Digital Libraries:
A focus on image repositories.

Perspectives on an archive creation**.**

Master Thesis

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Faculdade de Letras da Universidade de Coimbra
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"Science is a tradition of thought. It implies the use of objective, precise and replicable methods of research, logic and honesty in bringing together and interpreting observations. If we reflect on the structure of that tradition of thought, it is possible to discern a certain intellectual divergence."[1]

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- ❖ And thanks to every professional that give valorous input into digital libraries and its development.

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[1] Ciolek, T.M. "From Private Ink to Public Bytes: the epistemological effects of Internet publishing on scholarship in the social sciences and humanities." Wasilewski, Jerzy S. and Anna Zadrozynska (Eds.). Horyzonty Antropologii Kultury [Horizons of Anthropology of Culture], Warszawa: DiG, Instytut Etnologii i Antropologii Kulturowej UW 2005, pp. 33-49.

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[2] [In English] Image Archive of Coimbra University (IACU).

Abstract

*"Rules for the scholarly use of objects should apply equally
to both print and online publications[3]."*

The new digital technologies made real the convergence of ideals and tools, but with it brought troubles and questions to solve. The inovation created digital libraries, repositories of information now available in any part of the world, intricate search engines filled with complex metadata all of it bringing cooperation to a new level. Image repositories have particular dificulties from other type of archives and are relegated to a secundary role or even forgotten over text digital archives, this needs to be changed. I go through all the stages, from metadata methods, to the questions of acess, funding, web 2.0 Mashing up for tool improvement and the dificult copyright issues; in the intent of providing enough information and methodology to change even a little bit the present state of digital image repositories.

The practical example used is a image repository created for the University of Coimbra that gains from the expertise of database software and the methodology, with the objective of showing how to put all the methods into practice in a good way, and explain cliffs and errors that can be avoided.

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[3] "Best Practices for Access to Images: Recommendations for Scholarly Use and Publishing." Max Planck Institute for the History of Science. 2009. Page 4.

Introduction.

The background of construction.

When confronted with a proposition to enter into a project with the objective to set up an image repository, my mind wandered to the primeval question: what is a digital library? Think about it, aren't digital libraries reflections of the normal libraries and, consequently, do they have the same objectives and roles in the world? They perform the same functions like collection development and management; subject analysis; index creation; provision of access; reference work and preservation. The big change is that new technologies bring improvement into the actual librarian system. The online library will be open 24/7, will enable the users to connect with each others and the librarians, save records of any user searches so that he can be better served by the library, and so many more new tasks that the technology now allows. The new technologic library its an extension of the already existent work flow of any actual library, however some new applications (some of them will be mentioned and explained in this thesis) will definitly bring new methods of work.

So, what are the changes in the image repositories? What does the new technology bring forward? Image databases and digital libraries are essentially similar, but in reality a bit different. Their similarity is simple, they are *"akin"*. With akin I mean they are related because image databases are part of digital libraries, libraries content is made of all different types of data, including images - So what's different? Metadata is different, the visual aspect is different because contains visual and not textual content, but the search engine also works based on metadata, even if with very distint metadata elements. We will see more about the differences ahead on the next chapters.

"A digital library is a library in which collections are stored in digital formats (...) and accessible by computers (...) A digital library is a type of information retrieval system." [4]

An image repository is a tool; sometimes a web site other times only an interface on closed doors. It's used to provide the users with an interface that allows to search by keywords, date, size, and even colour patterns like some field workers state to be important.

Metadata in the image repositories is a tricky thing. Who decides what that image is? Its description, keywords, etc. It is more complex than a book just because image metadata is more subjective, it doesn't consist on a statement, or any described information. Information in an image needs to be perceived and interpreted from the content, much of the times searched. We

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[4] A Digital Library definition by Wikipédia users: http://en.wikipedia.org/wiki/Digital_library

will know more about this ahead on this work. Taking into account this explanation about the difference, from now on when talking about digital library in this thesis, the concept comprises repositories, digital image, text, movies, music and any other media or sources you can imagine in a digital library. Digital libraries are repositories of not only books like we are used to think, they contain video, images, journals, etc. They can be focused on one specific media, have them all or just some, and the primal objectives in each decided format to follow are most the same.

What distinguishes the University of Coimbra from any university is that it has a context very different from a normal institution. What is special? Coimbra as a city has a amount of history significant to Portugal and the world, so it is an important point of interest. One of the biggest reasons for that history is definitly the University. One of the oldest of the world with 720 years, it is filled with history, changes, influencing the academic world. Much like Harvard, Bologna and other universities with a enourmous amount of history, Coimbra has important and unvaluable patrimonial visual assets, carefully stored in the university department of Identity, that creates, manages and preserves its quality and usage. The visual patrimony of the university is amazing at so many levels, being the historic one the most valuable of them. For all this reasons and conditionants, the project reveled itself to be of high importance and because of that of great relevance to the University of Coimbra, as also to the field.

After all this explantions to contextualize the project, the needs of the DIIC.UC were of preservation of the images and a search tool to support them, which also demanded structure and organization into them and into their cataguing. So the objectives became the following: To create a data base with search engine that is user friendly, interactive and public, permanent so that will preserve all the contained images, and that can withstand the input of more images over the time, improving it not only with images but with new applications and better metadata. Create metadata to all images inserted, so that they can be searched and recognized, catalogued in a simple but complete manner. And create and oficialize a method of organization that can be simple to any intervenients, that can be of great help to future projects and present ones. In addiction to the data base and the search engine, a web page to be the face of the data base will be created, an e-mail to the requests and an administrative tool to keep records and understand the quality of the service.

In overview, this project consists on the creation of an archive with images of the University of Coimbra in Portugal and for that purpose this thesis was an defined structure. To give a view into the state of the art, then explain the stages, problems, choices, pitfalls, to-do's and what to avoid. It is an image repository for an academic community so it is an academic repository and, therefore, has a set of rules that is different from a commercