these sites; the person who invites you does not usually see that they are being actively rejected, only that they are being ignored or allowing the inviter to decide that perhaps the invitation never made it to the invitees mailbox.

1.2.8.4 Second House of Sweden in Second Life — MUVE

One of the most impressive builds is the Swedish Institute, a promotional organisation which works alongside the foreign ministry who have built the Swedish Embassy on their specially designed island in Second Life. Although this embassy does not issue residents with either passports or visas, it does explain to avatars how to get the necessary documents for their alter-egos in the real world. Since May 30, 2007, the Institute has been circulating information about Sweden, making their representatives available to meet the public during the office hours clearly posted on their "reception desk" in a dedicated, virtual diplomatic effort towards extending Sweden's culture. More interesting for our discussion however, is the collaboration taking place between the Swedish Institute and the National Museum in Stockholm, which is "loaning" some of its most famous works of art to the Second House of Sweden in Second Life. Why would such a prestigious national institution invest in these resources? According to the Swedish Institution's website:

Paintings and textiles offering links with Sweden and the museum's collections will now be placed in the virtual version of architect Gert Wingårdh's new embassy building in Washington DC.
The items to be shown in the virtual embassy are among the best-known works of art at National Museum. They reflect different epochs in the history of art and the museum's collections of Dutch and French painting from the 17th to the 20th centuries.
Swedish Institute 2007

Taking up official residence in the new world is a logical extension of the country's national outreach policies and Sweden's embassy in SL is in fact modelled on another embassy - architect Gert Wingårdh's new embassy building in Washington DC. Based on the very same architectural concept – and even perhaps using the same CAD drawings – the building can be almost effortlessly relocated to the synthetic world. In addition to the virtual treasures from the National Museum, the Embassy also hosts a photography exhibit from Sweden and a comprehensive exhibition about the life of Raoul Wallenberg, arranged in cooperation with OSA Archivum[35], the Open Society's archives in Budapest. In addition to the permanent exhibitions, Second Sweden's diplomatic staff present a rich agenda of seminars, lectures and distance learning, all developed to amplify its public diplomacy agenda. Set in the elegantly designed island, the buildings and the gardens have been created by one of the leading SL designer companies, the Electric Sheep Company[36] and were modelled according the embassy's specifications.

[35] The Open Society Archives – OSA – is an archive and centre for research and education. Its collections and activities relate to the period after the Second World War, mainly The Cold War, the history of the formerly communist countries, Human rights, and War crimes.
[36] The Electric Sheep Company, http://www.electricsheepcompany.com.

1.2.8.5 McMaster University, Hamilton, Ontario, Canada — MUVE

A highly innovative approach to accessing library resources has been taken by the University Library of McMaster University, Ontario[37]. Avatars Danu Dahlstrom, Amanda Matzerath, Devi Daviau, Isobella Sands, Gudrun Bertolucci and Ataro Santos (real-life librarians Krista Godfrey, Amanda Etches-Johnson and Nora Gaskin, and staff members Rhonda Moore, Renu Barrett and Derek Bragg) are currently helping visitors (avatars) at their newest branch, located on Second Life on Cybrary City, near InfoIsland.

The librarians are amazingly patient as they explain (in chat) to drop-in avatars how to access resources – via in-world terminals to the library's website; all lined up against the wall in this tiny simulation of the real library. In much the same way as one would expect to retrieve books, and journals in the real world, fondly referred to as RL (real life), some publications are available electronically, while others (the books for example) still demand a visit to the physical library, located in the Canadian campus. There are currently hundreds of universities that actively teach accredited classes on Second Life, demanding these kinds of responses that allow students – fresh from their morning's lecture (in world) – to be able to 'pop over' with a friend to the 'local library'.

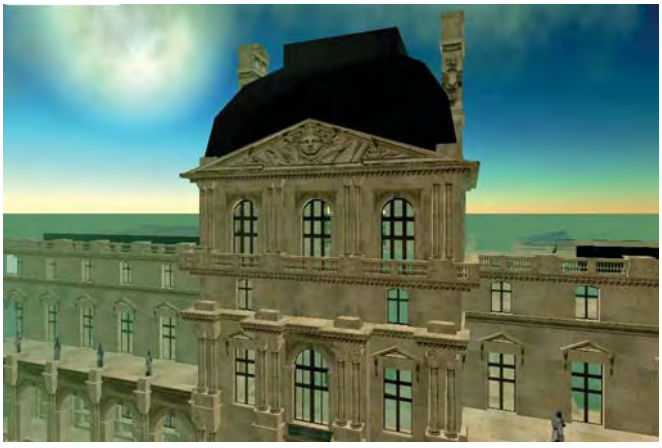
[37] McMaster University, Ontario, http://dailynews.mcmaster.ca/story.cfm?id=4660.

1.2.8.6 Musée du Louvre on Thompson Island — MUVE

Many of the in-world cultural institutions are not listed; one simply hears about them from others or flies into them by chance. News travels fast in Second Life, and like-minded people know how to use both in-world and online facilities to spread the word. Currently, one of the most popular new museums is the Second Louvre Museum, where self-proclaimed curator Kharis Forte has developed an impressive rendering of the physical museum, now transposed to Thompson Island. Forte's 'physical' layout follows the same floor plan as the real museum, but he names his galleries and curates their contents at whim. For some this might be a perplexing visit. Professionals who work in the real Louvre might find it downright shocking. For while Forte has modelled his SL museum on the original in exquisite 3D detail; the collections displayed inside bear no resemblance to those that appear in the physical museum located far away in Paris. Forte does, of course, leave us with the disclaimer:

This museum is in no way affiliated with the Musée du Louvre in Paris, France.
No claims or representation of being anything other than a museum of Second Life are being made.
Please refer inquiries to Kharis Fortis.

While this rendering of the Parisian Louvre seems extraordinary, considering that the staff of the real museum had no part in the support or development of this museum, never the less, The Second Louvre still continues to be one of the best known museums in Second Life.



1.2.8.7 The Staatliche Kunstsammlungen's Old Masters Picture Gallery, Dresden — MUVE

The third example of a Second Life Museum is the spectacular Dresden Gallery[38] in Second Life. This museum is located on its own island and is a replica of the Staatliche Kunstsammlungen's Old Masters Picture Gallery in Dresden. The locations of many famous masterpieces, such as Raphael's "Sistine Madonna" or Giorgione's "Sleeping Venus" have been transposed to this beautifully modelled museum, and have been reconstructed, true to scale to include *all* of the 750 masterpieces in the permanent exhibition. Andrew Curry from "Wired Magazine"[39] playfully suggests, 'if you can't make it to Dresden this summer, consider teleporting'. While this might sound rather alarming to some museum professionals, who tend to prefer their visitors to walk through their physical door, this simulation is exquisite. Acting in the same ways as do their institutional web portals, the Staatliche Kunstsammlungen's Second Life presence may well generate enough interest so that visitors will actually seek out the real museum, and come to visit the collections and exhibitions for themselves.

[38] Dresden gallery in Second Life, http://www.dresdengallery.com.
[39] Andrew Curry, http://www.wired.com/culture/art/multimedia/2007/08/gallery_dresden.

1.2.8.8 Annual International Museum Day in Second Life — MUVE

On May 18, 2008 ICOM museums celebrated annual International Museum Day, and this year the theme was *Museums: agents of social change and development*. In addition to the traditional seminars, lectures and exhibition visits that took place in museums around the world, this year, for the first time, ICOM added a Second Life location for museum professionals to join in the festivities from the comfort of their office chair, or, as it was a Sunday, if they so chose, from the luxury of their armchair at home.

Avatars were welcomed with the indispensable coffee, and quickly got themselves comfortable in small groups on the cozy sofas for informal chitchat for the 24 hours that crossed all possible time zones.
Participants to this event were encouraged to visit the rock art grotto, created by Bjorlyn Loon, a SL designer (Lynn Cullens in real life) who built the rock face, and embellished it with pseudo-ancient cave paintings. This made an excellent locus for exploration, and an obvious focus of avatoral discussion. Tours of the Tech Museum campus were available by a specially-scripted, flying, ICOM-bus which took those participants – who were perhaps a little weary of flying themselves around the build as their still unfamiliar avatar – but who still wanted to enjoy a bird's eye view of the Tech Museum's campus.

ICOM-branded T-shirts were distributed to participants, and ICOM staff welcomed museum professionals during the event, where each participating museum was represented by a "curator" avatar. The celebration began at 3 am, Eastern Daylight Time (9 am SLT) and continued on for this especially long day with the highlight of International Museum Day taking place at 6 p.m., Paris Time, (9am SLT) when Alissandra Cummins, ICOM's President gave a welcome speech from the Second Life podium to the assembled avatars from all over the world.

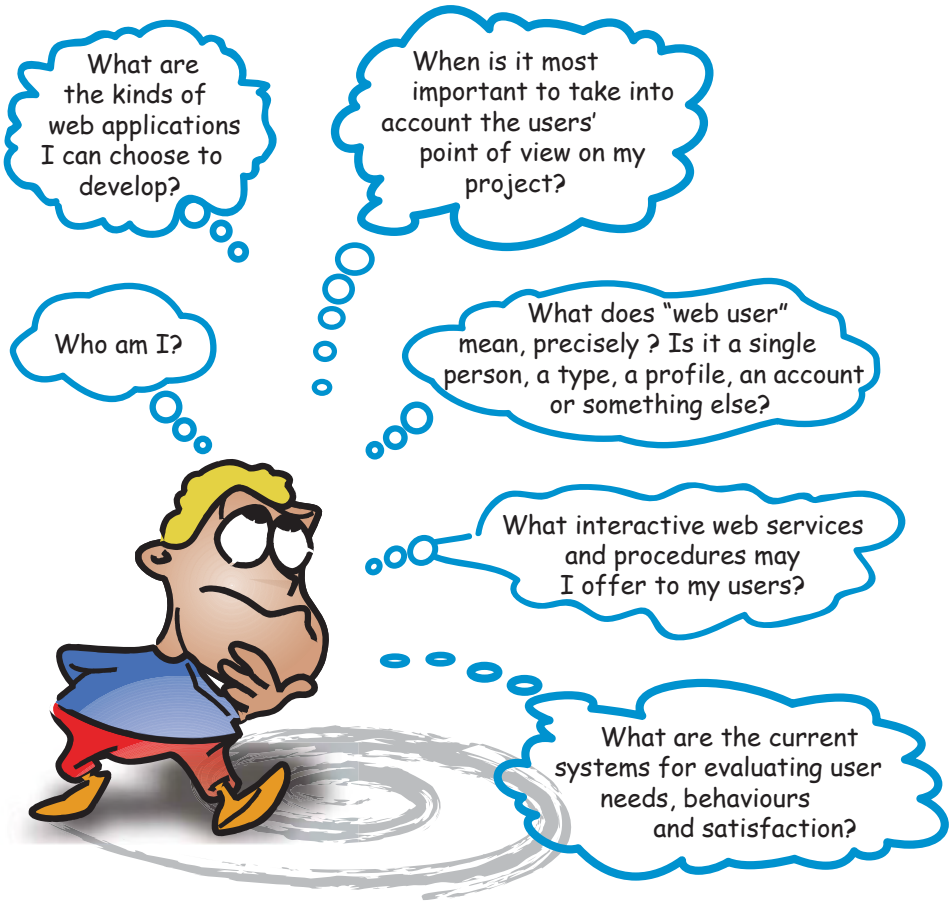
The Tech Island in Second Life, The Tech Virtual, who hosted International Museum Day, was developed by the Tech's San José, California (USA) with the simulated facility looking very much like the real site. While the auditorium and exhibition galleries are modelled on the real museum, the build is designed to facilitate projects and community connections using virtual worlds as a platform to build new kinds of

collaborations within the museum world. I had to admit that sitting down with Mars Voyager, an 'astronaut' from the Second Life Planetarium in a fascinating discussion about what added value their visitors could get from flying around their island, made for a useful exchange of ideas. Where else could I learn, first hand about what the virtual world could offer museums that simply is not possible in real life, and perhaps, even more interestingly, what this could contribute to a meaningful visitor experience.

2 Finding one's way

This chapter offers a collection of reasoned schemas, information and tools to auto-orientate our web project, taking into serious account users needs (before) and opinions about web application (after).

It aims to address some basic questions for online cultural heritage institutions:



2.1 Cultural entity types

Who am I?

A cultural entity can be a person, an organisation, an institution or a group of different entities combined to deliver a cultural product, which may also deploy web technologies in achieving its aims.

2.1.1 Archives (see also 1.1.3)

An archive is an entity, public or private, which manages and provides access to archive material. By "archive material" we mean records, documents, or materials conserved as evidence or because of their historical interest.

Remote users who could be interested in information and archive services, are principally people interested in public administration and culture or in the use of new technology for public services and document management. Specialist or professional users are interested in more specific research, and in exchanging experience and good practices in organising archives and registers. However, the users of archives are not only professionals: they are often university students, teachers and school students, university professors, people interested in establishing or managing their own archives. In addition there are amateurs interested in history, tour operators interested in collecting content for creating tours, services which carry paid research for third parties (genealogical or anagraphic), etc.

2.1.2 Library (see also 1.1.1)

"A public library is an organisation established, supported and funded by the community, either through local, regional or national government or through some other form of community organisation. It provides access to knowledge, information and works of the imagination through a range of resources and services and is equally available to all members of the community regardless of race, nationality, age, gender, religion, language, disability, economic and employment status and educational attainment." (IFLA/Unesco, 2001)

The primary goal of a library is to offer resources and services for the diffusion, archiving and conservation of all types of culture and expression, regardless of source or location. Documentation centres are intended as belonging to this category.

2.1.3 Museum (see also 1.1.2)

"A museum is a non-profit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment".

While accepting this ICOM definition, it is important to stress that museums constitute a varied and articulated universe; vast because of the many histories of education, diverse content, collections and compositions. They may be viewed as "abstract" representations of the societies that generated them; it is for this reason, more than in other sectors, that museums can be considered a unifying symbol of the diversities of the cultures of their Regions.

2.1.4 Widespread cultural heritage

This category includes fixed-location archaeological, architectural and natural heritage. They are dealt with together, because they share the feature of being "fixed

in place" and are often so important as to have become part of the historical, cultural and scientific identity of their location.

The oldest European park goes back to Sweden in 1909. The twentieth century saw a specialisation and increasing specification in the realisation of parks and reserves which often included differing values which were present in the location: environmental, historical/cultural, traditional and the emerging sciences of archaeology and urban-architecture. This led to the composition of complex landscapes and the most advanced examples of "abstract parks" such as for example, the "park of literature" which is clearly anchored to a defined territory, or "areas of cultural tourism" which have clearly defined homogeneous areas and add value to important historic/cultural, environmental, ethno-gastronomic elements.

From the point of view of a web application, the subject is wide and complex. It includes traditional archaeological Monuments, buildings and on-site historical/artistic heritage, entities which are often connected with local museums, libraries and archives. The category also embraces parks and archaeological areas which are managed by a public institute and also specific projects such as stratigraphic and thematic surveys of the territory.

2.1.5 Temporary event (see also 1.1.4)
This category includes temporary festivals, events and exhibitions.

2.1.6 Management and governing institution
This category includes all levels of administration of the cultural heritage: from central state and regional offices (Ministries, General Management) which are concerned mainly with directing and co-ordinating policies, strategies and spending programmes, to local offices and institutes with technical-scientific administrative roles. This includes museums, libraries and archives.

2.1.7 Centre for research and training, School (see also 1.1.5)
The Web itself originated as a research centre. Creation of Web systems for the exchange of information and sharing of documents in hypertext is the need which Tim Berners Lee aimed to meet through a communication tool which harmonised existing standards (networks, data transmission, hypertext, multimedia).
This category includes research networks, websites on specific research themes, academic digital archives, schools and universities.

2.1.8 Cultural digital project
The implementation of a website is often one of the outcomes of a cultural project. In line with the objectives of the project, it aims to improve and strengthen strategies for the creation and diffusion of cultural content. A cultural digital project may create its own Web-based data banks. In this case, complying with the norms for preservation of privacy of contents, the cultural web application becomes not only a tool for communication, but also the manifestation of the Project itself.

This category includes Portals (see also 1.1.6), Digital libraries (see also 1.1.1.1) and Cultural tourism portals (see also 1.1.7). They play an increasingly important role in helping users to access cultural information and services.

2.2 Web application types

Which kind of web application do I plan to build?

Schematic presentation of the main types of web applications that cultural subjects can promote as tools for achieving their mission in whole or in part.
Some types has been already more deeply analysed in chapter 1.

2.2.1 Website (see also 1.1)

A website is a collection of web pages, that is to say a hypertext structure of documents (called *web pages*) that are accessible with a browser through the World Wide Web. A web page is usually in HTML/XHTML format; it contains hypertext links that facilitate navigation from one page or section to another; it often uses graphics that in their turn can also be active links. A *dynamic* web page is a page the contents of which is as a whole or in part generated on the fly by the server and it can therefore be different every time that it is called up. This means that the HTML language is not used directly, but programming languages (*scripting* languages) are used; these deal with creating the page at the time when it is visited, and with user interaction.

We can therefore identify two main types of websites:

a) *static sites*, that offer contents that are solely and exclusively for reading. They are usually maintained by one or more people who edit on the code of the page directly

b) *dynamic sites*, that on the other hand offer content prepared dynamically (for example, using a Content Management System). Dynamic sites provide content via search and navigation routes that can vary on the basis of a number of factors. Dynamic websites are often characterized by a higher level of interaction between site and user.

2.2.2 Web application

Web application is a term used within the sphere of *software engineering*, to describe an application that is accessible via the web. Web-based applications contribute to implementing wholly or in part many common software solutions such as webmail, e-commerce, web forum, blog, MMORPG and many more besides. Common examples are those applications that permit us to search on the web, to cooperate in projects, to purchase products from an auction, etc. In recent times, very advanced web applications that make it possible to replace the application software usually loaded on one's PC, moving it onto a server web, are becoming common: popular examples are some server-side multimedia readers and the Google Apps package (Calendar, Docs, PageCreator..).

2.2.3 Forum

A Forum (message board, bulletin board…) is an online location for discussion through the publication and reading of messages, organized by subject (*thread*), messages (*post*) and replies to messages (*reply*). In contrast to chat, which is a synchronous communications tool, a forum is asynchronous inasmuch as the messages are usually written and read at different times. The *administrators* are usually the managers of a forum and they normally are able to modify, cancel and move any message. They can usually also close the forum, change it, bring changes to the software, expel, cancel or create users. *Moderators* may assist the administrators.

2.2.4 Blog
See 1.2.1.

2.2.5 Wiki
See 1.2.2.

2.2.6 Web portal (see also p. 12 and 1.1.6)
A web portal is a website that forms an entrance gate to a good-sized group of resources on the Internet or on an Intranet. The most important web portals provide a wide range of commercial or cultural services, content and collaborations. Many of the portals were born as Internet directories (like Yahoo!) and/or as search engines (among the first Excite, Lycos, Altavista, infoseek, HotBot). The list of offered services (web mail, personalization and chatroom procedures, for example) was then extended so as to consolidate the user base and lengthen their time of stay within the site. The portal tool orders, addresses, chooses, organizes and facilitates access to the many resources present in the web, which is increasingly full of data and information that is non-structured and therefore hard to retrieve and for which it is hard to evaluate the reliability. Within the cultural sphere, one of the main functions of portals is that of gathering together resources that come from various reliable sources, to improve the quality of user search results.

2.2.7 Database management system
A database site is a web facility, the main use of which is to enable the user to search for and retrieve information. A database management system, available online or not, allows to record, edit and extract data from a database (a collection of permanent data, based on a schema).

2.2.8 Web service
A web service is a software system designed to support interoperability between different computers on one network. A fundamental characteristic of Web Service is that of offering a software interface through which other systems can interact with the web service. Other systems request the web service to carry out specific operations by sending a message to the software interface in the form of a SOAP (Simple Object Access Protocol) "bag". The protocols and formats of web services of data are, where possible, in text format, thus making them more easily understood and used by developers. This makes it possible to interoperate between different software applications on different hardware platforms, using "open" standards and protocols.

2.2.9 Online social network
See 1.2.5.

2.2.10 Web games
Video games are evolving, building on the spread of household consoles that can connect to the Internet, so that the players are part of a huge world community and can play wherever they are (see 2.5.6.8). Some games, on the other hand, such as the so-called MMORPG (Massive(ly) Multiplayer Online Role-Playing Game), can be used through web browsers. These are played contemporaneously by thousands of people controlling characters that evolve together with the world that surrounds them and in which they live.

2.2.11 MUVE
See 1.2.6.

2.3 Web applications life cycle

When is it more relevant to take into account the users point of view?

Another important question is the relation between the life phases of a cultural web project and the problems connected with interaction with its users (see also 3.1).

Some phases are particularly critical both because they can be used to gather information about user expectations or because they can focus on meeting these expectations.

This schedule of the life phases of a website, with some small variations, is based on that of the *MINERVA Quality principles for cultural websites: a handbook*, in its turn a partially modified version of the life phases of a digitisation project proposed in the *Good practice* handbook and in the *Technical guidelines for digital cultural content creation programmes*), again of the MINERVA project.

The creation of a site involves the phases listed below. These differ from the documents mentioned because they only refer to websites and not to digitisation projects. Each phase is marked by one (*) or two (**) asterisks, to indicate how critical it is with respect to interaction with users' needs.

2.3.1 Website planning **

This phase deals with defining the nature of the site, the user base which it aims to serve and the services and content that it is intended to provide. It is also essential for defining policies regarding the treatment of personal data, the long-term preservation of the content, accessibility, etc. It seems important in this phase to outline the responsibilities and technical roles typical of a project for a high quality website, drawing up a management manual.

From the viewpoint of user interaction it is advisable, if possible, to carry out procedures to establish the expectations of a representative sample of the future users. As comprehensive a study as possible of solutions used by comparable web applications should also be executed. Consideration must also be given to aspects such as multilingualism and interoperability, two quality principles that are particularly important from the user perspective. This implies the necessity take them into account from the time of the site's inception, rather that taking them into consideration at a later stage.

2.3.2 Website design **

This more operational phase defines the way in which the site will provide the services and present the content, choosing moreover the most suitable technological platform. This phase, which is directly dependent on the activities carried out in the planning phase, is the right one for defining the special interactive procedures and the degree of usability of the digital environment. It is advised that at this stage careful consideration is given to deciding whether or not to offer user interaction facilities.

2.3.3 Content selection **

In this phase the selection criteria are chosen and the contents of the web application that we are creating are prepared for digitisation on the basis of the resources available and the user base which we intend addressing. This latter information is

drawn from the evaluations carried out in the planning phase. In this very delicate phase casual choices must be avoided, as must those based on prejudices about "popular" interests among users (e.g. the most famous pieces, the oldest pieces, the rarest pieces). If possible, carry out here an additional analysis of the sample of users consulted in the planning phase, adding some specific questions on the contents in the questionnaire.

2.3.4 Digitisation process and collection of digital contents *

The chosen contents are digitised, creating the master images and all the other necessary digital resources. This very technical phase only partially affects the users, but any digitisation process must take into account the final application of the content.

2.3.5 Storage of the digital masters *

The master digital documents are collected and stored on secure media that guarantee their safety. The versions destined for publication on the website are then prepared from these. This operation affects the users because it is a good idea to use standard or very common formats, so as not to force users to have to acquire special technologies to have access to them.

2.3.6 Metadata creation and capture **

The metadata that refer to the chosen and digitised contents are created, captured and stored in this life phase of the web application. From the point of view of interaction with the users the creation of the metadata is a particularly critical activity, because it impacts on the effective availability of the contents, both using search procedures that are internal to the environment and using search engines external to it.

2.3.7 Website implementation and test of the prototype **

From an operational viewpoint the website is created on the basis of established policies, available content and a defined presentation; in this phase it would be a good idea to submit the prototype of the website, made available on a local network or a protected version in Internet, to test procedures by people who are not its designers. If possible this could be done through a focus group, and could include techniques like the use of feedback questionnaires or comments and proposals of changes for individual pages.

2.3.8 Online publication *

In this phase the website is made publicly available on the network: an initial check on how the application has been received by users is possible by collecting opinions on the occasion of public presentations. These should be carefully evaluated, bearing in mind the importance of "first impressions" in web usage.

2.3.9 Ongoing maintenance **

This very important phase takes place as the site is kept up to date and expanded in terms of its content . The comments and suggestions of the users, collected through questionnaires, comments, requests of assistance, forums, etc., together with an analysis of accesses to the *server*, must be given due consideration when adjustments or improvements are carried out.

2.4 Users and usage

What does it mean "web user"? Is he a person, or what else?

In this section we begin to reason what it means to talk about users and usage of the cultural web and we provide tools of reflection for designing applications that satisfy citizens' expectations.

2.4.1 The web user: state of the art and trends in definitions

This paragraph proposes various approaches with respect to the users, according to the most common approaches taken to the design and creation of web applications.

2.4.1.1 The user for ICT professionals

A user is a person who uses a computer system. In order to identify oneself, a user has an account (a user account), a username (also called a screen name, handle, nickname, or nick on some systems) and a password.

An account is that collection of functions, tools and contents available to a user in certain operational contexts. Through the mechanism of the account, the systems provide the user with an environment with contents and functions that can be customized, as well as separation from other parallel users and their accounts.

2.4.1.2 The user in marketing

Another approach is that of marketing, classifying users on the basis of their possible quality as consumers.

The users are not treated individually, but gathered into consumer market segments, or groups of people that have a similar perception of a requirement, its characteristics and motivations, that brings them to demonstrate an homogeneous behaviour in solving the problem represented by the requirement.

The requirements for a successful classification are: homogeneity within the segment; heterogeneity between segments; measurability; identifiability; accessibility of information; enough quantity to be profitable.

The variables used for segmentation include:

- Geographic variables (nation, region, country, etc.)
- Demographic variables (age, gender, family size, family life cycle, education, income, occupation, socio-economic status, religion, nationality/race, etc.
- Psychographic variables (personality, life style)
- Behavioural variables (product usage rate, brand loyalty, etc.)

When enough information is combined to create a clear picture of a typical member of a segment, this is referred to as a "profile" (or "type").

2.4.1.3 The user according to MINERVA

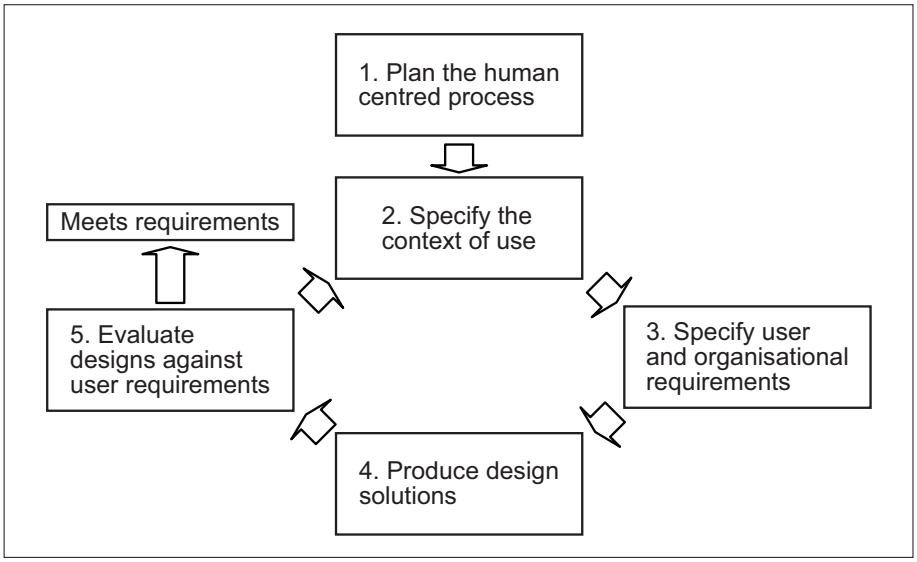
According to the MINERVA *Handbook for quality in cultural websites: improving quality for citizens*, "A user is a professional person or not, a specialist or not, who casually or with specific aims, occasionally or systematically uses the Cultural Web Application. User identity is extremely variable depending on cultural profile, aspirations for cultural

growth, professional aims and even momentary curiosity" (p. 15). Therefore, a quality website must be user-centred, "taking into account the needs of users, ensuring relevance and ease of use through responding to evaluation and feedback" (5th MINERVA Quality Principle).

2.4.1.4 **The user according to usability gurus**

According to usability experts, the end user of an interface needs extensive attention at each stage of the design process. "User-centred design (UCD) can be characterized as a multi-stage problem solving process that not only requires designers to analyze and foresee how users are likely to use an interface, but to test the validity of their assumptions with regards to user behaviour in real world tests with actual users. Such testing is necessary as it is often very difficult for the designers of an interface to understand intuitively what a first-time user of their design experiences, and what each user's learning curve may look like. [...] The chief difference from other interface design philosophies is that user-centred design tries to optimize the user interface around how people can, want, or need to work, rather than forcing the users to change how they work to accommodate the system or function" (Wikipedia).

This process was defined by different authors and also by some ISO rules, as n. 13407, *Human-centred design process* and TR 18529, *Human-centred lifecycle process descriptions*[1]. Several sources describe slightly different processes, but they are all guided by the same philosophy: the project must be founded on user needs.



User-centred design

[1] Usability.net, *ISO 13407: Human centred design processes for interactive systems*, <http://www.usabilitynet.org/tools/13407stds.htm>.

A requirements analysis forms one of the primary activities of a web application project.

The decisions made at this time make a significant impact on its usability. In order to construct a successful application, the requirements of all stakeholders involved must be analyzed, in this case the stakeholders being both those who use the services offered by the web application and the clients.

Task analysis, which can be conducted at different levels of granularity, means learning about one's users' goals.
User and task analysis aims at understanding:

- which are the users' goals
- what the users do to achieve these goals
- which are the personal, social, and cultural characteristics of the users
- how the physical environment influences users
- how users' previous knowledge and experience influence their workflow.

The benefits of this type of analysis are:

- discover which are the tasks that must be supported by the web application
- choose the best technological solutions a web application should include
- define the web application's navigation and search according to user needs
- build specific web pages and web applications matching users' goals, tasks, and behaviour on the web.

Usability.gov. ***Conduct task analysis***
http://www.usability.gov/analyze/analysis.html

2.4.1.5 The user in current trends

Seeing the current trends of the Web, strongly oriented towards the functions of cooperation and advanced interaction, with the movement of applications onto the network, the sharing of social networks, etc. (Web 2.0, by now 3.0...) it would seem necessary to update the classical concept of the user as a person who uses an application.

As early as 1980 Alvin Toffler introduced the term *prosumer* (producer + consumer), extending a suggestion made by McLuhan in 1972: in a standard and saturated market, the added value would be found in mass customisation guided by users, and the functions of consumer and producer would tend to become mixed and overlap.In short, the classical user is changing into a hybrid individual also defined as a *transceiver* (transmitter + receiver), the addressee of content and the source of his own multimedia productions.

In conclusion, a fluid individual, from time to time prosumer, consumer, client, audience, surfer, visitor, viewer, player, clicker, downloader, streamer, etc.

These are only some of the terms used to describe many the current activities and user roles in the network.

IN-DEPTH

To explore the issues for users and the Web, a significant study on the user behaviour of virtual libraries is the *information behaviour of the researcher of the future,* commissioned by the British Library and JISC to identify how the specialist researchers of the future, currently in their school or pre-school years, are likely to access and interact with digital resources in five to ten years' time.

The main question focused on by the study is this one: if the `Google generation' are searching for and researching content in new ways, do these seem to be any different from the ways that existing researchers and scholars carry out their work? To reach an answer the study examines first of all the edges of the so-called Google generation, and the current behaviour of virtual libraries users, characterised by horizontal information seeking, by the prevalence of navigation in comparison to reading, by the average shortness of time spent on e-books and e-journals and by 'squirreling' behaviour. According to the study, some trends of the future information environment could be identified: a unified web culture, the inexorable rise of the e-book, more content explosions, emerging forms of scholarship and publication, virtual forms of publication and the spread of the semantic web.

Fully available at http://www.jisc.ac.uk/media/documents/programmes/reppres/gg_final_ keynote_11012008.pdf

2.4.1.6 **The automatic user**

The Web is increasingly an environment of interaction not only between people and organisations but also between software procedures on different computers.
It is sufficient to mention search engines, web services, extraction and reprocessing of XML feeds, mash-ups between functions, harvesting of metadata and data, SOAP, WSDL, etc.

So a web application must also satisfy non-human users, which to function must be able to find the right information in the right form and in the right way. These conditions, in short, are what guarantee interoperability.

2.4.2 The web user – who is he?

These paragraphs try to classify web users based on the role that they play (within a cultural institute or as end users of information and services), or that it seems to the web designers that they want or can have (abstracting them into types, typical behaviour, profiles and scenarios).

2.4.2.1 **The in-home user**

The management of a web application within a cultural institution can be very simple (think of a little museum where one person is sufficient), or very complex and involve many individuals (think of a large museum or library). Web applications give the possibility to define in-home different user types with different roles – for example Administrator, Supervisor, Editor etc. – with different levels of authorizations.

In the *Handbook for Quality of Cultural Websites: Improving Quality for Citizens*, among the 8 recommendations (chap. 1.3) was put in evidence the necessity for cultural institutions to grant the co-ordination of internal and external information flow, the cross-over between various channels of communication and to focus on the phase of planning,

development and management of web applications. The issues involved in the planning and preparation phase of a digitisation process, involving the organisation of human resources and the choice of the right in-house users, are well explained in the MINERVA *Technical Guidelines for Digital Cultural Content Creation Programmes* and in the *Quality Principles for cultural websites: a handbook*, as regards transparency, effectiveness, maintenance, responsiveness and preservation.

2.4.2.2 The simulated user

Recently, web individualisation through information technology has become an increasingly significant trend in cultural institutions, in order to make facilities more relevant and useful for individual users and to help to respond to institutions' educational, marketing, and as usability priorities.

Consequent to the rapid development of the Web, people with different characteristics and goals can access an ever-growing quantity of information for personal use.
But the potential visitors of a web application have a wide variety of characteristics which are difficult to predict and which change over time. In order to manage this complexity, in the phase of task analysis, it may be worthwhile to "simulate" some "user profiles", "user types" or fictitious characters, through experimented techniques.

2.4.2.2.1 User types and roles

The user types describe "some stable features of a type of people which are representative of the user base which the web application aims to address"[2].

As in marketing, user types can be classified, for example:

- By geographic variables (nation, region, town, etc.)
- By demographic variables (age, gender, education, income, occupation, socioeconomic status, religion, nationality/race, disabilities, language, etc.
- By 'webliographic' variables (behaviour in using Internet, preferite sites, browsed used etc.
- Behavioural variables (impatiens, disposed to explore etc.

Example of User Type
Job: Museum Curator
Age: 25-35
Use of the Web: 2 hours a day
Connection: ADSL
Favourite sites: museums and art portals
Languages: English, French

This kind of classification doesn't allow the consideration of features which are common to more than one profile and that need to be treated in a different way.
In fact each user type may to correspond a "role", describing the user's general reasons for visiting a web application and the tasks or objectives deriving from these reasons.
A role must not describe any personal feature. A role may be assumed by other user types.

[2] Lorenzo Cantoni, Nicoletta Di Blas, Davide Bolchini, *Comunicazione, qualità, usabilità*, Milano: Apogeo, 2003, p. 33.

Example of Roles in a Museum Website

Casual exploration
Planning of a visit
Look for events
See a virtual exhibition
etc.

The web application can propose content selections based on certain user types or roles. This process may also be automated following a registration where the end user indicates the profile he belongs to.

In this case, user types can be added according to the requirements of the site and deleted if no longer needed. Once defined and assigned to users, these types can be used in searches and to apply marketing logic to specific groups of users. Once a user type has been defined, it may be used as an attribute that can be used to quickly retrieve all users of this type.

When site access is directly controlled by roles, these roles may be granted to users through user types.

Each role may controls access to one or more web pages. A user type may be associated with more than one role; a role may be associated with more than one user type. For example, in a museum website, roles could be: explore, search images, plan a visit, learn, purchase.

Examples of user types and roles on the Web

Louvre http://www.louvre.fr/llv/commun/home.jsp?id=home	*Professionnels* (A la Une, Journalistes, Entreprises, Tourisme, Professionnels & Associations) *Enseignants* *Jeunes – de 26 ans* (A la Une, Moins de 18 ans, 18-25 ans)
Children's Museum of Manhattan http://www.cmom.org/	*For teachers* *For parents*
MOMA http://www.moma.org/education	*Destination modern art* (for Kids) *Red Studio* (for teenagers) *Modern teachers*
Britih Library http://www.bl.uk	*For higher education* *For business* *For librarians*
Aboriginal Canada Portal http://www.aboriginalcanada.gc.ca/acp/site.nsf/en/index.html	*By Audience* (Elders, Women, Youth, Kids)

British Museum http://www.britishmuseum.org/learning.aspx	*Schools and teachers* *Further and higher education* *Adult learning* *Access, families and children*
Parent portal http://www.activ.asn.au/parentportal/life_events.cfm	*Life events* (Adolescence, Ageing, Diagnosis, Employment, Infancy, Leaving Home, Post School, Preschool, School)
Spain.Info http://www.spain.info	*Where to go* *What to do* *Plan your trip*
Cité des sciences et de l'industrie http://www.cite-sciences.fr/francais/indexFLASH.htm	*Cité des enfants* *Cité des metiers* *Cité de la santé*
MICHAEL Culture http://www.michael-culture.org	*By institutions* *By audience*

2.4.2.2.2 Personas

To characterise user types, it's possible to use the technique of "personas".

"Personas – a technique popularized by Alan Cooper in his 1999 book *The Inmates are Running the Asylum* – are fictitious characters that are created to represent the different user types within a targeted demographic that might use a site or product. [...] Personas are useful in helping to guide decisions about a product, such as features, interactions, and visual design. A user persona is a representation of the goals and behaviour of a real user group" (Wikipedia).

How do we get information for a persona? Usually, personas are synthesized from data collected from contextual interviews, individual interviews, online surveys, focus groups, usability testing, etc. (*see section 2.6*). Through these techniques, the major user groups of one's web application type are identified and descriptions including behaviour patterns, goals, skills, attitudes, and environment are identified. Once each group's most representative characteristics have been selected, they are combined into a persona. For each application, more than one persona is usually created, but one persona should always be the primary focus for the design.

A persona usually include a fictional name, perhaps an image, demographic information (age, education, race, family status, etc.), job titles, goals and tasks vis-à-vis the web application, environment (physical, social, technological), etc.

The benefits of using personas include:

- Personas give a personal "human face" on otherwise abstract data about users.
- Defining personas helps the development team to share understanding of the real users in terms of their goals, capabilities and contexts.
- Personas help prevent "self referential design": designers and developers may unconsciously design a web application following their own mental models which could be very different from those of most end users.

For example, in a library website, personas could be: a person accessing the site for the first time, teenagers, users with visual disabilities, teachers, journalists etc.).
Some experts denigrate the use of personas, arguing that they are fictional and therefore there is no clear way to determine how many users are represented by any given persona.

John Smith
Tourist
• 45-years-old
• Married, 2 children
• Degree
• Comfortable using a computer, with an ADSL connection at work and at home
• Uses e-mail extensively; uses the web about 1.5 hours a day

Key Attributes
• Focused, goal-oriented
• Curious, etc.
Etc.

Example of a Persona

Usability.gov. Develop personas
http://www.usability.gov/analyze/personas.html
Wikipedia – Personas
http://en.wikipedia.org/wiki/Personas

2.4.2.3 Use simulation

Some techniques allow also to "simulate" the user's behavior on a particular web application.

2.4.2.3.1 Use cases

A use case is a description of how users will perform tasks on one's web application. It describes a sequence of interactions between a user and a web application, without specifying the user interface. Usually it is divided into two parts:

- the steps a user will take to fulfil a particular task
- the way the web application should respond to a user's action.

A use case must include:

- the actor (the user who is using the web application)
- the interaction (what the user wants to do)
- the goal (of the user).

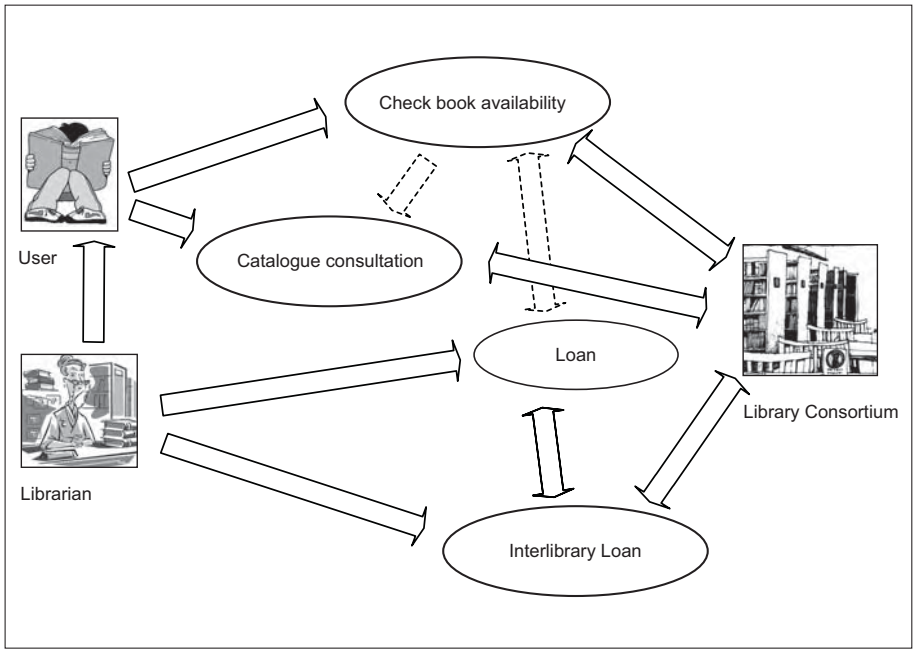
Generally, a use case must be narrated in an easy-to-understand language. Members of the design team must be involved and encouraged in defining the requirements.

Alistair Cockburn, in *Writing effective use cases*, identified three levels of detail in writing use cases:

- **brief use case**: a few sentences summarizing the use case
- **casual use case**: few paragraphs of text, summarizing the use case
- **fully dressed use case**: formal document based on a detailed template with fields for various sections.

In summary, a use case defines the interactions between external actors and the system in order to accomplish a goal. An actor specifies a role played by a person or thing when interacting with the system. The same person using the system may be represented as two different actors because they are playing different roles. For example, "Juliet" could be playing the role of a Student consulting an online catalogue to find a book or the role of a Librarian giving online advice.

To describe the functions and services offered by a system, so as they are perceived and used by actors interacting with it, it is possible to use a Use Case Diagram (UCD).



Use case diagram

The diagram includes three items:

System: the system as a whole is represented as an empty rectangle. This symbol placed relative to the others so that the elements that represent characteristics of the system will be positioned inside the rectangle, while those that represent external bodies are positioned outside.

Actor: he is graphically represented in the diagram by an icon that shows a stickman. Formally, an actor is a class with a stereotype "actor". Practically, an actor represents a role covered by a certain group of bodies interacting with the system (including human users, other software systems, hardware appliances and so on). A role corresponds to a certain family of related interactions that the actor undertakes with the system.

Use case: a use case is graphically represented as an ellipse containing the name of the use case. Formally a use case is a classifier with behaviour; it could be seen as a class of related behaviours. Practically, a use case represents a function or service offered by the system to one or more actors. The function must be complete and significant from the point of view of the actors that participate in it.

Usability.gov. *Use case*
http://www.usability.gov/methods/usecases.html
Wikipedia – Use case, Use case diagram
http://en.wikipedia.org/wiki/Use_case
http://it.wikipedia.org/wiki/Use_Case_Diagram
Identifying use cases (with practical examples)
http://www.agilemodeling.com/artifacts/systemUseCase.htm

2.4.2.3.2 **Scenarios**

"A *scenario* is a narrative describing foreseeable interactions of types of users (characters) and the system. Scenarios include information about goals, expectations, motivations, actions and reactions. Scenarios are neither predictions nor forecasts, but rather attempts to reflect on or portray the way in which a system is used in the context of daily activity" (Wikipedia).

Scenarios can be at different levels of detail:
- goal- or task-based scenarios in which it's only stated what the user wants to do
- elaborated and very detailed scenarios
- full-scale task scenarios, including all the steps to accomplish the task.

Scenarios for one's website may be built by gathering information from many sources (*see section*, 2.6), such as:
- e-mail to users
- surveys (Online)
- contextual Interviews
- individual Interviews.

The differences between *use cases* and *scenarios* are that a use case typically refers to generic actors and describe several paths, while scenarios typically refer to examples of the actors and describe a single path.

W3C. Web Service Description Usage Scenarios
http://www.w3.org/TR/ws-desc-usecases/

To formulate scenarios, a valid help may be given by editing tables with lists of personas, roles and expectations[3].

[3] Lorenzo Cantoni, Nicoletta Di Blas, Davide Bolchini, *Comunicazione, qualità, usabilità,* op. cit., p. 47.

Personas' goals

	Persona	Goal	Expectation
Job	Tourist	To decide to visit the museum or not To decide whether or not to bring children ...	Attractiveness Attractiveness
Behaviour	Student	To consult a database To download images	Accuracy Richness
	Curious Needing to be guided	To explore all the contents To follow in-depth paths	Richness Clarity
Etc.			

Roles' goals

Role	Goal	Expectation
Visit planning	To look for opening time and address To reserve a guided tour ...	Currency of information
Looking for images	Find works images of xyz with relevant information Download high resolution images Know about copyright rules ...	Accuracy Accuracy Authority
Etc.		
Needing to be guided	To follow in-depth paths	Clarity

2.4.2.4 The final user point of view: user stories

"A user story is a software system requirement formulated as one or two sentences in the everyday language of the user. Each *user story* is limited to the volume of a small paper note card to ensure that it does not grow too large. The *user stories* should be written by the customers for a software project and are their main instrument to influence the development of the software (Wikipedia).

User stories are a quick way of handling customer requirements without having to elaborate vast formalized requirement documents and without performing the administrative tasks related to maintaining them. The intention with the *user story* is to be able to respond faster and with less overhead to rapidly changing real-world requirements. User stories are written by the users as things that the system needs to do for them.

Wikipedia – User story
http://en.wikipedia.org/wiki/User_story

Example of user story by MICHAEL project
"How I found Austria in North East England"

My name is XXX. I am from Germany and I am working on my Ph. D.. I am writing about the history of German university studies in Austria and Germany and two 19th century scholars in particular, August Sauer from Vienna and Albert Leitzmann from Magdeburg. They exchanged letters for nearly 40 years and their letters are the basis of my dissertation. My research started with the biographical details of their lives. Being interested in getting a picture of their home towns and living conditions in the nineteenth century, I was looking for an easy way to get the information and found MICHAEL to be a very helpful.

I started my research in the MICHAEL portal using the geographical search combined with period: I chose "Austria" and "19th century". Next, I was able to browse the digitised collections that document Austria in that period. It is surprising the collections in which one finds interesting pictures, drawings and photographs!

From the MICHAEL portal I was redirected to the Bowes Museum in North East England that holds a great collection of European fine and decorative arts - including Austrian art. Amongst the digitised items I found a lithograph called "National Costume of Austria" showing the fashion and local costume of the time (http://www.bowesmuseum.org.uk/collections/objects/category/11/7610/). This was very interesting for me as August Sauer was engaged in ethnological studies. In the 19th centuries there were more than 10 different nationalities and ethnicities in Austria. Without MICHAEL I would never have looked at an English museum collection! MICHAEL broadens my sense of the richness of European historic tradition and shows just how widespread the collections and cultures of Europe are.

Of course, I could always borrow a book from the library in order to get a picture from former times. I see using digital information as complementary - MICHAEL's advantage for me is its 24 hour availability, and the service is free of charge. Also the content is taken from reliable sources - and cultural institutions allow for quotation and academic uses of their content.

MICHAEL-Culture – User stories
http://www.michael-culture.org/en/user-stories

2.4.3 Systems adapting their behaviour to users

Often it is very difficult for people to find the right information at the right time and at the right level of detail. In order to find a solution to this problem, researchers are developing systems which adapt their behaviour to the interests, task, and goals of single users or groups of users. Individualisation helps to provide differentiated access to information and services according to the user's profile. Such systems are generally called "adaptive or personalized systems/hypermedia". Differing from traditional "static" web pages, personalised systems foresee a user model that represents the characteristics of the user. This model is then used to create and present content and services adapted to the requirements of different individuals. Individualisation techniques offer useful tools in the selection and filtering of information, facilitating navigation and increasing the possibility that the user finds what he is looking for in a shorter time.

The first applications of this type were developed in the e-commerce field, where companies understood the possibility to market products and services and to offer advertisements according to a customer's profile.

In the field of cultural institutions, the first personalised web applications were developed by libraries, in order to assist librarians in selecting and filtering materials for users. By means of personalised systems, models of users' interests can be created in order to "prioritize" information and sort search results so that users find immediately what they are looking for in the library's catalogue.

In recent years museums and other important cultural institutions are experimenting with individualisation tools, offering various modes of access to collections, personalised agendas, tour proposals, etc. They have understood that the challenge is not solely to improve the usability of the website and access to information, but also to facilitate the learning process. In fact, research says that learning is stimulated when information is described in a more understandable way. Moreover, personalised systems "listen to the user" recreating the human element and making the user feel more comfortable. A satisfied user may be encouraged to go back to the site and reuse the system.

When providing access to information and services, there are clear benefits for cultural institutions to take into account the different user's needs. However some analysis must be carried out first. Studies say that often only a few percent of visitors benefit from individualisation techniques. This may be due to the difficulty of using these technologies or just because the user decides not to invest the necessary time. Moreover the cost of personalisation is rather high, so only large cultural institutions can invest in them. It may be suggested that an institution invests in individualisation systems only if there is a real added value in terms of increased website use and increased real visits to the institution, at least until technologies are more stable, usable and cheap.

There are several different techniques for collecting information about users, as well as different methods to process this information to create different user profiles and develop/deliver adapted content, presentation or structure. Moreover, the amount of control the user has on the personalisation process may vary a lot, depending on the techniques used.

Individualisation techniques can be divided in two fields: customisation and personalisation.

2.4.3.1 Customisation

Customisation refers to the ability of the user to modify the interface to meet individual requirements. The user can configure an interface and create a profile manually, adding and removing elements in the profile. In this case the user is involved actively in the whole process and has direct control.

A good example is given by *My Yahoo!*, which emerged in 1996, a customizable web page with news, stock quotes, weather, and many other features, giving the possibility to customize the access to content and the layout.

Other examples are given by websites customized to aid disabled access online, for example partially sighted people who can customize colours, sizes and fonts. In summary, customisation generally covers content *presentation*, meaning that the user chooses the best way in which he wants the content to be *presented*.

2.4.3.2 **Personalisation**

Personalisation techniques see the user as being more passive and less in control. In this case, modifications in access to content and structure are performed automatically by the system, which uses information on the user included in the so called *user profile*. This information can be provided *explicitly* by the user, by means of online registration forms, questionnaires and reviewing, or *implicitly* by recording the surfing behaviour and preferences of the individual user, for example through *cookies* and *web server log files* which track user routes through the site. In summary, personalisation generally involves modifying *access to content* on the basis of information given explicitly by the user or extracted implicitly through technologies.

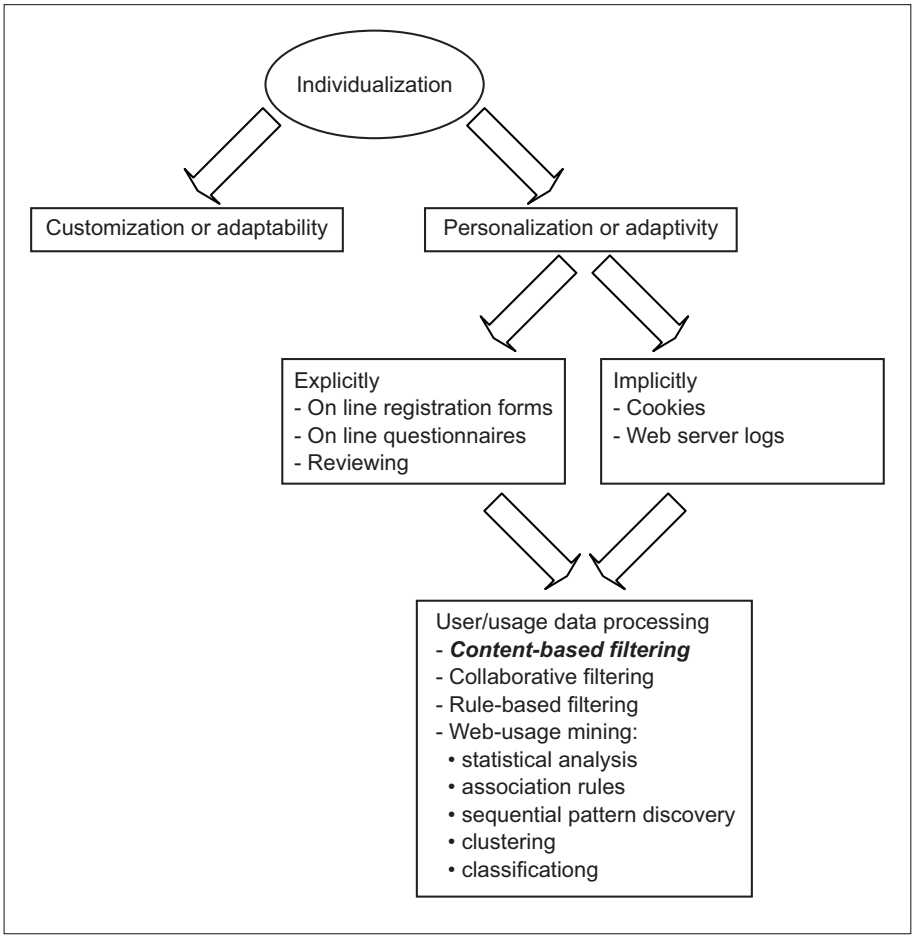
After the collection of the users' data in both implicit or explicit ways, appropriate content is edited and delivered by one or more of the following techniques:

1. **Collaborative filtering:** this compares the different user's tastes, assuming that a user will value what like-minded users also enjoyed. Amazon, for example, identifies the users' interests by analyzing and comparing previous purchases and ratings given to titles. Libraries, for example, could use this technique to generate lists of the most read books in the library.

2. **Rule-based filtering:** website administrators specify rules based on a profile to associate a certain content with a certain user. For example, a user interested in Lascaux murals could also be interested in prehistoric rock painting.

3. **Web usage mining:** the application of statistical and data-mining methods to the web server log data, in order to produce patterns indicating the user's navigational behaviour. According to Wikipedia "Data mining is the principle of sorting through large amounts of data and picking out relevant information". Data mining techniques include: *association rules* (to find correlations among sets of items), *sequential pattern discovery* inlcuding the notion of time sequence); *clustering* (according to Wikipedia: "the partitioning of a data set into subsets (clusters), so that the data in each subset (ideally) share some common trait"; *classification* (process which maps items into classes, as for example different user profiles).

Jonathan P. Bowen, Silvia Filippini-Fantoni,
Personalization and the Web from a Museum Perspective,
Paper presented at the International Conference"Museum and the Web 2004",
http://www.archimuse.com/mw2004/papers/bowen/bowen.html



Individualisation techniques (from Bowen, Filippini-Fantoni 2004)

2.5. Interactive and user side services

This section aims to present ICT applications that can be adapted for the end user, providing interfaces and selections of contents and of personalized services. The single services are organised into some macro-categories, to help readers to make their choice. URLs have been checked in August 2008.

2.5.1 Interactive communication services mediated by the information provider

2.5.1.1 Electronic mailing list

An electronic mailing list (sometimes written as elist or e-list) is a special usage of e-mail that allows for widespread distribution of information to many Internet users. It is similar to a traditional mailing list — a list of names and addresses — as might be kept by an organization for sending publications to its members or customers, but typically refers to four things: a list of e-mail addresses, the people ("subscribers") receiving mail at those addresses, the publications (e-mail messages) sent to those addresses, and a *reflector*, which is a single e-mail address that, when designated as the recipient of a message, will send a copy of that message to all of the subscribers.

Science Museum, UK
http://www.sciencemuseum.org.uk/visitmuseum/enews.aspx
Fundació Antoni Tàpies, Spain
http://www.fundaciotapies.org/site/spip.php?rubrique528
IRCAM Centre Pompidou, France
http://listes.ircam.fr/wws
AIB-CUR, Italy
http://www.aib.it/aib/aibcur/aibcur.htm3

2.5.1.2 Newsletter

A newsletter is a news bulletin in written or image form periodically sent out by electronic mail, often in HTML format. It is usually requested by those who receive it.Some portals and providers make an invasive use of them for advertising.

Tate, UK
http://www.tate.org.uk/bulletins/
Centro cultural de Belém Lisboa, Portugal
https://www.ccb.pt/sites/ccb/en-EN/Registo/Pages/default.aspx
Museo del Prado, Spain
http://www.museodelprado.es/index.php?id=206
Musée des Instruments de Musique (MIM), France
http://www.mim.fgov.be/home_fr.htm
Museum Moderner Kunst Stiftung Ludwig Wien, Austria
http://www.mumok.at/online-resources/newsletter-en/?L=1
Museo Thyssen-Bornemisza, Madrid, Spain
http://www.museothyssen.org/thyssen/comunicacion/comunicacion_newsletter.html
Centre de Cultura Contemporània de Barcelona (CCCB), Spain
http://www.cccb.org/en/contacte
IRCAM Centre Pompidou, France
http://www.ircam.fr/newsletter.html?&L=1
Rijksmuseum, Amsterdam, The Netherland
http://rijksmuseum.dmdelivery.com/x/plugin/?pName=
opt_in1&MIDRID=S7Y1BwAA04&lang=en&Z=920694542

2.5.1.3 **Forum**
See also 2.2.3.

Egyptology community
http://www.aegyptologie.com/forum/
IRCAM Centre Pompidou, France h
http://forumnet.ircam.fr/

2.5.1.4 **Blog, photoblog, videoblog, geoblog**
See also 1.2.1

Centre Pompidou, France
http://www.centrepompidou.blogs.com/
Liverpool Museums Walker art Gallery, UK
http://blog.liverpoolmuseums.org.uk/CategoryView,category,learning.aspx
Victoria and Albert Museum
http://www.vam.ac.uk/activ_events/do_online/blogs/index.html
Museo Diffuso di Torino – Geoblog
http://www.geoblog.it

2.5.1.5 **Virtual reference services**
Online reference service, generally known as "Ask the librarian", offered via e-mail or chat by the library. Sometimes is optimized for handheld devices.

Library of Congress, USA (Ask a librarian)
http://www.loc.gov/rr/askalib/
Florida's Virtual Reference Service, USA (Ask a librarian)
http://www.askalibrarian.org/aal.asp
Regione Toscana, Italy (Chiedi in biblioteca)
http://www.cultura.toscana.it/biblioteche/servizi_web/chiedi_biblioteca/
Bibliothèque Centre Pompidou, Paris, France (Discutez en ligne avec les bibliothécaires)
http://www.bpi.fr/uploadfile/formulairechat.htm
City Museum Helsinki, Finland (Ask the museum)
http://www.hel.fi/wps/portal/Kaupunginmuseo_en/Artikkeli_en?WCM_GLOBAL_CONTEXT=/en/ City+Museum/Ask+the+Museum
British Museum, UK (Ask the expert)
http://www.britishmuseum.org/explore/families_and_children/ask_the_expert.aspx

2.5.1.6 **Mobile devices: SMS/MMS/Bluetooth**

Short Message Service (SMS) is a communications protocol allowing the interchange of short text messages between mobile telephone devices. Multimedia Messaging Service (MMS) is a standard for telephone messaging systems that allows sending messages that include multimedia objects (images, audio, video, rich text) and not just text as in Short Message Service (SMS). Institutions are beginning to send information using these technologies.

Servizio bibliotecario vimercatese, Italy (SMS Service)
http://www.sbv.mi.it/IT/sistema/003/009/001/
Swinburne Library, Australia (SMS Service)
http://www.swinburne.edu.au/lib/forms/sms_registration.htm
Guggenheim Bilbao, Spain (Mobile devices)
http://www.guggenheimbilbao.es/
secciones/area_de_prensa/alertas_al_movil.php?idioma=en

2.5.1.7 **Instant messaging**

"Instant Messaging (IM) is a form of real-time communication between two or more people based on typed text. The text is conveyed via computers connected over a network such as the Internet. It is important to understand that what separates chat and instant messaging from technologies such as e-mail is the perceived synchronicity of the communication by the user - Chat happens in real-time before your eyes. For this reason, some people consider communication via instant messaging to be less intrusive than communication via phone. However, some systems allow the sending of messages to people not currently logged on (*offline messages*), thus removing much of the difference between Instant Messaging and e-mail.

Some IM systems allow users to use webcams and microphones which make them more popular than others. Due to this feature users can have a real-time conversation. In addition IM has additional features such as: the immediate receipt of acknowledgement or reply, group chatting, conference services (including voice and video), conversation logging and file transfer.

Mobile Instant Messaging (MIM) is a presence enabled messaging service that aims to transpose the desktop messaging experience to the usage scenario of being on the move" (Wikipedia).

Several libraries are already using this kind of technology for interaction with users.

University Libraries of Nevada, Las Vegas,
Instant messaging reference service
http://www.library.unlv.edu/ask/chat.html

2.5.1.8 Videoconferencing

"A videoconference (also known as a *videoteleconference*) is a set of interactive telecommunication technologies which allow two or more locations to interact via two-way video and audio transmissions simultaneously. It has also been called visual collaboration and is a type of groupware. It differs from videophone in that it is designed to serve a conference rather than individuals. The core technology used in a videoteleconference (VTC) system is digital compression of audio and video streams in real time" (from Wikipedia).

Natural History Museum, London, UK (Educational Videoconferences)
http://www.nhm.ac.uk/education/activities/school-activities/video-conference/Videoconferencing.html
Smithsonian – National ad Air Space Museum, Washington, USA (Educational Videoconferences)
http://www.nasm.si.edu/education/classroom_videoconf.cfm
National Maritime Museum, Greenwich (Videoconferencing)
http://www.nmm.ac.uk/server/show/nav.3009
Project Videonet. *Guidelines for Community Use of Public Library Videoconferencing Services*, July 2003
http://www.infopeople.org/partners/vidnet/guidelines/PolicyPricingGuidelines.pdf

2.5.1.9 Streaming

"The term streaming identifies a flow of audio/video data transmitted by a source to one or more destinations through a telematic network. This data is reproduced as it arrives at its destination. There are basically two kinds of streaming:

- *Streaming live.* Similar to traditional broadcasting transmission by radio or video. In this case too the data is transmitted using opportune compression to lighten the load on the network as much as possible. The compression of the contents introduces a delay of about ten seconds in the flow. This delay is not usually a problem in the area of streaming live.
- *Streaming on demand*: the audio/video contents are initially compressed and memorized on a server as files. A user can request the server to send him the audio/video contents. It isn't necessary to download them all on the PC to be able to reproduce them: the data received is decompressed and reproduced a few seconds after the beginning of reception. This delay allows the creation of a sort of lung for compensating delays or micro-interruptions of the network. The streaming flows of Real Video and Real Audio, Windows Media Player, QuickTime Flash Video (Youtube) are of this type." (Wikipedia).

Museu d'Art Contemporani de Barcelona (MACBA) (Conferences: audio)
http://www.macba.es/controller.php?p_action=show_page&pagina_id=72&inst_id=23061
Liceu Barcelona, Spain (Watch and listen)
http://www.liceubarcelona.com/musica/esp/index_dvd.asp
Centre Pompidou-Metz: le chantier hier, France
http://www.mairie-metz.fr/metz2/actions/cpm/hier.php
The Natural History Museum, London, UK
http://www.nhm.ac.uk/kids-only/naturecams/index.html
teacher.tv
http://www.teachers.tv/
Università di Torino, Italy (telewebradio)
http://www.110.unito.it/?pubblica=&lang=fra

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Streaming Museum

It is a real-time exhibition in cyberspace and public space on seven continents, launched on January 29, 2008. The project presents an ongoing program of multi-media exhibitions in collaboration with international curators and cultural institutions. Streaming Museum is conceived as a source of free cultural content and public service messaging on the environment, education and health, accessed via the Internet and in high visibility public locations.

http://www.streamingmuseum.org/info/

2.5.1.10 **WebCam**

Webcams (web cameras) are small cameras whose images can be accessed using the World Wide Web.

Centre Pompidou, France
http://www.centrepompidou.fr/pompidou/Communication.nsf/0/EC87316EA3FB8B1FC1256E2000462116?OpenDocument&sessionM=3.4.1&L=1

2.5.2 Interactive learning services

2.5.2.1 **Online tutorials, Online help**

Online courses and tutorials, available through websites of public cultural institutions.

Plot, Park Library Online Tutorial - Resources for Librarians and Educators
http://www.lib.cmich.edu/departments/reference/instruct/intro/
Uk, The National Archives – In-depth learning guides
Guides covering some of our most popular research topics:
Family history, Latin, Local history, Paleography
http://www.nationalarchives.gov.uk/gettingstarted/in_depth_guides.htm
Library of the Southern Cross University, Australia
Tutorial for students on copyright
http://www.scu.edu.au/policy/copyright/

2.5.3 Virtual interactive tours

Interactive tours on collection highlights, exhibitions, popular themes, etc.

The London Canal Museum, London
http://www.eyerevolution.co.uk/virtual_tours/london_canal_museum/index.php
Madrid Virtual. Com, Spain
http://www.madridvirtual.com/
Leopold Museum Vienna
http://www.leopoldmuseum.org/index_en.html
Museo Thyssen-Bornemisza, Madrid, Spain
http://www.museothyssen.org/thyssen/coleccion/thyssen_virtual/w_pages/mtb/hall_1.htm
Liceu Barcelona, Spain
http://www.liceubarcelona.com/visita/eng/index.asp
Guggenheim Bilbao, Spain
http://www.guggenheim-bilbao.es/visita_virtual/visita_virtual.php?idioma=fr
Centre Pompidou, France
http://www.centrepompidou.fr/Pompidou/Communication.nsf/0/D8A04006C256531CC1256DE5005A5324?OpenDocument&sessionM=3.4.2&L=1
MuseumsInsel Berlin, Germany
http://www.museumsinsel-berlin.de/index.php?lang=en&page=5_1

2.5.4 Commercial interactive services

2.5.4.1 E-commerce

Electronic commerce or e-commerce consists in buying and selling, marketing and providing products or services through network linked computers. In the telecommunications industry it can also mean the group of applications dedicated to commercial transactions.

British Museum, UK (Shop Online)
http://www.britishmuseumshoponline.org/icat/shoponline
The Library of Congress, USA (Shop, Best selling images)
http://loc.gov/shop/index.php?action=cCatalog.showSubCategory&cid=43&scid=402&page=1&PHPSESSID=d656fdd3614b1d9388a816b8244d0a6c
Museum Moderner Kunst Stiftung Ludwig Wien, Austria (Shop)
http://www.mumok.at/?L=1
Kunsthistorisches Museum Wien, Austria (Shop)
http://ecomm.khm.at/cgi-bin/khmmuseumsshop.storefront/EN/Catalog
Secession Wien, Austria (Shop)
http://www.secession.at/shop/index.php
Van Gogh Museum. The Netherlands (shop)
http://www.vangoghmuseumshop.com/Default.htm
Rijksmuseum Museum Amsterdam, The Netherlands (Shop)
https://rijksmuseum.nl/webwinkel/index.jsp?lang=en
Victoria and Albert Museum (Shop)
http://www.vandashop.com/
Toronto Public Library, Canada (Photographic and Digital Reproduction Services)
http://www.tpl.toronto.on.ca/spe_ser_photo.jsp

2.5.4.2 Online ticketing

On line booking service for museums, exhibitions and events.

Museo Thyssen-Bornemisza, Madrid, Spain
http://www.museothyssen.org/thyssen_ing/informacion/informacion_ticketing_ing.html
Oceanario Lisboa
http://www.oceanario.pt/site/ol_bilheteira_00.asp
Centro Cultural de Belém
https://www.ccb.pt/sites/ccb/en-EN/Bilheteira/Pages/Search.aspx
Belvedere Wien
https://tickets.belvedere.at/index.php5?action=step2
Schoenbrunn Wien
https://eticketing.schoenbrunn.at/amepheas/inet/eticket.html?eLngId=5
Cosmo Caixa Barcelona
http://obrasocial.lacaixa.es/centros/cosmocaixabcnreservas_es.html
Centre Pompidou, Paris
http://www.centrepompidou.fr/Pompidou/Manifs.nsf/Actualite?ReadForm&count=999&sessionM=2.1.1&L=1
Rijksmuseum Museum Amsterdam
http://ticketing.wheretocard.nl/rijksmuseum/ctrl/orderentry?language=en

2.5.5 Interactive forms

Many institutions use interactive forms for subscriptions, reservations, desiderata, suggestions, comments etc.

New York State Library, USA (Library Online Request Forms)
http://www.nysl.nysed.gov/library/forms.htm
Juedisches Museum Berlin, Germany
http://www.juedisches-museum-berlin.de/site/EN/03-Collections/reading-room/reading-room-application-form.php

2.5.6 User-side services

2.5.6.1 Podcasting

See 1.2.3.

MoMAudio, USA
http://www.moma.org/visit_moma/audio.html
British Library, UK
http://www.bl.uk/onlinegallery/whatson/downloads/index.html
Guggenheim Bilbao, Spain
http://www.guggenheim-bilbao.es/secciones/multimedia/multimedia.php?idioma=fr
Cité des Sciences Paris, France
http://www.cite-sciences.fr/francais/aide/syndication/syndication_blogs.php
Espace Dalì Paris, France
http://www.daliparis.com/photos-videos.html
Van Gogh Museum, The Netherlands
http://www3.vangoghmuseum.nl/vgm/index.jsp?page=139043&lang=en
Rijksmuseum Museum Amsterdam, The Netherlands
http://www.rijksmuseum.nl/podcast?lang=nl
Museo Thyssen-Bornemisza, Madrid, Spain
http://www.museothyssen.org/thyssen_ing/actividades/actividades_actuales.html

2.5.6.2 RSS Feed

See 4.4.

Victoria & Albert Museum, UK
http://www.vam.ac.uk/about_va/about_web/rss_feeds/index.html
Library of Congress
http://www.loc.gov/rss/
National Archives of Australia
http://www.naa.gov.au/info/rss/index.aspx

2.5.6.3 Social bookmarking

See 1.2.4.

National Army Museum Chelsea, UK (social bookmarking buttons)
http://www.national-army-museum.ac.uk/pages/socialBookmarking.shtml
Victoria and Albert Museum London, UK (social bookmarking buttons)
http://www.vam.ac.uk/vastatic/microsites/1750_scalway/blog/
Getty Bookmarks
Getty Bookmarks lets you collect and save your favorite artists and works of art from the Getty collection on your own bookmarks page.
https://www.getty.edu/mygetty/mygetty?handler=newuser

2.5.6.4 **Folksonomies, social tagging**
See 1.2.4

Del.icio.us
http://del.icio.us/
Simpy
http://www.simpy.com/
Taggly
http://www.taggly.com/
Segnalo
http://segnalo.alice.it/?
Technorati
http://www.technorati.com/
StumbleUpon
http://www.stumbleupon.com/
taggato
Service proposed by the town of Torino, Italy
http://www.comune.torino.it/taggato/
"Steve Museum" project (see p. 58)
http://www.steve.museum/

2.5.6.5 **File-sharing (texts, images, video)**
The sharing of files within a common network can take place through a network with a client-server or peer-to-peer structure.

Global Museum Podcast Index
http://www4.wave.co.nz/~jollyroger/GM2/podcasts.htm
SlideShare
http://www.slideshare.net

2.5.6.6 **Mashup**
This term is used to describe the creation of Web services by freely using the information of other sites or services, extracted using public interfaces. This procedure is possible thanks to the use of application programming interfaces (APIs), which allow a program on one computer to invoke services from another. Google maps has a very widely used API, for example.

Sputtr
http://www.sputtr.com/
Book Finder 4 you
http://www.bookfinder4u.com/isbn_search.html
Book Jetty
http://www.bookjetty.com/

2.5.6.7 **Story-telling**
Story telling is the ancient art of conveying events in words, images, and sounds often by improvisation or embellishment. Stories have been shared in every culture and in every land as a means of entertainment, education, preservation of culture and moral instruction. Crucial elements of storytelling include plot and characters, as well as the narrative point of view.

The evolution of technology has changed the tools available to storytellers. Traditionally, oral stories were passed from generation to generation, and survived solely by memory. With written media, this has become less important. Conversely, in

modern times, the vast entertainment industry is built upon a foundation of sophisticated multimedia storytelling (from Wikipedia)

Every object tells a story (see 1.1.8.7)
Story teller museum, Poland
http://www.storytellermuseum.org/index.html
Guggenheim Bilbao, Spain (Tell about the visit)
http://www.guggenheim-bilbao.es/secciones/el_museo/cuentales_tu_visita.php?idioma=en

2.5.6.8 Interactive games

A video game is a game with rules that are automatically controlled by an electronic man-machine interface. Like any game, a video game symbolically reproduces particular cultural contexts, taking them from their *default* environment and applying them to contexts and situations that can go from the most faithful simulation to parody. Cultural institutions often use them for educational or entertainment purposes.

Public Records Office – Just for kids, UK (see 1.1.8.9)
http://www.nationalarchives.gov.uk/teachers/kids.htm
Ajuntament Barcelona, Spain
http://www.bcn.es/jocs/eng/welcome.htm
Guggenheim Bilbao, Spain
http://www.guggenheim-bilbao.es/secciones/ninyos_y_familias/juegos.php?idioma=fr
http://www.guggenheim-bilbao.es/secciones/ninyos_y_familias/imprimibles.php?idioma=fr
Musée Marmottan Monet, France
http://www.marmottan.com/francais/enfants/rebus/index.asp
Rembrandt Museum, The Netherlands
http://www.rembrandthuis.nl/cms_pages/index_main.html
Liverpool Museums Walker art Gallery, UK
http://www.liverpoolmuseums.org.uk/nof/portraits/index.html
Museums of Liverpool, UK
http://www.liverpoolmuseums.org.uk/online/games/beatles/

2.5.6.9 Masterpiece on your desktop

This is a widget which allows you to view a different work from the collection every day. And the 'reverse side' of every work provides more information about the work and the painter.

Rijksmuseum Museum Amsterdam, The Netherlands
http://www.rijksmuseum.nl/widget?lang=en

2.5.6.10 Add a comment

This facility offers the possibility for a user to add a comment to a text or on an image.

Tate Britain, UK (Write your own label)
http://www.tate.org.uk/britain/writeyourown/
Schoenbrunn, Austria (Guestbook)
http://www.schoenbrunn.at/it/contatti/libro-degli-ospiti.html

2.5.6.11 **Send to a friend**

This facility offers the possibility for a user to send the content of a webpage to another person, thus sharing his enjoyment of the content.

Kindermuseum Wien, Austria
http://www.kindermuseum.at/jart/prj3/zoom/main.jart?rel=en&content-id=1127609922463&reserve-mode=active
Juedisches Museum, Berlin, The Netherlands
http://www.juedisches-museum-berlin.de/site/EN/00-Metanavigation/01-Visitor-Information/visitorinformation.php

2.5.6.12 **Votes and polls**

These facilities offer the possibility for the user to vote for his favourite content items.

Moma, RedStudio, USA
http://redstudio.moma.org/polls/

2.5.6.13 **Travelogue service**

This facility offers the possibility to organise a journey by selecting and saving information in a convenient location. Simply click on "add to travelogue" button to save information for one's trip; design one's own tailor-made route and create a map of one's trip; make personalised tourist leaflets; create one's trip planner, add notes to each stage of the trip.

Spain.Info (see 1.1.8.16)
http://www.spain.info/TourSpain/users/authorize?language=EN

2.5.6.14 **Personalised agenda and calendar**

Personalised diary for saving information. For those who are bewildered by the amount of daily activity at the Institution, the system offers the opportunity to set up a personal profile indicating specific interests and selecting from the range of event types and the subjects.

Guggenheim Bilbao, Spain
http://www.guggenheim-bilbao.es/secciones/planea_visita/agenda_rapida.php? idioma=&err=1
Cité de la musique Paris, France
http://www.cite-musique.fr/francais/spectacles/agenda.asp
New York's Metropolitan Museum, USA
http://www.metmuseum.org/calendar

2.5.6.15 **Personalised map**

This facility takes the form of a map on which it is possible to save personal information. This adds an extra, geographical, dimension.

2.5.6.16 **Personalised visitor plans**

This function supports a personalised plan for the visit, taking into consideration how and when, with whom and for how long the visitor is planning to come, as well as in what is he interested. Part of the content concerning an exhibition can be retrieved by the visitor after the visit.

Cité des Sciences et de l'Industrie, France (Mes service Visite+)
http://www.cite-sciences.fr/cgi/modif?ref=43bfe9610d2858660884bc4165d88ccd& onglet=profil&langue=fr
Tate Britain, UK
http://www.tate.org.uk/britain/explore/etb.jsp

2.5.6.17 **Personalised web gallery / The virtual curator**

This facility offers the possibility to select images from the digitised collection in order to create a personalised Web gallery, adding personal comments and descriptions. The user can create a "My Personal Museum" space in which to collect, interpret and exhibit regarding a theme, an artist, or a favourite object. This type of facility can be very interesting for school projects.

Virtual Museum of Canada
http://www.virtualmuseum.ca/English/Personal/
Louvre, France (see 1.1.8.5)
http://www.louvre.fr/llv/perso/identification/connexion.jsp?bmUID=1209501204235
Musée Orsay, France
http://www.musee-orsay.fr/en/collections/index-of-works/home.html
Tate Britain. UK
http://www.tate.org.uk/britain/yourcollection/

2.5.6.18 **Virtual postcards**

This facility offers visitors to the site the possibility to make and send self-made virtual postcards.

Virtual Museum of Canada
http://www.virtualmuseum.ca/PM.cgi?LM=Postcard&LANG=English&AP=
postcard&Category=FP&Language=english&submit=submit
Gubelkian Lisboa, Portugal
http://www.museu.gulbenkian.pt/postais.asp?lang=en
Museo Thyssen-Bornemisza, Madrid, Spain
http://www.museothyssen.org/postales2005/index.html
Musèe Orsay, France
http://www.musee-orsay.fr/it/attrezzi/spazio-personale/tessere-virtuali.html
Irish museum of modern art, Ireland
http://www.irishmuseumofmodernart.com/en/postcard.cgi

2.5.6.19 **Learning environments**

Learning environments are online facilities where the users can explore and discover collections through narrative topics, images and other content-rich resources such as library and object records.

UK National Museum of Science and Industry Museum Group – Ingenious Project
http://www.ingenious.org.uk/
Explore Art Getty, USA
http://www.getty.edu/art/gettyguide/
Louvre, France
http://education.louvre.fr

2.5.7 MUVEs (see also 1.2.6)

Online, multi-user virtual environments, sometimes called virtual worlds". The most common platform is Second Life (see 1.2.8.4-8). Whyville is a virtual world where boys and girls from all over the real world come to chat, play, learn, and have fun together.

Second Life
http://www.secondlife.com
Whyville
http://www.getty.edu/gettygames/

2.6 Audience measurement on the Internet

The aim of this section is to review the techniques and metrics used for audience measurement in the Web.

By **audience measurement** we mean the methods used for calculating how many people form part of an **audience**, that is a group of people reached by a message (television programme, advertising, multimedia content, written texts, etc.).

The main aim of audience measurement is therefore to quantify the public, not just in terms of numbers, but also in terms of **socio-demographic characteristics** (sex, age, study title, geographical area, place of use, taste, behaviour, etc.). On the Internet, ***audience measurement*** is carried out for a variety of reasons, among which are:

1. *programming analysis*: we must know the characteristics and behaviour of the users in order to satisfy their requirements;
2. *social research*: public institutions must monitor the means of mass communication (and therefore also the Internet) in order to understand the role carried out by the media in involving citizens;
3. *advertising sales*: a lot of media are supported by advertising and it is not unusual for portals of cultural interest to be sustained by the contribution of advertising banners;
4. *product sales* (ticket sales, bookshops, photographs, etc.): it is essential to determine the nature of one's user population and to study its evolution.

Certain special aspects of the network must however be considered. Within mass communication, the Internet represents a real revolution: in traditional media, communication is from one to many whereas there is a two-way relationship between the user and the web, a constant dialogue between content and navigator. The interface of all the new media (web messenger, chat, blog, etc.) must also be taken into account. These are designed for viewing content and interacting with them in different ways. On the one hand, the user expresses his intentions; on the other, the system, through the aid of technologies in constant evolution, responds to the actions of the user.

Many professionals find themselves using methods of measurement. Among these we find producers of online content, computer industry professionals, public administration and e-government operators, webmasters, those in charge of commercial strategies in the network, etc. Techniques for audience measurement change over time, both as a result of technological development and in response to the evolution and use of the network.

In order to become familiar with these subjects, below is a list of the terminology currently in use on these themes, which are quite extensive and diversified. Literature does in fact distinguish between:

1. systems based on: *a*) *census-based measurement*, in which the measurement is made on the entire collection of information received, without any panel plans or statistic projections; *b*) *panel-based measurement*;
2. systems that take measurements based on the network infrastructure (*site-centric / server centric*) or on the user (*user-centric*);
3. measurement based on *server experience* or on *user experience*;

4. measurements based on devices for access to the net (*device-centric*) or systems aimed at visitors (*visitor-centric*);
5. tools of *web analytics* and *audience measurement* services.

Up to now, the quantitative analysis of the *audience*, even within the sphere of other media, has used two approaches:
1. measurement of media consumer behaviour with automatic and passive instruments, that do not require the user's direct involvement;
2. information gathering through interviews or questionnaires presented to users.

Starting from the 1990s, with the new potential of Internet and the web, these two approaches have undergone significant evolution. Automatic data measurement, that is the gathering and analysis of online traffic, is now generically indicated with the term of *web analytics*, a concept that includes the capacity to record server webs (*logging capabilities*), the technologies for "tagging" the digital contents (*tagging technologies*), the possibilities for "sniffing" the traffic in the network (*network sniffing*), in other words a series of technologies that use different data sources for detecting and analysing the manner in which users are active on the web.

On the other hand, gathering data through more traditional investigations (questionnaires, etc.) has in its turn evolved, by taking advantage of the interaction potential of the web. In no way can it be affirmed that one method is better than another; the methodology to be used needs to be considered on a case by case basis, taking into account the information requirements and available resources.

One of the fundamental issues is that regarding the process used for data gathering:
1. in *census data* modality, the measurement is carried out on the total reference population;
2. in *sample data* modality, the measurement is done on samples of the population.

Of course, the costs associated with measuring and analysing data means that sample data measurements are often preferred to census data measurements.

2.6.1 Census data measurements: web analytics

The term *web analytics* refers to the study of the behaviour of the network users. This system of census data measurement does not entail the direct involvement of the subjects to be measured.

A classification of these measurement systems can be made on the basis of the *data sources* of the behaviour of the users on the web:
1. **server based measurement:** the web server records (logs) the requests of access to the pages of a website, and analyses them;
2. **browser-based measurement:** in this case the measurement is done by the client's computer. The browser calls up the pages of a site hosted by a web server and these are "labelled" with a form of *tag* through sophisticated technology. This technique is founded on the convinction that measurements must be made in the closest point to the place and at the moment of effective media consumption of the site's resources, that is to say the instant when the browser loads and therefore visualizes the web pages on the client's screen;

3. **network based measurement:** measurement takes place at the level of the *proxy servers* of the Internet service providers that sort the requests of resources of the various clients and direct them towards a web server that hosts a site. In actual fact, all the pages consulted by the users are gathered and analysed by these intermediate network nodes. Sophisticated tools "sniff" the page requests and the resulting data is processed.

Various web analytics software and services are available commercially as open source (for example, Google Analytics, Shinystat, AWStats etc.).

2.6.2 Sample or user centred measurements

The methodology of user centred measurement derives from "recording the activity of a sample of Internet users who are recruited to be representative of the entire universe of Internet users. The behaviour of these subjects is subsequently projected in order to estimate the behaviour of the entire population of Internet users through opportune statistical projections" (Australian Technical Committee for the Internet Industry).

There are two fundamental elements on which a "user centred" measurement system is based: the identification of a sample of Internet users that is representative of the whole, and the actual monitoring of the online behaviour of these individuals.

The sample chosen is usually described as a **panel** (according to Wikipedia, a *panel* is "the 'quantity' chosen on the basis of representative criteria, used for the statistic measurement of a specific universe. It is usually a group of persons or families included in a sample investigation").

The choice of a sample of a population can be made in a number of different ways; the sample must however reflect as far as possible the total population from which it was chosen, precisely so that the partial information can be subsequently applied to the total of the population investigated. Generally speaking, it is usual to prefer a choice of "casual samples" or "probable" samples that do not feel affected by the influence or inclination of the analysts. The *panels* are therefore representative statistic samples of a certain sphere, on which a certain number of more or less continuative or distanced-over-time measurements are made. The advantage of these measurements is that they provide data on the evolution of particular phenomena over time.

So how does one recruit a *panel*? Generally speaking, research institutes adopt various techniques, among which telephone research with random dialing of numbers or personal interviews with person to person meetings. More recently, recruiting systems have used the post or the web, even if the latter risks skewing results due to the exclusion of non-Internet users.

User-centred measurement methodology (by *panel*) is strongly recommended during the design of websites that are accessible to all user categories, including the most disadvantaged.

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For example in Italian national rules: having defined the objectives of the web product and experimented with alternative solutions, you proceed to an evaluation with the client in the use context, to then carry out any corrections and updates, to be submitted to progressive monitoring.

"This methodology is based on four main conditions:

1. the formation of a representative group of users or a panel in which there must be users with different types of disabilities and also the different roles and reasons for which a user is interested in entering the site;

2. the construction of use scenarios: define contexts, reasons, and ways of interaction with the site. It is on the basis of these scenarios that the site is imagined, designed, developed and updated and improved;
3. the evolutionary design: the site is submitted to an evaluation by the panel on the basis of a number of complex scenarios. The evaluation aims to define new requirements and new purposes. The definition of the new purposes should be done interactively through the production of prototypes, such that they make it possible to evaluate solutions, identify limits and establish feasibility. A constant conversation with the panel allows us to have an in-progress evaluation of the solutions and gives an advance idea of the final evaluation of the project. Finally the panel becomes an observatory of the use of the site and thus contributes to its continuous update and improvement;
4. monitoring: as we have already said, because it is important to ensure that the site content does not remain static, there must be continuous monitoring, to identify opportunities for its improvement in terms of how well it meets user requirements. The formation of the panel is therefore a central element of the methodology because it guarantees a level of realism, but also of consensus and communication on the project. From this viewpoint it produces data and ideas and makes it possible to make empirically founded decisions. From this last viewpoint the panel is a place for experimenting with opportunities, but also with the limits of dedicated technologies for access and interaction."

http://www.pubbliaccesso.gov.it/biblioteca/documentazione/studio_lineeguida/index.htm

2.6.2.1 The meter

Generally used in traditional media, the meter is a device for measuring quantities. It is downloaded as software and installed in the computers of the subjects to be monitored. The idea of applying this monitoring technique in the sphere of informatics dates to 1994, when it was used by a group of researchers for measuring the spread and use of application software.

This measuring system entails a minimum involvement of the subjects to be analysed, so that in contrast to to server-centred and browser-centred systems (*devices-based measurement*), aimed at analysing "machine users", it is effectively "user-centred" (*user-centric measurement*). It is no longer the machines and their software that is monitored, but the single individuals with their social-demographic and behavioural specificities.

Fundamentally there are three processes on which monitoring software by meter placed in the PCs of the panellists is based: univocal identification of the individual that

navigates; recording of the information regarding his navigation route; sending of the recordings to the companies who asked for the measurement analyses.

Measurements based on *panels* with a *meter* are currently the best for gathering data on the navigators' profiles, the ranking of sites and audience fluctuations among sites (*source&loss*).

Measurement operations by *panel* and *meter* are basically the following:

1. definition of the target and behaviour to be measured (for example, individuals between the ages of 20 and 40 who have used Internet and digital application media from home in the last six months);
2. quantification of the size of this population;
3. *panel* recruitment;
4. data gathering by *meter*;
5. expansion of the data gathered on the total population.

The advantages of this type of analysis are:

- social-demographic profiling
- competition analysis
- fluctuation monitoring (*source&loss*)
- grouping by sectors
- measurement of the pages in memory cache
- identification of unique users
- automatic exclusion of non-human traffic

The disadvantages are:

- measurement only from certain places
- measurement limited to sites with significant traffic
- considerable investment
- data measured not always proprietary
- difficulty in profiling parts of the limited traffic sites

2.6.2.2 **Standardized interview – Static textual questionnaire** (see also 3.2)

The most extensively used method of investigation of media audiences, including those of websites and portals, is a standardised interview. This is done by asking structured questions of all users or of a group of chosen individuals. This measuring system entails the direct involvement of the subjects to be analysed. The aim is to investigate their preferences, habits and behaviour, in order to verify effectiveness in terms of user satisfaction with choices made and to study behaviour during network navigation – in other words, to build a "profile".

The choice of those to be interviewed can be casual or not casual, according to whether or not the choice of those to be interviewed should be probabilistic or not.

The following are among the casual methods for choosing a panel:

- *entertainment survey* or *polls*: short requests for judgement on various subjects
- *unrestricted self-selected survey*: usually present on portals and sites with a lot of traffic, they are invitations to participate in a *survey*
- *volunteer opt-in panel*: self-proposed volunteers recruited through sites and portals who, after being registered and profiled, are subsequently contacted at the beginning of the actual investigation.

Among the non-casual methods for choosing a panel are:

- interviews intercepted among a site's navigators (*intercept survey*): questionnaires completed by the visitor and randomly selected
- panels based on lists of known names (*list-based sample*): more or less detailed questionnaires submitted to lists of users with Internet access (for example, those registered with a newsletter, or with a library, the friends of a museum, etc.)
- *pre-recruited panels*: recruitment of users that are not self-chosen or volunteers, but chosen with probabilistic sampling methods.

Interviews can be made by telephone or in person, sent by e-mail (*e-mail survey*), or filled in online using graphical user interface elements such as menus and radio buttons (*web interviewing*, *web-based survey*).

An online questionnaire can be submitted using the technology offered by the web (at the time of entering or leaving a site, the specific amount of time spent on a site, specific navigation behaviour, every access to the site, etc.), but it is important that a visitor is not constantly exposed to invitations to participate in an investigation.
Normally an online questionnaire can be viewed on a full screen or inside various sizes of windows (*pop-up*). It is formed of a series of questions posed in different ways (open, closed, single, multiple, etc.) and with which the user can interact through interactive graphic solutions (buttons, drop down menus, boxes, advancing arrows, etc.).

In order for the interview to be effective and to have high quality results, it is suggested that simple language is used and that a certain amount of care is dedicated to the functionality and aesthetics (*look and feel*) of the questionnaire. It is advised that the duration of the interview be communicated in advance, and kept to a minimum: we should remember that the users are being asked to dedicate some of their time to helping us!
The sequence of the questions should be coherent and dynamic, preventing multiple answers, up to the conclusion of the interview and the final thank-you page. The thanks can be confined to two lines written at the end of the questionnaire, or to an e-mail of reply with a text along the lines of: "Thank you! Your email has been sent to us successfully..."

The aim of a pleasant presentation and an effective structure is the achievement of a greater number of completed interviews, minimizing the rate of refusal or incompleteness. The questionnaire can be a chance for winning over a user by registering him with the newsletter or for recompensing him for the energy spent in compiling it, "making him a present" of resources that would usually be subject to payment or reserved (digital and non digital gadgets, subscriptions to exclusive newsletters, the privilege of cooperating in the content creation, etc.).

The results can be used through statistical processes or by extracting individual suggestions for changes to the web application.

Once the analysis has been completed, it is advised that the results of these surveys (*website feedback survey results*) be published with an indication of the number of questionnaires analysed and the suggestions that will be implemented or which have already been implemented on the web application.

The following are the advantages of this type of technique:
- limited costs
- rapid planning and completion times
- capacity to reach users regardless of geography
- possibility of using multimedia content (audio and video)
- control of the processes in real time.

What is really critical is the truthfulness of the statements provided by the interviewee regarding his user type, a question that has been rendered even more complicated by the new reality of Internet that witnesses the increase of "virtual beings" (role games, chat, avatar, nicknames, etc), although studies in this sector are not yet consolidated.

2.6.3 Audience metrics

Audience metrics is a discipline which originated within the sphere of advertising and marketing. In the web context, its major role is that of providing qualitative and quantitative indicators for the analysis of web application effectiveness.

Audiences translated into numbers are defined as *ratings*. Although traditional media measurement systems are by now standardized (for example, average minutes for TV, average quarter of an hour for press, etc.), this is not the case for the Internet and the web. Let us consider the differences.

In traditional media, the relations between the medium (TV, radio, cinema, press etc.) and the public (TV viewers, radio listeners, readers) is identified through measurement of the *exposure* time, without a close study of the motivations and effects of this exposure. Starting from the 1990s, new metrics (*e-metrics*, *web-metrics*, *net-ratings*) were identified for investigating and quantifying the relationship between Internet users and digital content. The new *medium* is no longer characterized by a simple "exposure" model, but becomes an "interactive" space of action. The **viewer** is transformed into an **active user**.

Internet interaction means the use on the web of a space of variable size in which to put data (informative, promotional, advertising, multimedia, etc.) so that the user is not confined to just looking at them but is encouraged to interact by providing a form of reply. This strategy can be defined as a **Call to action**, in the sense that the contents are placed in the network inviting the user to "do something!" and also specifying "what to do". Closely linked to this idea there is also the so-called "funnel process": the user is involved in various processes that bring him from being a simple visitor to becoming involved in more interactive procedures, thus reacting to the communications to which he has been exposed. Of particular importance in the sphere of e-commerce, this process thus makes it possible to verify in real time the effect of a communication on users' behaviour.

There are many forms of interaction: clicking on a banner, filling in a form or questionnaire, making a purchase, downloading applications, participating in a community tool, inserting files, using a content collector, etc.).

Within the sphere of **exposure metrics**, the following are the main indicators, each one of which is in its turn connected to more specific metrics:
- **Impressions:** number of banners inserted, fixed or variously animated, seen by the user
- **Page views:** number of web pages requested and viewed by the user

- **Visits or sessions:** number of visits to a site made by users. By visit or session we mean the viewing of a series of pages by a user without there being a period of over thirty minutes of inactivity between one page and another.
- **Unique visitors:** number of single users that have visited the site, net of duplications.
- **Time spent:** time spent in minutes and seconds while navigating or viewing the pages of a site or using a digital application.
- **Frequency:** average number of visits to a site or of use of a digital application by a single individual

Within the sphere of **interactivity metrics** we can distinguish between:
- passive exposure, that can be investigated by calculating *page views*, and active exposure, identifiable with the *click* action;
- metrics for monitoring the use of the content (*content metrics*) and metrics for monitoring activities connected with e-commerce (*commerce metrics*).

Interactivity metrics are used especially in the marketing sector, but they can also be important in the sphere of cultural web applications. The most important indicators are:
- **Click-through** (the act of clicking on an announcement or banner): absolute number of click actions carried out during a promotional campaign, which in the field of marketing is also linked to the concept of *pay by click* (payment for the clicks generated).
- **Click-through rate:** within the sphere of a single campaign, relation between clicks generated by a banner and the total viewing (impressions) of the same announcement
- **Conversion:** successful completion of the phases of a process aimed at a network result (e.g. subscription to a newsletter, download of media, purchase of a product, etc.)
- **Conversion rate:** relation between the conversion operations carried out with success and the total of potential conversions
- **Interaction rate** (time spent in interaction): average time spent in interaction with an announcement.

Obviously, to make a correct analysis of the results, the indicators that analyse the negative results must be considered:
- **Abandonment rate:** percentage of processes not concluded with respect to the number of processes begun
- **Churn rate** (cancellation rate): percentage of cancellations (for example, to a newsletter)
- **Bounce rate:** percentage of missed deliveries (for example, of e-mails).

Within the sphere of interactions, it is important to understand other concepts:
- **Enquiry** (information requests): number of information requests sent directly from the user via the web
- **Lead** (profiled user): concept that indicates that a user has provided information on his network preferences
- **Search** (information search): number of searches that the user makes on a site using a search system that is internal to the web application
- **Registration:** number of registrations made by users for access to information or services
- **Order:** number of orders made by users for purchasing products or services.

Although they are not studied in depth in this context, we should not forget the indicators of communication costs, or the investments made to generate attention (costs for exhibiting information) or to generate action (costs for enticing interaction).

2.6.4 Log file analysis

Servers that host web applications send users textual content, images, multimedia files, etc. In order to increase user satisfaction, their navigation pathways can be carefully monitored and analysed. Standard web server functionality includes the capacity to collect and store detailed information about web server activity. Every provider of server solutions includes his own systems for logging, which collect detailed information on the use of the site. This can then be analysed from various perspectives, in order to extract useful information for various roles (technical, scientific, research, marketing).

The interpretation of network traffic makes it possible to extract indicators relevant, for example, to the number of accesses, the navigation routes, behaviour models, technical configuration of the devices used for connecting, etc.

The web page requests made by users are stored in the form of *log files* that record the activities ofteh web server. Due to the considerable size of this type of file, their processing is usually carried out by specific software called *log analyzers*. These classify *logs* by type, that is to say access logs (page requests that reach the server with the time and date of the request as well as the IP addresses of the computer that requested the resource and the name of the resource requested by the user); error log (recording of the malfunctions or failures in the handling of resource requests); reference log (recording of the URLs from which the user comes, the search engines used and the key words used); agent log (recording of information regarding the browsers utilised by the end users).

The analysis of the log files must however include wide margins of approximation.

The *advantages* of this type of analysis are numerous:
- special hardware or software installations are not required
- both current and historical information is always available
- all events that happen in the server are recorded
- even low traffic sites can be analyzed.

The most obvious *disadvantages* are the following:
- difficulty of standardizing the metrics
- an significant proportion of the online resources visited escapes the logging process. This is due to difficulty in measuring dynamic pages; as well as failure to measure traffic from client-side memory or *cache*. Recently some Content Management Systems (CMS) include watchdog modules to monitor the web site, capturing system events in a log to be reviewed by an authorized individual at a later time. The watchdog log is simply a list of recorded events containing usage data, performance data, errors, warnings and operational information. It is vital to check the watchdog report on a regular basis as it is often the only way to tell what is going on
- difficulty of calculating the time really spent on a page (the request of a resource does not necessarily involve its viewing)

- lack of social-demographic information
- lack of information on competition
- lack of certification of information taken from third parties, since all the processes are managed directly by the software platforms.

2.6.5 Protection of privacy

Online audience measurement may acquire personal data regarding network users.

When individuals are interviewed or metered, they should be warned beforehand of the on-going audiometric procedures so that they are aware how information is being gathered about them. In the case of web analytics techniques, the recording of information is automatic and the individuals "measured" are not made aware of the procedures taking place.

In both cases the legislation regarding rights to privacy and protection of personal data must be taken into consideration by any organisation which gathers web usage information.

The Directive number 2002/58/CE of the EU regarding the treatment of personal data and protection of privacy in the sector of electronic communications[4] foresees that the use of data gathering tools must be made known to the subjects being monitored so that such gathering is transparent. At the same time, the Directive recognises that such tools can be considered legitimate for improving online services.

The World Wide Web Consortium (W3C) proposes the use of a standardized solution known as P3P (Platform for Privacy Preferences Project)[5], a model that allows websites to state how they mean to use the information gathered from their users.

Circulation Audit Board. *Rules & Guidelines for Interactive Publishers*, 2000 http://www.auditbureau.org.au/CAB/pdf/CABwebrules.pdf

Diamond, Fran. *Web Traffic Analytics and User Experience*. 28 July 2003 http://www.boxesandarrows.com/view/web_traffic_analytics_and_user_experience

Double Click. *Internet Audience Dynamics: How Can You Effectively Use Online as a Reach Medium?*. September 2004 http://www.doubleclick.com/insight/downloadResearch.aspx?fileName=dc_internetauddynamics_0409.pdf

Esomar http://www.esomar.org

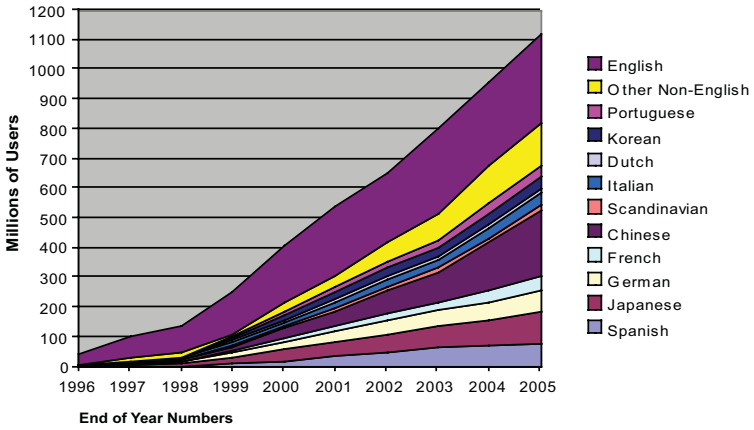
Web Analytics Association. *Web Analytics Key Metrics and KPIs*, Version 1.0, 2005 http://www.webanalyticsfacts.nl/wp-content/documents/waa-kpi-definitions-1-0.pdf

[4] For the text of this directive and other relevant legislation consult the site of the European Data Protection Supervisor, <http://www.edps.europa.eu/EDPSWEB/edps/lang/en/pid/17>.
[5] <http://www.w3.org/P3P/ >

2.7 Users in the globalised world: multilingualism issues

There is an increasing awareness of the importance of the role of multilingualism in making the digital cultural heritage of Europe available to all users. Language is one of the most significant barriers to website access and, because of this barrier, great parts of the European digital cultural heritage cannot be found on the Internet.

The problem is complex. There are nearly 7,000 known languages spoken throughout the world[6], approximately 2,200 of them also have writing systems but just 300 have some kind of language processing tools. In Europe alone, the European Union currently has 23 official languages, and there are many more languages actually in everyday use. However, despite this global multilinguality, the English language still tends to dominate the Internet, although to a lesser degree than in the past. It is clear that if national languages are to be preserved for the future, multilingual access points must be provided.



Trend towards multilingual web (source: http://global-rearch.biz/globstats/evol.html)

In the information society, the acquisition and dissemination of information in digital form must transcend language boundaries: if the Web is to be used for knowledge dissemination and acquisition, its content must be available in many languages. Information providers and seekers should have equal opportunities, regardless of the language which they prefer.

When we talk about access to information without language or cultural barriers we mean that certain functionality must be guaranteed: it must be possible to find information in foreign languages, to read and interpret that information and to merge it with information in other languages.

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[6] See http://www.multimatch.eu. The consortium, whose coordinator is Pasquale Savino savino@isti.cnr.it, is composed by Istituto di Scienza e Tecnologie dell'Informazione, University of Sheffield, Dublin City University, University of Amsterdam, University of Geneva, Universidad Nacional de Educación a Distancia, OCLC, WIND Telecomunicazioni S.p.A., Cultural Heritage, Fratelli Alinari Istituto Edizioni Artistiche SpA, Netherlands Institute for Sound and Vision, University of Alicante – Biblioteca Virtual Miguel de Cervantes.

Research on Multilingual Information Access (MLIA) thus focuses on the storage, access, retrieval and presentation of information in any of the world's languages.

There are two main areas of interest:

- *multiple language access*, which addresses the enabling technologies for browsing and display, such as character encoding, support for the specific requirements of particular languages and scripts, internationalization & localization
- *cross-language information discovery and retrieval* (CLIR), which addresses the problem of querying in one language a collection containing documents in many other languages, of filtering, selecting, and ranking the retrieved documents and of presenting the resulting information in an interpretable and exploitable fashion.

The main (although certainly not the only) problem when building a CLIR system is to be able to match the user query against the document collection. In order to do this both queries and documents must be pre-processed and indexed – generally using language dependent techniques (tokenisation, stopwords, stemming, morphological analysis, decompounding, etc.). Various approaches are adopted generally involving the translation of either the queries or the documents (or both). Systems that cater for many languages may use an interlingua or pivot language. Translation resources can be Machine Translation (MT), parallel/comparable corpora, bilingual dictionaries, multilingual thesauri, conceptual interlingua. The most successful systems often use a combination of more than one translation resource.

The main CLIR difficulties involve the correct handling of language identification, morphology, proper names, terminology, multi-word concepts, phrases and idioms, ambiguity and polysemy. In particular, the processing of many languages simultaneously, merging results from different sources/media, and the presentation of the results in appropriate fashion for the specific user represent challenging issues and satisfactory solutions are still being investigated.

Interactive CLIR systems can help users to locate and identify relevant foreign-language documents, by formulating and translating the query or by query re-formulation, browsing/navigating results and/or identifying relevant documents.

Providing multilingual retrieval for a mixed media collection is a non-trivial problem. Different media are processed in different ways and suffer from different kinds of indexing errors: spoken documents are indexed using speech recognition, handwritten documents are indexed using OCR, and image collections use feature-based indexing. Retrieval in such cases implies a complex integration of multiple technologies.

In any case, implementing Multilingual Information Access functionality is complex and involves issues at a number of levels. For multilingual portals, it is necessary to decide how many languages should be catered for, how many levels of the site should be multilingual, and how should updates be handled. For monolingual search in a multiple language context, encoding and representation issues (language identification and indexing issues, such as stop words, stemmers, morphological analysers, named entity recognition, etc.) must be addressed. For cross-language search, appropriate translation resources must be acquired, maintained and updated regularly. And finally, the presentation of results must be in a form which is interpretable and exploitable by users.

The MLIA issues for Cultural Heritage have the same problems but systems need fine tuning with respect to the specific terminology and media involved and specific user profile (see 2.4).

2.7.1 A case study: the MultiMatch project

On the web, cultural heritage (CH) content is everywhere, in traditional environments such as libraries, museums, galleries and audiovisual archives, but also in popular magazines and newspapers, in multiple languages and multiple media.

The MultiMatch Search Engine is a first attempt to provide a complete and integrated solution to search CH content. It supports the retrieval of cultural objects through different modalities:

- Free text search. This search mode is similar to that provided by general purpose search engines, such as Google, with the difference that MultiMatch is expected to provide more precise results – since information is acquired from selected sources containing CH data – and support for multilingual searches
- Multimedia search, based on similarity matching and on automatic information extraction techniques
- Metadata based search, where the user can select one of the available indexes built for a specific metadata field and can specify the value of the metadata field (e.g. the creator's name) plus, possible additional terms
- A browsing capability allows users to navigate the MultiMatch collection using a web directory-like structure based on the MultiMatch ontology.

Concerning multilingual functionality in MultiMatch, users can formulate queries in a given language and retrieve results in one or all languages covered by the prototype (English, Italian, Spanish, Dutch, German, and Polish) according to their preferences. Six separate monolingual index files are maintained.

Cross-language searches are performed by a combination of machine translation and domain-specific dictionary components. Users can select the source and the target languages as well as the most appropriate translation among those proposed by the system.

The domain-specific lexicon has been built up by deriving CH vocabulary from appropriate multilingual corpora and in particular from Wikipedia. In addition to the separate monolingual index files, a single multilingual index file, created by translating all incoming documents into English, is maintained to facilitate multilingual searches. Incoming queries in any language can be translated into English and submitted to this index. Retrieval performance is enhanced by the use of thesaurus expansion and relevance feedback.

3 Practical tools

Two practical tools are presented here for cultural entities who want to evaluate the users' point of view.

3.1. A self-evaluation questionnaire for planning a user-centred web application

This handbook is based on a concept that has been often been asserted by MINERVA: the quality of a cultural project relies on decisions that must be taken from the earliest stages of the project. This also applies to interaction and user satisfaction, which is a central goal of any high quality web application.

This questionnaire, that to some extent returns to the check-points of the *Handbook of quality principles* but for the most part is based on the contents of the manual that you are reading, is addressed to those cultural entities that are about to develop a new web application (or want to update one already on-line) and whose objective is to seriously evaluate user expectations, user satisfaction and the potential of advanced user interaction. It is suggested that the questionnaire is used not only in the initial stages of the project, but also in the subsequent phases, including that of maintenance of the on-line application.

The first two parts (GENERAL INFORMATION and APPLICATION QUALITY AND USERS) aim to assist the web application designer in evaluating if and to what extent key (strategic, technical, legal and organizational) questions are being considered; such questions will have an impact on the use of the application. The questions are organized under sub-titles that follow a precise path of self-evaluation, within which the questions are arranged in a deliberate order.
On the other hand, in the subsequent parts of the questionnaire, different options are suggested to the entity carrying out the self-evaluation. These are taken from the material presented in chapters 2.4-2.6 of this handbook, in no particular order.

The third part (HELPING THE USER FIND HIS WAY: PROFILING AND CUSTOMIZATION) aims to present the most common profiling logics of users/uses of cultural web applications, in order to make the most appropriate choices (see also 2.4).

The fourth part (INTERACTIVE SERVICES) guides the cultural entity in choosing the actual forms of user interaction which are most appropriate for the web application. This can be applied in his site in order to improve overall user satisfaction (see 2.5).

Finally, the fifth part of the questionnaire (AUDIENCE MEASUREMENT) presents techniques to measure the use of the application and subsequent user satisfaction (see 2.6).

1. GENERAL INFORMATION

What cultural subject/project am I?

- ☐ Archive
- ☐ Library
- ☐ Museum
- ☐ Widespread cultural heritage institution
- ☐ Management and governing institution
- ☐ Centre for research and training
- ☐ School
- ☐ Cultural project, portal, digital library, cultural tourism portal
- ☐ Temporary exhibition event
- ☐ School

Which digital application do I want to develop?

- ☐ Static website
- ☐ Dynamic Web site
- ☐ Web application
- ☐ Forum
- ☐ Blog
- ☐ Wiki
- ☐ Web portal
- ☐ Database management system
- ☐ Information system
- ☐ Web service
- ☐ Online social network
- ☐ Web game

2. APPLICATION QUALITY AND USERS

2.1 Users evaluation strategy

1.	Have I recruited a dedicated user focus/panel group?	☐ Yes	☐ No
2.	Does my user group truly reflect my target audience?	☐ Yes	☐ No
3.	Are all major elements of my target audience represented in my user group?	☐ Yes	☐ No
4.	Has my focus group reviewed prototype web elements?	☐ Yes	☐ No
5.	Has the website concept and aims been clearly communicated to my user group?	☐ Yes	☐ No
6.	Has my user group provided feedback?	☐ Yes	☐ No
7.	Has the feedback been formally documented and included in the design process?	☐ Yes	☐ No
8.	Has this feedback been reflected in later prototypes?	☐ Yes	☐ No

2.2 Effectiveness

1.	Have user groups or other user representatives been consulted as to the choice of content which would make the site as effective and useful as possible for them?	☐ Yes	☐ No
2.	Have formal content criteria been drawn up, and followed, which reflect the target audience requirements?	☐ Yes	☐ No

2.3 Accessibility

1.	Was the site planned from the start to support universal access?	☐ Yes	☐ No
2.	Does the site comply with my national rules on ICT services accessibility?	☐ Yes	☐ No
3.	Does the site comply with W3C WAI guidelines?	☐ Yes	☐ No
4.	Has the site been evaluated by automatic or half-automatic tools?	☐ Yes	☐ No
5.	Was the site planned from the start to support access via a wide range of delivery channels?	☐ Yes	☐ No
6.	Does the site make sense and still have value without any images?	☐ Yes	☐ No
7.	Does the site rely on proprietary extensions or plug-ins?	☐ Yes	☐ No
8.	Are multiple browser types supported?	☐ Yes	☐ No
9.	Are mobile and handheld devices supported?	☐ Yes	☐ No
10.	Are slow Internet connections supported?	☐ Yes	☐ No

2.4 Multilingualism

1.	Was multilingualism planned into the site from the very start?	☐ Yes	☐ No
2.	Does the site have a stated multilingualism policy?	☐ Yes	☐ No
3.	Has the site been reviewed by experts or user groups against such a policy?	☐ Yes	☐ No
4.	Does the site mission, identity and profile material appear in more than one language?	☐ Yes	☐ No
5.	Is there any material presented in sign language?	☐ Yes	☐ No
6.	Is there any material presented in non-EU languages which are used by immigrant populations?	☐ Yes	☐ No
7.	Is the site's non-static information available in multiple languages?	☐ Yes	☐ No
8.	Is the static (cultural) information available in more than one language?	☐ Yes	☐ No
9.	Is the site structure logically separate from the language in use?	☐ Yes	☐ No

2.5 Management (Privacy, IPR)

1.	Does an end user code of conduct exist?	☐ Yes	☐ No
2.	Must the user actively endorse it?	☐ Yes	☐ No
3.	Does the end user code of conduct include protecting the overall database, as well as the content in the database?	☐ Yes	☐ No
4.	Are steps taken to restrict the potential unauthorised reproduction or exploitation of content?	☐ Yes	☐ No
	a) Limited image resolution?	☐ Yes	☐ No
	b) Visible watermarking?	☐ Yes	☐ No
	c) Digital watermarking?	☐ Yes	☐ No
5.	Is a user privacy policy available?	☐ Yes	☐ No
6.	Is it (or a link to it) prominently displayed for the end user?	☐ Yes	☐ No
7.	Are records kept of user access or user information?	☐ Yes	☐ No
8.	Are these records necessary?	☐ Yes	☐ No
9.	Are these records protected in accordance with privacy legislation and directives?	☐ Yes	☐ No
10.	Is the site content available under a Creative Commons license?	☐ Yes	☐ No

3. HELPING THE USER FIND HIS WAY: PROFILING AND CUSTOMIZATION

Do I want to organize the content of my web applications according to user types (personas)? ☐ Yes ☐ No

If yes, which among these audience groups do I want to represent?
- ☐ General public
- ☐ School students
- ☐ School staff/teachers
- ☐ University/College students
- ☐ University/College Staff/Teachers
- ☐ Researchers
- ☐ Professionals/Business people
- ☐ Librarians
- ☐ Journalists
- ☐ Tour/Travel professionals
- ☐ Public officers
- ☐ ICT Professionals
- ☐ Children
- ☐ Teenagers or young adults
- ☐ Parents
- ☐ Suppliers
- ☐ .....

Do I want to organize the content of my web applications according to use scenarios?
- ☐ Planning a visit
- ☐ Searching the catalogue
- ☐ Finding didactic material
- ☐ Buying
- ☐ Playing
- ☐ .....

Do I want to organize the contents in thematic areas?
- ☐ Theme 1 (Ex. Archaeology)
- ☐ Theme 2 (Ex. Art)
- ☐ Theme 3
- ☐ Theme 4
- ☐ Theme 5

4. INTERACTIVE SERVICES

Do I want to include interactive communication services?
- ☐ Mailing list
- ☐ Newsletter
- ☐ Forum
- ☐ Virtual reference services (Ask a librarian)
- ☐ SMS/MMS
- ☐ Blog

☐ Instant messaging
☐ Videoconference
☐ Streaming

Do I want to include interactive learning services?
☐ Online tutorials
☐ Online help
☐ Virtual interactive tours

Do I want to include commercial interactive services?
☐ E-commerce
☐ Ticket office
☐ Reproductions
☐ .....

Do I want to include interactive forms?
☐ Subscritions
☐ Reservations
☐ .....

Do I want to include user-side services?
☐ Podcasting
☐ Social bookmarking
☐ Social tagging/folksonomies
☐ File-sharing (texts, images, video)
☐ Mash-ups
☐ Story-telling
☐ Interactive games
☐ Masterpiece on your desktop
☐ Add a comment
☐ Send to a friend
☐ Votes and polls
☐ Save a search
☐ Travelogue service
☐ Personalised agenda and calendar
☐ Personalised map
☐ Personalised visitor plans
☐ Personalised web gallery/The virtual curator
☐ Virtual postcards
☐ Learning environments
☐ .....

Do I want to share resources with other sites?
☐ Flickr
☐ YouTube
☐ .....

5. AUDIENCE MEASUREMENT

Do I want to use audience measurements techniques in order to evaluate user needs and satisfaction? ☐ Yes ☐ No

Which audience measurements techniques do I want to use?
- ☐ Web analytics
- ☐ Meter
- ☐ Standardised questionnaire

How do I want to select people to be interviewed?
- ☐ Casually
- ☐ Through volunteer opt-in panels
- ☐ Through pre-recruited panels

How do I want to give interviews?
- ☐ On the phone
- ☐ In person
- ☐ Leaving a form on the desk
- ☐ By e-mail
- ☐ By interactive online form

Do I want to reward people who answered to the interview? ☐ Yes ☐ No

In which way?
- ☐ Offering the possibility to benefit from a service
- ☐ Offering a gadget
- ☐ Inviting the user to participate in a draw

Do I want to circulate the results of my surveys? ☐ Yes ☐ No

In which way?
- ☐ Distributing a printed report
- ☐ Distributing an on-line report
- ☐ Putting FAQs online

3.2 Websites and portals feedback form

On the basis of what was explained in chapter 2.6, and bearing in mind similar material that is already available on the web, this manual proposes a standardised interview model to be distributed to users of websites and cultural portals. It can be used as a starting point for the construction of a personalized questionnaire that reflects the requirements of one's own web application.

The questionnaire model is divided into various inherent sections: 1. data protection; 2. personal details; 3. visit; 4. reasons for the visit; 5. technical and graphic aspects; 6. identification of the web application; 7. quality of the content and search functionality.

In addition, there is a section in the final part dedicated to the possible granting to the user of discounts, prizes and gadgets as a way of thanking him/her for having devoted time to filling out the questionnaire. Finally a set of links is provided, which shows the sources from which this model of questionnaire is taken.

The entries with an asterisk (*) cannot be used in questionnaires regarding portals.
The entries with two asterisks (**) are particularly suitable for portals.
The term "personalisable" means that the question can be adapted to the specific requirements of a particular site.
The term INSTITUTION NAME refers to the institution that presents the questionnaire.
The term SITE/PORTAL NAME refers to the main name of the web application (site, portal, database, web service, etc.) that is subject of the questionnaire.
The term LIST indicates that a list of elements may be added.

Cotswold District Council Online - Museum Website Feedback Form
http://www.cotswold.gov.uk/nqcontent.cfm?a_id=2733&tt=cotswold
Charles Stuart University
http://yourlibrarycsu.blogspot.com/2007/04/complete-library-web-site-survey-enter.html
Kansas City Public Library Website Survey
http://www.kclibrary.org/promos/websurvey/questions.cfm
Glasgow Metropolitan College Library Services – Website Survey
http://www.surveymonkey.com/s.asp?u=302712136806
Newburgh Free Library Web Site Survey
http://www.surveymonkey.com/s.aspx?sm=E_2ffGu42x8DLYEa6DxsO1bQ_3d_3d
Western Australian Museum – Website Feedback
http://www.museum.wa.gov.au/aboutus/feedback/website.asp
Queensland Museum - Web Site Feedback
http://www.qm.qld.gov.au/inquiry/contact/feedback.asp
Kavanagh Websites Feedback
http://ktransit.com/feedback.htm
The Jewish Museum – Website Feedback
http://www.jewishmuseum.org.uk/feedback/websitefeedback.asp
Museum of Australian Currency Notes – Feedback Form
http://www.rba.gov.au/Museum/Visitors/feedback.html
Australian Museum Audience Research Centre: Website Feedback
http://www.amonline.net.au/amarc/feedback.htm
Arizona State Museum – Website Feedback Survey
http://www.statemuseum.arizona.edu/feedbk/index.shtml
UC History Digital Archives User Survey
http://sunsite.berkeley.edu/~ucalhist/feedback.html
MICHAEL Questionnaire (see Annex 1, p. 139)
Europeana.eu – online Questionnaire
http://www.irn-research.com/surveys/euro.htm

INTRODUCTION

Example:
Thank you for taking the time to answer some questions about the SITE NAME.
The questionnaire will take about __ minutes to complete.
Your comments will be greatly appreciated.
Any answers you provide will be anonymous and treated as strictly confidential.

DATA PROTECTION

☐ I agree that INSTITUTION NAME may collect details for the purposes of processing this form

YOUR DETAILS

Your gender

☐ Male
☐ Female
☐ Not answered

Your postcode .....

How old are you?

☐ Under 16
☐ 16 - 19
☐ 20 - 24
☐ 25 - 29
☐ 30 - 34
☐ Etc.
☐ Not answered

Your occupation (PERSONALISABLE)

☐ School student
☐ School staff/teacher
☐ University/College student
☐ University/College Staff/Teacher
☐ Researcher
☐ Professional/Businessman
☐ Journalist
☐ Tour/Travel professional
☐ Public servant
☐ ICT Professional
☐ Home maker
☐ Retired
☐ Enthusiast
☐ Parent
☐ ...
☐ Not answered

Your level of education (PERSONALISABLE)

- ☐ Primary school
- ☐ Secondary school
- ☐ Bachelors Degree
- ☐ Masters degree
- ☐ Doctorate

Other .....

Your main field of activity (PERSONALISABLE)

- ☐ Archives
- ☐ Libraries
- ☐ Museums
- ☐ Research
- ☐ Teaching
- ☐ Tourism
- ☐ Culture heritage administration
- ☐ Publishing/Audiovisual
- ☐ ...
- ☐ Not answered

What country do you live in? (LIST)
What region/city do you live in? (LIST)
Which languages do you know? (LIST)

Your connection to the Internet

- ☐ Dial up
- ☐ Broad band (DSL, cable modem, T1)
- ☐ Not sure

If you are you disabled, from what kind of disabilities do you suffer?

- ☐ Visual disabilities
- ☐ Hearing disabilities
- ☐ Learning disabilities
- ☐ Mobility disabilities

YOUR VISIT

How often have you visited our website/portal?

- ☐ First time visitor
- ☐ Seldom
- ☐ Monthly
- ☐ Weekly
- ☐ Daily

Have you visited INSTITUTION NAME in person? *

- ☐ Yes
- ☐ No

What did you know about INSTITUTION NAME before visiting the website? *

- ☐ Nothing
- ☐ The name, but little else
- ☐ Some idea of what the Museum/Archive/Library is and how to visit
- ☐ A great deal about what the Museum/Archive/Library offers and how to visit

Comments .....

REASONS FOR VISITING OUR SITE

Why did you visit this website? PLEASE MARK ALL THAT APPLY (PERSONALISABLE)

- ☐ to learn about the INSTITUTION NAME
  (what it is, what it does, its history, and its mission, contacts)
- ☐ to arrange a visit to the INSTITUTION NAME*
- ☐ to conduct research on ……
  (please be as specific as possible, i.e.: genealogy, tourism, digitisation, etc.)
- ☐ to find information for my thesis or dissertation
- ☐ to find help with homework
- ☐ to find a job
- ☐ to use online services (subscriptions, reference, reservations, etc.)
- ☐ to view online exhibitions
- ☐ to learn about events and news
- ☐ to learn about educational activities and available materials
- ☐ to use the e-learning platform
- ☐ to visit the online store
- ☐ to consult the digital library/online databases etc.
- ☐ to download text/images/video/audio content
- ☐ to download forms
- ☐ to play games
- ☐ to make a donation
- ☐ just to browse
- ☐ to use the community tools (blogs, chats, forums, ikis, etc.)
- ☐ ...

Do you regularly use the following databases? MARK ALL THAT APPLY (PERSONALISABLE)

- ☐ x
- ☐ y

RATE THE TECHNICAL ASPECTS AND THE LOOK/VISUAL APPEAL

Navigation/Organisation of the website

- ☐ Like it a lot
- ☐ Like it
- ☐ Neutral
- ☐ Don't like it
- ☐ Really don't like it

Design/Overall look of the website

- ☐ Like it a lot
- ☐ Like it
- ☐ Neutral
- ☐ Don't like it
- ☐ Really don't like it

Colour scheme

- ☐ Like it a lot
- ☐ Like it
- ☐ Neutral
- ☐ Don't like it
- ☐ Really don't like it

What do you like or not like about the look of our site? .....
What operating system are you using? (LIST)
At what resolution is your monitor set? (LIST)
What browser are you using? (LIST)

Please rate the download time of the homepage

- ☐ Fast
- ☐ Average
- ☐ Slow

MISSION TRANSPARENCY

Is the mission statement prominently displayed?	☐ Yes	☐ No
Does the mission statement clearly state the aims, nature, owner and content of the site?	☐ Yes	☐ No
Does the homepage state clearly the identity of the organisation Responsible for the creation and maintainance of the site?	☐ Yes	☐ No

QUALITY OF CONTENT AND SEARCH MODE

Can you say in 1 or 2 sentences, what you think the aim of SITE/PORTAL NAME is? **……

If you had to describe the range of the content covered by SITE/PORTAL NAME to a friend or a colleague in 1 sentence, what would you say? **……

If you had to explain to a friend or colleague about the sources used for the content of SITE/PORTAL NAME, what would you say? **……

Did you find what you were looking for?

- ☐ Yes
- ☐ Yes, but just browsing
- ☐ Yes, but with difficulty
- ☐ No

Do you think this is the right website to make your search?

☐ Yes
☐ No

When you visit the website, how often do you find the information you are looking for?

☐ Always
☐ Most of the time
☐ Some of the time
☐ Rarely
☐ Never

How easy is it for you to find information on our site?

☐ Very easy
☐ Easy
☐ Neutral
☐ Difficult
☐ Very difficult

What was the last thing you looked for on this website but you could not find? ……

How would you rate the content of our site?

☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

How do you find our search tools?

☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

What do you think of our language style and the terminology used?

☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

What do you like most about our site? ……

Would you like if our website had more interactivity (Web 2.0)?

☐ Yes
☐ No
☐ Not answered

Would you be interested in these features in a restyled website/portal? (LIST) (PERSONALISABLE)
i.e.

- ☐ Feeds for new information
- ☐ Videos/Podcast
- ☐ Blog
- ☐ Wiki
- ☐ Online video tutorials
- ☐ Image sharing
- ☐ Games/quizzes
- ☐ Competitions
- ☐ Ability to listen to oral stories online
- ☐ Bookmarking tools
- ☐ …

How likely are you to use our site again?

- ☐ Yes definitely
- ☐ Probably
- ☐ Never
- ☐ Not answered

What digitised contents would you like to see on the website? .....

Would you use the search function on a site like this?

- ☐ Yes
- ☐ No

Which search functions do you use most often? (PERSONALISABLE)
i.e.

- ☐ By author
- ☐ By chronology
- ☐ By institution
- ☐ By collection
- ☐ By map
- ☐ By simple search
- ☐ By advanced search
- ☐ By theme
- ☐ By user profile
- ☐ By scenario
- ☐ …

COMMENTS AND SUGGESTIONS

.....
.....
.....
.....

THANKS PAGE

Example:
Thank you once again for your assistance. Please, leave your e-mail address below to enter our prize draw to win/receive a …… as a thank you for your help.

The information you have provided will not be passed to any third parties or used for any commercial purpose.

Would be willing to take part in future surveys as the SITE/PORTAL develops?

☐ Yes
☐ No

4 The importance of using metadata

4.1 Why use metadata for describing websites?

The reading of this chapter, which presupposes a basic ICT knowledge, is nevertheless suggested to cultural heritage professionals, in consideration of the increasing importance of metadata issues in cultural web world. The practical application of this chapter's contents is devoted to ICT professionals.

MINERVA's seventh principle of quality states: "A good quality cultural website must be committed to being **interoperable** within cultural networks to enable users to easily locate the content and services that meet their needs".

In order to guarantee interoperability between systems, **metadata** must be correctly compiled.

According to the *MINERVA Technical Guidelines for Digital Cultural Content Creation Programmes* "Metadata can be defined literally as 'data about data,' but the term is normally understood to mean structured data about resources that can be used to help support a wide range of operations on those resources. If a web application is created using certain standards this will facilitate interaction and interoperability with other web sites and with other on-line bodies (search engines, portals). A resource may be anything that has its own identity, and a resource may be digital or non-digital. Operations on digital resources might include, for example, disclosure and discovery, resource management (including rights management) and long-term preservation. For a single resource different metadata may be required to support these different functions"[1].

The daily work of the search engines spiders consists in searching and indexing metadata on the web pages that they visit. Our use of common search engines uses metadata to identify resources formed from web pages. Unfortunately the metadata managed by search engines is limited or not structured, as a result we often receive search results that have nothing to do with our search.

If, for example, we want to make a search in the web for the MINERVA project and we just enter "MINERVA" in the search string of Google, we will see that the result that interest us does not appear within the first six results [research effected the 20 May 2008].

If however the information published on the web has been "classified" in a more or less structured manner, the search can be made more effective.

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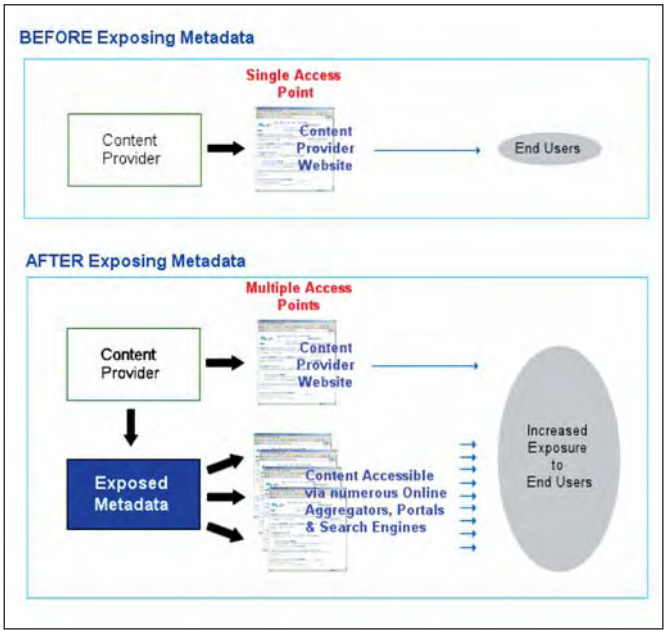
[1] *DCMI Metadata Terms*, http://dublincore.org/documents/dcmi-terms/; Diane Hillmann, *Using Dublin Core,* http://dublincore.org/documents/usageguide/; DCMI, *Expressing Dublin Core in HTML/XHTML meta and link elements*, http://dublincore.org/documents/dcq-html/; M. Moffat, *'Marketing' with Metadata: How Metadata Can Increase Exposure and Visibility of Online Content*, Version 1.0 8th March 2006, http://www.icbl.hw.ac.uk/perx/advocacy/exposingmetadata.htm.

4.2 Benefits of using metadata

Metadata can be used for the purposes of:

- making it easier to find content from among a large number of agents (portals, aggregators, search engines)
- allowing aggregators to promote material
- increasing the visibility and awareness of one's available resources
- allowing potential users to determine the relevance of resources before accessing them
- facilitating production of interoperable services
- improving the visibility of one's content in search engines such as Google, Google Scholar, Yahoo etc.
- increasing web site traffic and business
- exposing resources to new markets allowing intelligent user agents to perform inferences and make better use of resources.

The advantages of using metadata are equally valid for content providers that provide resources free of charge and for providers of commercial and restricted-access content



Exposing metadata can enhance the visibility of content:
Source: http://www.icbl.hw.ac.uk/perx/advocacy/exposingmetadata.htm

4.3 The Dublin Core standard

In the metadata domain, the standard defined by the Dublin Core Metadata Initiative (DCMI) is central. This organization develops and promotes the adoption of standards for the definition of metadata for the description of digital resources. DCMI has in particular developed a standard vocabulary for indicating the main properties of the most common online resources. Originally established for the description of bibliographic references, this vocabulary has been generalised and adapted to the description of a vast number of resources.

Under the guidance of the NISO (National Information Standards Organization), the Dublin Core Metadata standard was established as the ISO 15836:2003 regulation. The publication of the ISO regulation forms an official acknowledgement of the use of the set defined by Dublin Core. The Dublin Core has been translated into over 20 languages and is used worldwide for integrating various types of information.

The Dublin Core standard is composed of a group of elements for describing resources. This first group of elements, originally conceived for the descriptions generated by authors of web resources, was subsequently adopted by various communities, including museums, other public institutions and commercial enterprises. This helped to establish the necessary consensus for standardization at all levels.

The success of Dublin Core is due to the ease of comprehension of its elements, its universally accepted semantics and the ease of its application to different languages.

Dublin Core can be extended by using Refinement Elements: Qualifiers and Encoding Schemes. The Simple Dublin Core level has fifteen basic elements:

Element	Description
DC.title	A name given to the resource
DC.creator	An entity primarily responsible for making the resource.
DC.subject	The topic of the resource
DC.description	An account of the resource: description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource.
DC.publisher	An entity responsible for making the resource available
DC.contributor	An entity responsible for making contributions to the resource.
DC.date	A point or period of time associated with an event in the lifecycle of the resource.
DC.type	The nature or genre of the resource
DC.format	The file format, physical medium, or dimensions of the resource.
DC.identifier	An unambiguous reference to the resource within a given context, i.e. URL, ISBN number, etc.
DC.source	A related resource from which the described resource is derived
DC.language	A language of the resource
DC.relation	A related resource
DC.coverage	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant.
DC.rights	Information about rights held in and over the resource

Using these elements we can describe a resource as a group of element/value couples.

For example, to describe this chapter we could use the following sequence of element/value couples:

DC.title="The importance of using metadata"
DC.creator="MINERVA WP5 Quality Accessibility Usability"
DC.publisher="MINERVA Project"
DC.type="text"
DC.format="html"
DC.language="English"

All the elements of the language are OPTIONAL and can, if necessary, be REPEATED. For example, when there is more than one author the element DC.creator can be repeated.
The Qualified Dublin Core level adds other elements and introduces a group of qualifiers that enable the semantics of the base elements to be refined.

Element	Description
DC.audience	Group of bodies for which the resource is useful
DC.provenance	Information on possible changes from the creation of the resource
DC.rightsHolder	Indicates who holds the rights to the resource's use
DC.instructionalMethod	Indicates the learning process for which the resource is suitable
DC.accrualMethod	Indicates the method with which the resource is accrued to a group
DC.accrualPeriodicity	Indicates the periodicity of a resource to a group
DC.accrualPolicy	Indicates the policy that regulates the accrual of the resource to a group

The qualifiers make it possible to describe the information provided through the base elements in more detail. They are shown by the **Element Refinements**, elements that better specify certain characteristics, and by the **Encoding Schemes**, references groups for the interpretation of the values of the elements. For example, we can rewrite the description of this chapter with greater precision in the following way:

DC.title="The importance of using metadata"
DC.creator="MINERVA WP5 Quality Accessibility Usability"
DC.publisher="MINERVA Project"
DC.type="text"
DC.format="text/html"
extent "62 kb"
DC.language="eng"

In the description above we have indicated the type as text, referring to the standard *Encoding Scheme DCMI Type Vocabulary*, the format as text/html, referring to the MIME Type standard and the language as eng, referring to the standard. The **DC.extent** element was also used. This makes it possible to define the dimensions of the resource. The indentation of the extent element indicates that we are dealing with a supplementary indication (**refinement)** of the format element.
The language defined by the Dublin Core standard is independent of any special regulation and we can choose the terminology that best suits us. We could, for example, make the language elements correspond to the fields of a table of a database or to the properties of an object in a programming language. The DCMI in any case provides some indications for the use of a common syntax for the description of online resources, such as for example a web page. This can be described in terms

of Dublin Core elements expressed with the **<meta>** tags in the XHTML document of the same resource, quoting the source/UTL of the scheme adopted.
For example, this article can be described with the following XHTML code, collecting the metadata in the <head> section of the XHTML source code of each page and using the <meta> and <link> elements:

<head>
<link rel="schema.DC" href= "http://purl.org/dc/elements/1.1/" />
<link rel="schema.DCTERMS" href= "http://purl.org/dc/terms/" />
<**meta name="DC.title" lang="it"** content="The importance of using metadata" />
<**meta name="DC.creator"** content="MINERVA WP5 Quality Accessibility Usability" />
<**meta name="DC.publisher"** content="MINERVA Project" />
<**meta name="DC.type"** scheme="DCTERMS.DCMIType" content="Text" />
<**meta name="DC.format" scheme="DCTERMS.IMT" content="text/html"**/>
<**meta name="DC.format" scheme="DCTERMS.extent"** content="62kb" />
<**meta name="DC.language" scheme="DCTERMS. ISO639-2"** content="eng" />
</head>

In this example, the <link> elements indicate the schemes used for the elements of the *Simple Dublin Core* (DC) and for the *Qualified Dublin Core* (DCTERMS), while each <meta> element corresponds to the element/value couples used in the first examples. Where possible, the data of some elements should be chosen from a "controlled vocabulary", a series of terms which is carefully defined. This can greatly improve the search results, because computers are able to identify the individual words but find it difficult to understand concepts, associations, synonyms, etc.
Without some level of terminology control, incomplete or incorrect metadata can lead to poor quality in the results of a search. Controlled vocabularies and thesauruses can be used through ENCODING SCHEMES.

Example of the use of Dublin Core in the homepage of the Victoria and Albert Museum website

Dublin Core is often too general to effectively describe very specific resources; we are often forced to personalize the scheme in order to satisfy some particular requirement. This leads to a situation where, even while using the same regulations, the metadata is not directly interoperable, unless by **mapping** the

respective application profiles. While this may appear to be a limitation, it is in fact a strong point of Dublin Core. A user of Dublin Core is not excessively constrained in the description of the characteristics of a resource, but can create more detailed specifics if the information that must be described requires it.

Dublin Core
http://dublincore.org

DCMI Metadata Terms
http://dublincore.org/documents/dcmi-terms/

Diane Hillmann, *Using Dublin Core*
http://dublincore.org/documents/usageguide/

DCMI, *Expressing Dublin Core in HTML/XHTML meta and link elements*
http://dublincore.org/documents/dcq-html/

M. Moffat, *'Marketing' with Metadata: How Metadata Can Increase Exposure and Visibility of Online Content*, Version 1.0 8th March 2006,
http://www.icbl.hw.ac.uk/perx/advocacy/exposingmetadata.htm

4.4 Another way to expose resources: syndication & RSS

An alternative way to make information about resources available is to separate the resource (in our case the article) and its description. In such a scenario the description of the resource is expressed in XML or RDF/XML in an external file, which is linked to the actual resource. This model is referred to as **syndication**. 'Syndication' often uses the RSS file format. RSS, a form of XML, stands for Rich Site Summary, RDF Site Summary or Really Simple Syndication. An RSS file (also known as RSS feed or RSS channel) consists in a list of elements (ITEMS), each of which contains a TITLE, a DESCRIPTION and the LINK to a web resource. These are metadata, with the actual contents totally separate, but accessible from the link in the RSS file.

The use of the RSS feed is immediate. Once an RSS file is available on a web site, the parties involved can simply take a file from the site and reuse its contents in a variety of ways. There are various versions of RSS, but RSS applications usually support any RSS version.

An RSS feed allows potential users to see the data of some content providers without necessarily visiting their site. For example, many daily newspapers offer their contents with the RSS system (see also 2.5.6.2 for cultural institutions offering this service). Thanks to the RSS feeds, you can receive on your computer updates on the latest news published by the site. What's more, anyone who has a blog can spread the news of that daily in a simple and immediate manner.

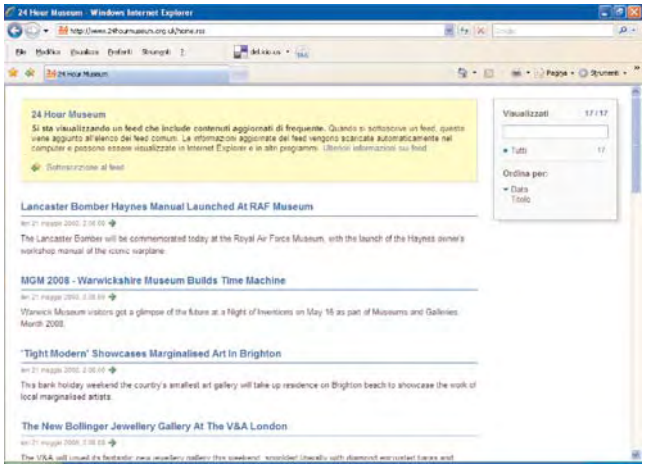
To access the RSS contents in a few easy steps it is sufficient to have an Internet connection and a special programme called "aggregator". There are many that can be downloaded on one's PC or that can be used through the web. Some aggregators can be integrated with common browsers and/or electronic mail programmes.

4.4.1 Feed readers

A feed reader is a programme that is able to carry out the download of an RSS feed (the user only has to indicate the URL of the feed to the programme), parse it and display its content on the basis of the user's preferences. Feed readers often have advanced functions; for example they can automatically detect if the feed producer has updated the feed, carrying out their download at regular intervals.

Many feed readers can be freely downloaded from the net, for example

- Feedreader (Windows)
- Sharpreader (Windows)
- Sage plug-ins (FireFox/ThunderBird)
- Urss plug-ins (Mozilla)
- Steaw (Linux)
- Netnewswire Lite (Mac OS X)



Example of an RSS feed, from the UK's 24-hour Museum

4.5 Towards semantic integration

The web is not a collection of documents, it is a group of 'places' set in a virtual landscape. The 'places' on the web are points of entry for interaction between individuals and individuals, between individuals and organizations, or between organizations and organizations.
The interaction occurs through the exchange of information and documents and access to services.
The basic problems of the web therefore consist of finding the relevant places and in exploiting the available information and services.

Search engines (universal, OPACs or the search forms of cultural heritage web catalogues) are essential for surfing on the web but they rapidly become insufficient: sometimes we end up with too many results, most of them useless; sometimes we have no

results; results depend on the vocabulary used (search by word or sequence of words). To give an example, if we search for information on "marsupial", the textual search engine identifies all the pages where the word "marsupial" (as it is written) is present, even if we would prefer a search engine that identifies a photo of the *wolf of Tasmania* (which is a marsupial) in a page where the word "marsupial" does not appear.

The ambiguity and subtleties of language (see also 2.7) must also be considered. For example, "net" means quite different things for a web designer or for a fisherman; a violinist is part of an orchestra and her/his fingers are part of her/him, but are these fingers part of the orchestra? If I say the "teaspoon is in the cup", do I mean that it is resting in the concave part of the cup, or that it is included in the actual material of the cup?

For a human-interpreter statements are always disambiguated from the context, because we reason by deduction, but for a computer?

The problem is that the World Wide Web was originally constructed for being used just by humans and, even if everything in it can be read by machine (*the automatic user* see 2.4.1.6), this data cannot be *understood* by the latter. Because of the (increasing) quantity of information on the web it is not possible to manage it manually.

A possible solution could be creating *metadata to describe the data* contained on the web. We must remember that on the web the distinction between **data and metadata** is not absolute; sometimes the resource itself can be interpreted simultaneously in two ways and the metadata can describe other metadata. Almost always *data* and *metadata* are based on a specific syntax (logical structure) in order to avoid ambiguity.

A better solution could be to teach machines to disambiguate all the statements present on the web, for example conceiving and sharing "documents" that collects and express all the concepts that build our knowledge, the **ontologies**.

Ontology is a term taken on loan from philosophy referring to the science of description of the *type of entities* of the World and of how they are *related one another*. The ontologies seem to be the most efficient way to represent knowledge, unambiguous descriptions of the concepts in a certain domain plus a hierarchical description of the relations between concepts themselves plus the rules necessary to obtain additional knowledge. Often ontologies are limited to specific domains of human knowledge, so that an entity assumes one meaning rather than another.
The overall solution to encode, exchange and re-use structured metadata, expressing data and representing data rules, exporting all that knowledge and making it sharable and available for any application is called "semantic web".

4.5.1 The semantic web

Tim Berners-Lee, James Hendler and Ora Lassila defined the semantic web "A new form of web content that is meaningful to computers" (The semantic web, *Scientific American*, May 2001).
But what does it mean more precisely? It aims to permit the discovery of information and services, taking as granted that each resource is identified by a **Uniform Resource Identifier** (URI), using concepts rather than keywords and allowing the automation of services.

To describe the data contained on the web in a machine-readable way (in this sense researchers use the word “semantic”), models must be defined for representing **knowledge**. The semantic web includes a set of design principles, collaborative working groups, and a variety of enabling technologies, for the most part defined by the W3C Semantic Web Activity.

The main difficulties in implementing the Semantic Web are in the definition and the universal dissemination of standard formats for assuring the interoperability of applications and the implementation of deductive reasoning in a completely automatic manner, exporting on the web rules from any knowledge base.

But where are we now? Some elements of the semantic web are still to be implemented or realized. The semantic web hypothesized by Tim Berners-Lee probably cannot exist still for some time. However, websites, intranets, and extranets that provide information services are already numerous. Technologies based on descriptive logic are currently ready to represent knowledge in textual form and to provide a level of automatic reasoning services. It is therefore already possible to take the first steps towards a semantic web creating simple applications based on the descriptive logics that provide services for our websites.

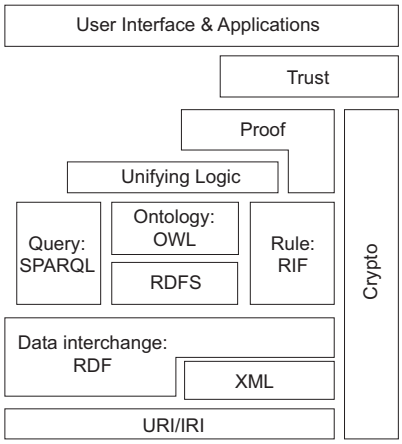
The semantic web, a declarative environment, uses standards and tools based on **XML Namespace** and **XML Schema**[2]. This set of W3C standards provides an elemental syntax for content structure within documents, but does not directly associate semantics to the meanings of the content.

The W3C technology to encode, exchange and reuse structured web metadata is the **Resource Description Framework** (RDF). To express restrictions on the associations, to avoid the encoding of syntactical correct *statements* without any sense a mechanism to represent *classes of objects* is necessary, and was created the *RDF Vocabulary Description Language*, or *RDF Schema* (RDFS).

After having expressed data and data rules we need a language to export that knowledge (ontologies) and to make it available to any application: the W3C *Web Ontology Language* (OWL).

All these components are usually organized in the so called “Semantic web stack”: above XML (useful to give a structure to resources) and RDF (to express meanings, or better to define that some elements have some properties), we find the *ontological level*, the area where to define formally the relations between terms. The upper level is the *logic* level, where the assertions present on the web may be used to derive new knowledge, not using an unique, universal *reasoning system* but with a unifying logic to represent all trusted demonstrations.

[2] See especially the informations on W3C Semantic Web Activity, http://www.w3.org/2001/sw/.



Semantic web stack

W3C Semantic Web Activity
http://www.w3.org/2001/sw/

4.5.2 Resource Description Framework Data Model

Resource Description Framework (RDF) is a universal, basic framework for codifying, exchanging and reusing structured metadata. It supports interoperability between web applications that exchange *machine-understandable* information.

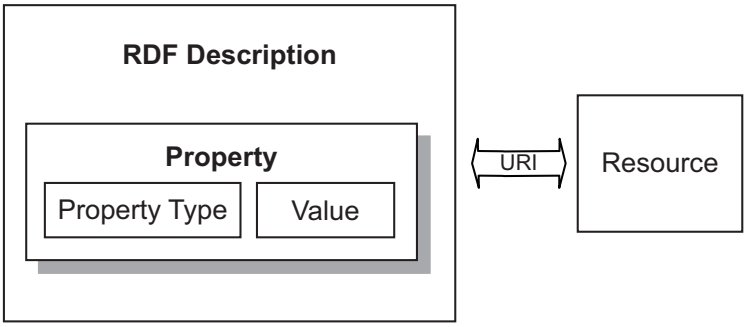
The RDF data model, that represents RDF statements in a syntactically neutral manner, is very simple and is based on three types of object: *resources, properties and statements*. The first two are univocally individuated by a URI:

Resources: Anything described by an RDF expression. A web page or part of one, or an XML element within the source document. But also an entire collection of web pages, or an object that is not directly accessible via the web.

Properties: A property is a specific aspect, a characteristic, an attribute, or a relation used for describing a resource. Every property has a specific meaning. It defines admissible values, the types of resource that it can describe, and its relations with other properties. The properties associated with a resource are identified by a name and have values.

Statements: A resource, with a property identified by a name, and a value of the property for a specific resource, forms an RDF *statement*. A statement is therefore a triple composed of a subject (resource), a predicate (property) and an object (value). The object of a statement (the property value) can be an expression (sequence of characters or some other primitive type defined by XML) or another resource.

A series of properties referred to the same resource is called *description*.



The RDF data model

For example, the statement that says that some information on the English writer William Shakespeare in Wikipedia can be found in a web resource titled 'William Shakespeare' can be expressed in RDF like this:

```
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://purl.org/dc/elements/1.1">
<rdf:Description rdf:about="http://en.wikipedia.org/wiki/William_Shakespeare">
<dc:publisher>Wikipedia</dc:publisher>
<dc:title>William_Shakespeare</dc:title>
</rdf:Description>
</rdf:RDF>
```

An interesting initiative was the encoding of basic DCMES (see 4.3) in XML using simple RDF, providing a DTD and W3C XML Schemas.

The primary goal for this work was to "provide a simple encoding, where there are no extra elements, qualifiers, optional or varying parts allowed, with some restrictions.

One result of the restrictions is that the encoding does not create documents that can be embedded in HTML pages. Encodings for qualified DC however were created, like for example *Expressing Qualified Dublin Core in RDF / XML*.

Resource Description Framework (RDF): Concepts and Abstract Syntax, W3C Recommendation, 2004
http://www.w3.org/TR/2004/REC-rdf-concepts-20040210/

Expressing Simple Dublin Core in RDF/XML
http://dublincore.org/documents/dcmes-xml/

Qualified DC in RDF/XML
http://dublincore.org/documents/dcq-rdf-xml/

4.5.3 RDF Vocabulary Description Language, or RDF Schema (RDFS)

RDF Schema is a vocabulary for describing properties and classes of RDF-based resources, with semantics for generalized hierarchies of such properties and classes. It provides basic elements for the description of ontologies (RDF vocabularies), intended to structure RDF resources.

RDF properties may be thought of as attributes of resources and in this sense correspond to traditional attribute-value pairs. RDF properties also represent relationships between resources.

RDF, however, provides no mechanisms for describing these properties, nor does it provide any mechanisms for describing the relationships between these properties and other resources. That is the role of the RDF Vocabulary Description Language, or RDF Schema. RDF Schema defines classes and properties that may be used to describe classes, properties and other resources.

The RDF vocabulary description language class and property system is similar to the type systems of object-oriented programming languages such as Java.

RDF Vocabulary Description Language 1.0: RDF Schema
http://www.w3.org/TR/rdf-schema/
(see in particular the *Introduction* to the document)

4.5.4 Representing thesauri in RDF: SKOS

The Simple Knowledge Organisation Systems or SKOS is a W3C area of work developing specifications and standards to support the use of knowledge organisation systems (KOS) such as thesauri, classification schemes, subject heading systems and taxonomies within the framework of the Semantic Web. SKOS is built upon RDF and RDFS, and its main objective is to enable easy publication of controlled structured vocabularies for the semantic web.

SKOS, frequently adopted in the cultural heritage field, is currently a work in progress, and the main published documents – the *SKOS Core Guide*, the *SKOS Core Vocabulary Specification*, and the *Quick Guide to Publishing a Thesaurus on the semantic web* – have W3C Working Draft status. The new Semantic Web Deployment Working Group chartered for two years (May 2006 - April 2008), has put in its charter to push SKOS forward on the W3C Recommendation track.

SKOS Simple Knowledge Organization System Primer
http://www.w3.org/TR/skos-primer

4.5.5 The Web Ontology Language (OWL)

The first level above RDF required for the Semantic Web is an ontology language what can formally describe the meaning of terminology used in web documents. If machines are expected to perform useful reasoning tasks on these documents, the language must go beyond the basic semantics of RDF *Schema*.

An ontology language is intended to be used when the information contained in documents needs to be processed by applications, as opposed to situations where the content only needs to be presented to humans. This language can be used to explicitly represent the meaning of terms in vocabularies and the relationships between those terms.

W3C Ontology Web Language has more facilities for expressing meaning and semantics than XML, RDF, and RDF S, and thus OWL goes beyond these languages in its ability to represent machine interpretable content on the web.

The W3C-endorsed OWL specification includes the definition of three increasingly expressive sublanguages designed for use by specific communities of implementers and users: OWL Lite, OWL DL and OWL Full. Each of these sublanguages is an extension of its simpler predecessor, both in what can be legally expressed and in what can be validly concluded.

OWL Lite supports those users primarily needing a classification hierarchy and simple constraints.

OWL DL supports those users who want the maximum expressiveness while retaining computational completeness (all conclusions are guaranteed to be computable) and decidability (all computations will finish in finite time).

OWL Full is meant for users who want maximum expressiveness and the syntactic freedom of RDF with no computational guarantees.

The semantic web and the systems based on descriptive logics, according to some voices, don't seem to be our immediate future, due to the resistance of many communities to full interoperability, but numerous software tools are already available on the market (free, often):

- for the use of RDF or OWL ontologies by software applications (e.g. *Jena*)
- for the definition and update of RDF or OWL ontologies (e.g. *Protégé*)
- for the automatic execution of deductive reasonings in OWL DL (e.g. *Racer*).

OWL Web Ontology Language Overview
http://www.w3.org/TR/owl-features/
Jena
http://www.jena.sourceforge.net
Protegé
http://protege.stanford.edu
Racer
http://www.racer-systems.com

4.5.6 Semantics for cultural heritage: CIDOC Conceptual Reference Model

How descriptive logics can be applied in the field of cultural heritage? Cultural heritage is a complex knowledge domain, with a great deal of ambiguous and transversal terminology. The CH sector is very rich in variety of possible associations, either between documents themselves and with documents pertaining to other disciplines.

The major initiative in this area is the CIDOC Conceptual Reference Model (CIDOC CRM), promoted by the International Committee for Documentation of ICOM (International Council of Museums) and now stable after a decade of work[3]. Since 2006 this has been the international standard (ISO 21127:2006) for the controlled exchange of cultural heritage information.

[3] CIDOC version 4.2 was also encoded in RDFS by the ICS-FORTH (ISL-ICS) on 2005-2006

The CIDOC CRM is intended to promote a shared understanding of cultural heritage information by providing a common and extensible semantic framework to which any cultural heritage information can be mapped. It is intended to be a common language for domain experts and implementers to formulate requirements for information systems and to serve as a guide for good conceptual modelling practice.

CIDOC CRM is a *core ontology* which incorporates basic entities and relationships common across the diverse metadata vocabularies and might be useful for integrating information from heterogeneous vocabularies and uniform processing across heterogeneous information sources.

There is an important, even if subtle, difference between a core ontology and core metadata, such as *Dublin Core*. Even if both are intended for information integration, they differ in the relative importance of human understandability. Metadata are in general created, edited, and viewed by humans. In contrast, a core ontology is a underlying formal model for tools that integrate source data and perform a variety of extended functions.

In this approach metadata can be used not only to describe and to link to resources, but also to indicate where and why you can go from the resource itself[4].
Cultural institutions are encouraged to use the CIDOC CRM to enhance accessibility to museum-related information and knowledge.

One of most interesting examples of semantic application in cultural heritage sector is the “Finnish Museums on the Semantic Web” (FMS) whose major goals are to make collection metadata, which stem from heterogeneous databases, semantically interoperable on the Web, and to provide facilities for semantic browsing and searching in the combined knowledge base of the participating museums[5].

The CIDOC Conceptual Reference Model
http://cidoc.ics.forth.gr/

[4] Oreste Signore, *Ontology Driven Access to Museum Information*, CIDOC 2005 Congress – Zagreb, http://www.cidoc2005.com/.

[5] A short presentation of the project is provided in Eero Hyvönen et al., *Cultural Semantic Interoperability on the Web: Case Finnish Museums Online*, http://iswc2002.semanticweb.org/posters/hyvonen_a4.pdf.

ANNEX 1 Users and usage on the Michael-fr website

First Survey (June-July 2006)

MICHAEL - Multilingual Inventory of Cultural Heritage in Europe
One European and many national portals

MICHAEL Culture service aims to open up worldwide access to digital collections from European museums, libraries, archives and other cultural and scientific institutions. Through MICHAEL multilingual service,people are able to find and explore the European digital cultural heritage using the Internet.

http://www.michael-culture.org (European portal)
http://www.michael-culture.eu (project website)

The object of the survey was to identify the users and usage patterns of the *Digital Heritage (Patrimoine numérique)* site and to obtain an initial impression of the perceived quality of the service. The survey was carried out through an online questionnaire (87 answers) and 9 semi-directive interviews[1]. The following elements summarise the results of the survey, which includes an analysis of the service in terms of the quality criteria of the Minerva guide. This study has limitations: it coincides with the launch of the new service and was carried out over a relatively limited time-span (5 weeks), the interviewed persons used the catalogue for the first time and the sample of interviewed persons could have been broader. None the less, the data gathered allows us to identify a number of significant points and avenues for development.

User profiles

More than half of the web users that responded to the questionnaire are not heritage conservation professionals (55 out of 87 or 63%). This allows us to believe that the user base catalogue is not restricted to cultural heritage professionals. This audience was made aware of *Digital heritage* through a notice on the home page of the Culture.fr portal (as of late July the ad was shown 16 700 times) or through information relayed by genealogy sites. We note that the majority of institutions that answered are closely concerned with digitisation: 27 institutions out of 32 are involved in a digitisation initiative.

Do you have an activity in the field?

Archives	**16,60%**
Libraries	**15,40%**
University research	10,71%
Teaching	8,30%
Museum	5,90%
Tourism	3,50%
Culture administration	2,30%
Publishing/Audiovisual	0%
Others	**36,90%**
Number of persons that answered the question	84
Did not answer	3

[1] Panel composed of: a high school teacher, a communication agent of a tourism office, a research director, three librarians (one from a municipal library with a regional mandate, a head of the digital library in a large public library, a head of unit at the ministry of culture), a researcher at the department of books and publishing at ministry of Culture, a professional genealogist, an artist (representing the “general public”).

What search did you do?[2]

Genealogy	**31,50%**
Curiosity / discovery	**30,20%**
State of digitisation in other institutions and regions	17,10%
University	11,80%
School	1,30%
Production of editorial products (DVD, CDROM…)	1,30%
Tourism	0%
Other	6,50%
Number of persons that answered the question	76
Did not answer	0

The institutional users

Reflecting the type of institutions represented in the catalogue, archives and libraries arrive in first place with over 30% of the answers, followed far behind by museums (6%). Curiosity and discovery not only motivates the non-institutional public but also figures in a good number of searches made by institutions. At the heart of the interest is the state of digitisation in other institutions and regions.

We note the small number of answers coming from institutions included in the catalogue (10 in over 100), but also the good match between *Digital heritage* and the institutions: most of them are ready to participate by making suggestions for the improvement of the professional space and to facilitate updates.

Two other audience segments stand out: genealogists and persons involved in teaching and university research.

Genealogists

A number of replies give genealogy as the activity (a professional and amateurs), as well as historical searches. Indeed genealogy searches are the most frequent (31.5% of answers), followed by curiosity/discovery (30.2%).

A number of comments come from genealogists. They know exactly what they are looking for and have precise expectations.

This public has high expectations in terms of the conditions and mode of accessing documents. Key issues include free access and delays in consultation. The question of on-line access to documents is often asked.

These results corroborate the conclusions of surveys of the users of archives: genealogy is one of the principle goals of searches in city and county (French *département*) archives (56%)[3] as well as in the National archives (a third of readers)[4]. These searches are general carried out on an amateur basis. These amateur genealogists, curious of their family origins, have contributed to the growing public use of archives over the last thirty years. A proportion of users carry out simultaneous searches in history and genealogy, some being only interested in local history, to

[2] Only 2 questionnaires contained this question: the n°1 general public questionnaire and the n°2 institution questionnaire.

[3] *Développement culturel*, n. 137, October 2001.

[4] *Développement culturel*, n. 151, January 2006.

which genealogy searches naturally lead, while others carry out more general historical searches: these practices concern one in five readers in the city and county archives. The most frequently consulted documents are the parish registers and those on civil status, especially at the county archives (60%).

Researchers and teachers
University research and teaching represent a significant proportion of the replies (19%). University research is mentioned by 12% of users.

A diversified public
The diverse origins of a segment of the users may be noted, namely including managers and technicians (transport, sales support technicians, construction, consulting, computers, advertising…), and people with free time (retirees, students…). An interest in heritage seems to motivate this public.

Diverse access modes

Though the survey period coincided with the launch of the new catalogue, one notes in the diversity of the access modes to the site. A number of announcements were made through email to correspondents, and to mailing lists; this explains the relatively high percentage of this mode of information (18.7%).
The Culture.fr portal brought in 12.5% of web users: an announcement was posted on the main page of the portal for two weeks, this announcement was shown 16 700 times. Search engines come in 3rd place, with 11.2%: because the records of the data-base are indexed one by one on Google, *Digital heritage* can appear as answer to a wide range of different searches.

Representation and usage

What is the catalogue for, according to you?

Exploring the wealth of heritage in France	**69,1%**
Locating the sites that offer access to digital works	62,9%
Publicising your digital collections	40,7%
Discovering the state of digitisation policy advances in France	38,2%
Conducting your digitisation policy	9,8%
Others (please specify)	1,2%
Number of persons that answered the question	81
Did not answer	6

Two roles stand out: exploration and access to digitised collections and documents.
In the replies, it is the exploration of the wealth of heritage that appears as the principal reason for use of the *Digital heritage* site (two thirds of answers, 69%). This answer can be compared with the motivation of curiosity/discovery that represents 30% of searches. Curiosity/discovery not only motivates the non-institutional public, but also a good portion of searches carried out by the institutions.

The location of sites that offer access to digitised collections is an option chosen by in a significant part of the answers (63%). The ambiguity of the word “site” may be noted,

in that it can mean an actual place, or a collection or a website. Certain interviewed people noticed this orientation of meta-catalogue.

Professional usage

The catalogue is seen as a tool for the promotion of collections (40.7%), particularly by a majority of the institutional public (close to 70%). On the other hand only 4 institutions in 32 see the catalogue as a tool for their digitisation policy; none of the institutions registered in the catalogue answered positively to this point. 38.2% of answers indicate a search on the state of advancement of digitisation policies in France.

The services proposed in the professional space, specifically dedicated to the actors in digitisation, only obtained a satisfaction rate of less than two institutions in three. These services must certainly be made more explicit, sometimes more visible (e.g. RSS).

It can be seen as paradox to note the many institutions that are most interested in establishing a personalised link to the catalogue from their site (65%) rather than a pdf publication of their own file (53%)! The RSS thread is judged useful by 61% of them.

A number of comments concern the services for professionals. They point to content development and the material to be presented by the site.

Frustration in terms of "classic" catalogues?

The title *Digital heritage: catalogue of digitised collections* often gives the impression that the site allows discovery and access to the documents and works. The gap between this expectation and the actual site content, the difference in granularity between a catalogue of documents and objects and *Digital heritage* may explain the lack of satisfaction expressed for certain search results (37.5 of unfruitful searches). The common expectation of digital versions of documents, reinforced by the presence of illustrations on the site, also led to some confusion.

A tool for professionals or for a wide audience?

The catalogue overhaul, in the context of the European Michael portal, had the goal of opening the catalogue to a new public, in the framework of broader public access to digitised documents and to information on digitisation. Is it possible to combine a data-base of interest to a wide audience and a professional tool? How to articulate such different uses? This first survey shows that *Digital heritage* effectively reaches a public of amateurs and curious users. Yet the multiple targets of the catalogue were soon noticed and its final goals, according to some, need to be more explicit.

What perspectives?

Digital heritage reflects the evolving digitisation landscape. Its goal is to tend toward an exhaustive approach. Included in by the French national digitisation plan, it covers data pertaining to "heritage", a notion which can easily have shifting definitions. The partnership with the *national Education* ministry, the European digital library can bring about changes in the initial concept.

On questions concerning the scope of the site, answers tend toward a broadening of scope, be it for new document types or the extension to the collections of other European countries, desired by 78% of web users.

What other types of digitised collections would you like the catalogue to describe?

Thesis	**65,60%**
Recent newspapers and magazines	55,20%
Classes	37,30%
Administrative forms in digital format	26,80%
Others	16,40%
Number of persons that answered the question	67
Did not answer	20

Do you intend to consult this site again?

Yes	95,1%
no	3,6%
Number of persons that answered the question	83
Did not answer	5

Despite the fact that searches do not always yield a result, the near unanimity of positive answers to the question “Do you intend to consult this site again?” shows that the catalogue meets the needs of a variety of audiences.

Usability

What do you think of the following aspects of the site?

	Satisfactory	Unsatisfactory
Contents of the home page	**87,30%**	**6,30%**
Graphic design of the home page	77,20%	10,10%
Download speed of the pages	70,80%	13,90%
Site navigation	**68,30%**	**26,50%**
Graphic design of the records	63,20%	16,40%
Entry fields of the quick search	60,70%	12,60%
Professional space	60,70%	15,10%
Entry fields for the advanced search	54,40%	20,20%
Search result order	50,60%	18,90%
Number of persons that answered the question	79	79
Did not answer	5	5

First impressions

The majority of users reacted rather positively to the home page (in the same graphic style as the Culture.fr portal): the aspects met most approval are the content and graphic design of the home page.

However, the presentation does not does not satisfy all users. Despite the mission statement on the home page, the objective of the site is not always clearly perceived, especially in the initial phase of site discovery.

It should be noted that the graphic design is appreciated by a higher percentage of the non-institutional public. Users accustomed to accessing catalogues and data banks, namely library professionals, expect more sober interfaces presenting only search forms.

The space dedicated to images on the home page is significant and most of the collection records contain illustrations. These images are meaningful, contribute to the site's attractiveness and play a role in encouraging users to browse and discover.

The numerous navigation choices that the designers included in the home page are underlined by the multiple choices made by the users who were interviewed. They explored the map, searched by institution, used the search engine, explored the editorial section and the professional space, etc. The observation of the navigation shows that, according to their interests or their habits, the users rather quickly undertake a search, some through the quick search, others through the menu, the map of France or the editorial facilities.

The site navigation is only satisfactory to 26.5%, a number of users having experienced difficulties. The articulation of the lists and site records, cd's and dvd's, are not well understood.

Search modes

There is no significant difference between the search modes that satisfy around two thirds of the users (between 65% and 70%). These figures can be contrasted to the proportion of users that stated having found what they were looking for: 64.2% vs 35.7%.

How do you find the following search modes?

	Satisfactory	Unsatisfactory
By institution	66,20%	22,90%
By collection	71,60%	18,90%
Search engine	64,80%	16,20%
Map	75,60%	14,80%
Advanced search	67,50%	13,50%
Number of persons that answered the question	74	74
Did not answer	14	14

Did you find what you were looking for?

No	**64,2%**
Yes	35,7%
Number of persons that answered the question	84
Did not answer	3

The search engine is the search mode that the users most spontaneously and directly use.
An important segment of those interviewed first use the map. Search by map is considered satisfactory for 75.6%. This search mode attracts strong interest.
There is criticism concerning the advanced search. It must be noted that it is the "or" value that is the default mode, hence the common confusion concerning non-pertinent search results compared to a result with the "and" value.

Next steps

Before undertaking a new survey phase there will be a number of minor modifications made to certain pages as well as a communication campaign aimed at the various user groups.
The quantitative data gathered in the survey will also be useful to supplement the qualitative data of the survey. It must be noted that in January 2007 *Digital heritage* counted 19 000 single visitors and 32 463 visits.

In light of the reflections and the evaluations on the European portal, a new survey phase will be planned.

Questionnaire

1. Do you have an activity in this field?
   - ☐ Archives
   - ☐ Libraries
   - ☐ Publishing/Audiovisual
   - ☐ Museum
   - ☐ Culture administration
   - ☐ Teaching
   - ☐ University research
   - ☐ Tourism
   - ☐ Other (to be specified)

2. What search did you do?
   - ☐ Curiosity / discovery
   - ☐ School
   - ☐ University
   - ☐ Tourism
   - ☐ Genealogy
   - ☐ Production of editorial products (DVD, CD…)
   - ☐ State of digitisation in other regions
   - ☐ Digitisation financing
   - ☐ Others (to be specified)

3. Did you find what were you looking for? ☐ Yes ☐ No

4. How did you find this site?
   - ☐ By entering the site URL
   - ☐ Promotional e-mail
   - ☐ Through the Culture.fr site
   - ☐ From a search engine
   - ☐ From the site of an institution
   - ☐ From a portal or index
   - ☐ Other (to be specified)

5. What is the catalogue for, according to you?
   - ☐ Exploring the wealth of French heritage
   - ☐ Locating the sites that offer access to digitised works
   - ☐ Discovering the state of digitisation policies in France

- ☐ To publicise your digital collections
- ☐ Steering a digitisation policy
- ☐ Other (please specify)

6. How do you judge the site?

☐ Home page content	satisfactory result:	☐ Yes	☐ No
☐ Home page graphic design	satisfactory result:	☐ Yes	☐ No
☐ Site navigation	satisfactory result:	☐ Yes	☐ No
☐ Fields proposed for advanced search	satisfactory result:	☐ Yes	☐ No
☐ Professional space	satisfactory result:	☐ Yes	☐ No
☐ Quick search fields	satisfactory result:	☐ Yes	☐ No
☐ Search result order	satisfactory result:	☐ Yes	☐ No
☐ Graphic design of the records	satisfactory result:	☐ Yes	☐ No
☐ Download speed of the pages	satisfactory result:	☐ Yes	☐ No

7. How do you judge the following search modes?

☐ By “collections”	satisfactory result:	☐ Yes	☐ No
☐ By “institutions”	satisfactory result:	☐ Yes	☐ No
☐ Advanced search	satisfactory result:	☐ Yes	☐ No
☐ Search engine	satisfactory result:	☐ Yes	☐ No
☐ Map	satisfactory result:	☐ Yes	☐ No

8. What other kinds of digitised collections would you like the site to describe?
   - ☐ Thesis
   - ☐ Classes
   - ☐ Newspapers and magazines
   - ☐ Electronic administrative forms
   - ☐ Others (please specify)

9. The *Digital heritage: catalogue of digitised collections* will be integrated in the European Michael portal. Will you likely search for information on digitised collections in Europe? ☐ Yes ☐ No

10. Will you consult this site again? ☐ Yes ☐ No

11. Your comments and remarks:_____

We thank you for answering this survey. If you would be prepared to take part in a short interview on this subject please leave your contact details:

Your phone number: _____ Or your e-mail: _____

The four following questions are for professionals that work in a cultural heritage conservation institution.

12. Do you regularly use the following data bases?:
    - ☐ SUDOC
    - ☐ Joconde
    - ☐ Mérimée
    - ☐ Gallica

☐ Other(s) (to specify)

13. Are the following services useful for you?
    - ☐ RSS thread to be notified of the latest record entries
    - ☐ PDF publication of your institutions records
    - ☐ Personalised link to a catalogue from your site
    - ☐ Publication of digitisation tables

    What other service(s) do you see as useful? _____

14. Is your institution involved in a digitisation operation? ☐ Yes ☐ No

15. Are you willing to contribute to the *Digital heritage* catalogue (signal digitised collections, propose links…)? ☐ Yes ☐ No

ANNEX 2 Digital library users: results of a survey on needs, expectations and skills *

Abstract
This section presents an evaluation of the results of a survey to identify users' needs, carried out by Fondazione Rinascimento Digitale. The aim of the survey was to stimulate a culture of excellence in the different cultural institutions involved. The primary objective was to establish and test a methodology with which to evaluate digital libraries. A secondary objective was to obtain feedback from the users on their satisfaction level, to find out what their needs and expectations are and to give them an opportunity to make suggestions.

Questionnaires and interviews were used to gather the data. A questionnaire was also distributed to the managers of the cultural institutions involved.

The survey's results indicated that different users have different needs and that they tend to use the services of more than one cultural institution. Overall, there is a positive attitude towards digital libraries, the survey also underlines that users often don't know how to use the libraries and are unaware of all of the services offered. The accessibility of the interface was considered important, but as it becomes more sophisticated to offer more services it will require more staff assistance. The survey also served to experiment with quality indicators and enquiry methodologies that focus on library users.

In conclusion, this paper evaluates the implications of these results for digital libraries in general, and, specifically, the value of a cooperative approach to the identification and evaluation of digital library users.

Introduction and background
The Fondazione Rinascimento Digitale[1] was established to encourage the cooperation of various organisations with experience and know-how in the digital domain, in order to promote the use of new technologies in cultural institutions by establishing a high standard of quality. The Digital Libraries Applications Project, begun by the Foundation, aims to evaluate the services currently offered by digital libraries in Italy, to identify the actual state of the art and any obstacles to improving their services in order to stimulate greater cooperation between different cultural institutions. To realize this aim, a Study Group was established in the summer of 2005. It was composed of a wide group of experts, representing different cultural institutions that offer digital services or make their collections accessible digitally, as well as projects dealing with digital library themes.

The approach chosen by the Study Group was to evaluate the complexity of the digital library from the user's point of view. Surely the user has a primary role in every digital library project; nonetheless it is not always easy to know what users really need and whether the user is satisfied with the digital resources and services available. The

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* Edited by Anna Maria Tammaro, University of Parma, Fondazione Rinascimento Digitale.
[1] The project Digital Libraries Applications is part of the activities of Fondazione Rinascimento Digitale entitled: Management of and Access to digital libraries. A report on the state of digital libraries and other documentary material is available on line: http://www.rinascimento-digitale.it/.

assumption on which the survey is based is that a digital library, to justify the effort invested to establish and manage it, must offer significantly superior user value when compared to a traditional library. This added value must be measured not only quantitatively, for example by the number of uses, but also qualitatively, based on research on the users themselves. The goal is to stimulate a culture of excellence with the user as the main focal point.

To accomplish this goal, the Study Group set the following obiectjves:

- Create and test an evaluation method to identify and measure the expectations, service perceptions and user satisfaction with available digital resources and services
- Launch a user survey comparing a range of case studies in the area of humanities.

Specifically, the Study Group posed these questions:

- What needs are considered to be priorities by which group of users?
- In relationship to these needs which services and resources are essential and which are considered desirable?
- How can digital libraries be useful to their public?

Among the analyses already carried out there were two useful surveys, by the Istituto e Museo di Storia della Scienza, (Museum of the History of Science - IMSS) and the other by the Biblioteca Nazionale di Firenze (National Library of Florence - BNCF) from which the study group took useful methodology suggestions. From literature and documentation on the subject, the Study Group noted that many of the evaluation experiences had been implemented by developing quantitative indicators, but that few of these surveys studied the users' opinions. The Study Group took as their reference points some of the most important studies, including the Project E-measures of SCONUL[2], Project by ARL called E-Metrics[3] and Project COUNTER[4].

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[2] The goal was to produce a set of statistics to estimate the use of digital services in the university libraries of the UK. The project is based on the periodic survey achieved in the all English university libraries. After two years of research the Project suspended the data-gathering, because they had no significant outcomes to understand the real performance of digital libraries. The Society of College, National and University Libraries (SCONUL) implement periodically the Annual Library Statistics, where the criteria developed within the Project during its existence are recorded. Cf Town Stephen, 2004. *E-measures: A comprehensive waste of time,* "VINE", 34 (4): 190-195.

[3] Miller Rush, Schmidt Sherrie, 2001. *E-metrics: Measures for electronic resources*, *Keynote Delivered at the 4th Northumbria International Conference on Performance Measurement in Library and Information Services*, Pittsburgh, 12-16 August, ARL http://www.arl.org/, http://www.arl.org/stats/newmeas/emetrics/miller-schmidt.pdf (30 November 2006).

[4] Working Group on Database Vendor Statistics enquired how to gather data from the data-base vendor statistics. From the Group's outcomes started up COUNTER project Cf Blixrud Julia C., 2002. *Measures for electronic use: The arl e-metrics project*, *IFLA Satellite Conference "Statistics in practice - Measuring & managing"*, Loughborough, UK, 13-25 August, Loughborough University http://www.lboro.ac.uk/, http://www.lboro.ac.uk/departments/dils/lisu/downloads/statsinpractice-pdfs/blixrud.pdf (30 November 2006); Blixrud, Julia C., 2003. *Assessing library performance: New measures, methods, and models*, *IATUL Proceedings "Libraries and Education in the Networked Information Environment"*. Ankara, Turkey. 2-5 June, IATUL http://www.iatul.org, http://www.iatul.org/conference/proceedings/vol13/papers/BLIXRUD_ fulltext.pdf (30 November 2006). COUNTER project established the standard criteria that rules the availability of digital resources managed by the vendor statistics.

The Project eVALUEd[5] proved particularly interesting to the Study Group as it had developed a toolkit to facilitate the assessment of digital libraries. The aim of the Project eVALUEd was to simplify a first reading of qualitative data, without abandoning the gathering of quantitative statistics. The Study Group used a methodological approach that integrated these international experiences with the experimental approaches of the IMSS and BNCF.

Methodology

The Fondazione Rinascimento Digitale survey has been divided into three phases. The first phase was dedicated to gathering information on existing digital libraries, and at the same time gathering the contributions of experts to define a theoretical context and reference model for digital libraries. These results were used in the second phase to develop measurement tools to gather data proposed for three areas:

1. Content, services and their uses
2. User satisfaction with digital resources and services
3. Impact measurement

Finally, in the third phase a User Survey Subgroup carried out the survey and analysed the data.
From the beginning of the survey, the Study Group had to allow for its limited resources and time considering the scope of the survey, and therefore chose to carry out various case studies, in order to compare the final results, instead of a broad quantitative survey. The survey had other limitations as well:

- It was limited to users on site at the institutions and therefore did not consider remote users
- The results would have been more useful if they also included non-library users.

Normally the evaluations of user satisfaction, use measurement and service impact with digital libraries are done separately. Nonetheless, the Study Group believed that the three measuring and evaluation processes should be complementary, and that the comparative results wouldn't be in conflict. Therefore a methodological toolkit was developed, and the methodological results are probably among the most interesting of the user survey.
The context chosen by the Study Group was that of three humanist cultural institutions and the survey was repeated in participating institutions with the same methodology. The case studies included the Mediateca of the Tuscany Region, the Humanities Library of the University of Florence and the Library of the Museum of the History of Science; the results were later compared to those obtained by the National Central Library of Florence.

[5] Began in 2001 and finished in 2004, eVALUEd sought to go over the measure of the performance indicator to tackle the evaluation outcomes related to the supply of electronic information services. Thebridge Stella, 2003. *Evaluating electronic information services: A toolkit for practitioners*, "Library and Information Research", 27 (87): 38-46, E-LIS http://eprints.rclis.org/, The English is ok here, but the "list of axioms" presentation may be criticised.

Collections, digital services and their uses
Traditionally the most common measurements, because they are easily obtainable, are concentrated on numbers and data like the budget employed, the number of titles in a digital collection, etc. Because these types of statistics don't give data about the user and their normal activities in a digital library, the Study Group did not take them into consideration.

The questions were aimed instead at identifying the users' expectations of the services offered such as: available hardware, on line catalogues, access from home, portal/site, users' educational background, promotion, and staff assistance. The resources were of the following types: electronic journals, e-books, databases, CD-ROM-s, learning materials, audiovisuals and multimedia, theses and students' work.

Additionally, the survey attempted to identify cultural institutions other than the surveyed institutions, where the users regularly go virtually. The Study Group wondered if enlarging the size of the collection is necessarily correlated to meeting users' needs, but they did not arrive at a final conclusion; moreover it is difficult to understand if a single research session in a digital library is truly useful to (or if it has had an impact on) the user. Therefore it was decided to evaluate the perception that users have of how resources are employed as well as the digital services available.

User satisfaction
Despite the fact that it is important to develop a tool to measure how digital libraries services contribute to the user's success, this is very difficult to assess. Therefore the Study Group chose to define user success as closely tied to the success of the institution that the digital library belonged to, as expressed in their mission or in other project documents.

This necessitated finding a tool capable of identifying the critical criteria of the specific mission of each individual digital library, one that preferably included a definition of user activities. To identify and measure the impact, the Group limited itself to evaluating the specific digital library services in the case study, which were provided in such a way as to be a support or useful to the research activities of the users.

The impact, therefore, is not a function of the resources or of the services themselves, but more pragmatically, a measure that identifies activities that would be impossible to accomplish without the use of the digital library. Impact measurement defined in this way was researched in the comments section of the survey and in specific questions asked during the interview. Of particular interest to the Study Group were qualitatively negative or neutral comments.

The tools employed in information gathering were a questionnaire and structured interviews. The following data represent the results:

Analysis Factors	Tools	Data collected
Who are digital library users?	Questionnaire Interviews	Demographic data
What are users' expectations of digital resources and services? How satisfied are the users with the resources and services? What is the impact of the resources and services?		The users' priorities for digital resources and services Impact on the users' productivity User satisfaction with digital services and resources
What is the users' perception of the service? What do the users find unsatisfactory?		Level of Internet knowledge Level of knowledge of what a digital library and web site are Frequency with which they are used Problems with user accessing the digital library and related problems
What are the users' suggestions to improve the quality of the services offered?		Open answers Cooperation between cultural institutions User education courses

The methodology employed could be used periodically to correlate the results obtained from user surveys and improvement in services.

The following table synthesizes the model chosen for the evaluation:

Cultural Institutions	User Information	Output	Outcomes (Impact)
Approaches and strategies applied by digital libraries • Experts' contributions to the discussion • Activities and state of the art in the Italian digital libraries • Digital Contents and services currently available	Needs, priorities and perception of services Demographic analysis of the users Socio-economic factors with an impact on the utilisation of the applications of digital libraries	User satisfaction (measured as GAP between expectations and perceptions) Frequency with which digital assets and services are used	Achivement of the Cultural institutions' mission Measure: How do digital libraries support thier regular users' activities? What wouldn't be possible to do without digital libraries?

Results

Here we analyse the data for the comparison between the case studies, while the full survey is available in the online report.

Who are the users of the cultural institutions?
Users were classified by age, gender, nationality, profession and hobbies. In the Humanities Library of the University of Florence the users chosen were undergraduate and graduate students, with an age that ranged between 25 and 40; they have an average knowledge of the Internet and they frequently use the online library system, but they rarely use the Ateneo's Digital Library. The users at the Library of the Institute and Museum of the History of Science are professionals and employees with a post bachelor degree and an age that ranges from 32 to 76; they have a good or excellent knowledge of the Internet and they frequently use the Digital Library. Mediateca users are primarily students and the youngest in age, from 19 to 25; they use the Mediateca weekly, also from home. All of the users replied that they also use the services of other libraries: the users of the Library of the Institute and Museum of the History of Science and the Mediateca users access other national and international institutions with the same specialisation from remote locations; the University students use primarily local services of the Florentine Public Library system.

The result that was discovered from this first part of the survey is the importance of clearly defining the user because upon it depends the choice of service and digital resource priorities. Even within the limits that have already been underlined, we can say that the users of different institutions have different service priorities.

Comparision of the results
Even with a wide range of different uses some results were common to all groups and can be compared.

What are the service expectations?
Through a careful examination of the service expectations, correlated to the user satisfaction with those same services, it was possible to identify which services users consider to be unsatisfactory and therefore know where it is necessary to concentrate our efforts to improve. These are:
- The promotion of resources and services
- On line tutorials
- User education
- Staff assistance.

It should be noted that need for promotion of available services was expressed by all users.

The services that received the highest level of **satisfaction** were:
- Remote access
- On line portal.

University students prefer remote access, but contradictorily they also prefer the help of staff and information literacy courses with an actual teacher, to online tutorials. The IMSS users prefer remote access and the portal, together with on line tutorials, but they see staff assistance as their first priority. Mediateca users, also due to the unique characteristics of the current service that is mainly local, decidedly prefer a local access and are the users that demonstrate the greatest appreciation of staff assistance even though remote access, the portal and the tutorials are also regarded as important.

What are the priorities for digital resources?
By repeating, for the digital resources section, the correlation between the satisfaction with individual resources it was possible to identify the resources that are **not considered priorities.** They are listed in inverted order, starting from the less used:

- E-books;
- Audiovisual materials
- Learning materials
- Theses.

The resources that were listed as **priorities** are:

- The OPAC catalogue
- On-line databases
- Electronic journals.

Regarding resources, the priorities demonstrate the biggest differences between different types of users. For example, University students mainly use the on-line catalogue and the databases; the IMSS users are the ones that prefer the e-book and CD-ROMs more than the others; Mediateca users tend to prefer the audiovisual material.

Impact
The impact was expressed primarily in terms of the advantages of the digital library. These included the speed of access to digital resources, the great number of resources available (even if this is not yet considered to be sufficient), and personalization.

What interventions are possible for improvement?
It can be stated that new users want to be independent to do their research and they want remote access: this is demonstrated by the general expectation of a good orientation through a portal, even in the case that the user regularly goes to a physical library. Databases and on-line catalogues are areas that need particular attention, in order to meet the users' expectations. A service that users view as particularly important is information retrieval. In the suggestions that were made it seems particularly relevant to underline the demand for enhanced OPAC functionality. Users expect to find and locate digital resources quickly and easily.

In answer to the question: *which services would you like to find in a digital library?* most of the users interviewed answered: *a greater number of digital resources available*. Other answers mentioned the possibility of integrating the different databases available, with for example a link from the OPAC to a preview of the cover, copyright page, and contents of the book. The personalization of the service was also viewed as important, as well as the possibility of having functions available, to manage a personal digital collection.

In answer to the question on the need for greater cooperation between cultural institutions, the indication was that the current situation is definitely unsatisfactory and insufficient. The answers also underlined the need to improve the user skills with digital resources and the need for more promotion of their existence.

Conclusions

The results of the survey have made clear that users have different needs, which correlate to the different goals of the digital libraries' institutions. Nonetheless, users regularly use the services of more than one cultural institution and they share some common priorities. Users view the services offered by digital libraries in a positive light, but there is a lack of knowledge on how to use them. Users are often unaware of all the services that are available to them. The accessibility of the interface is considered important, but the more sophisticated it is, the greater the need for assistance from the staff.

In conclusion, it is important to give users the capability to say where the services should be improved, so that their expectations can be better met. Moreover, digital libraries can try to improve their services through a cooperative approach. In fact, with periodic user surveys, the individual institutions could compare their own results with other digital libraries, that are positively evaluated by their users.

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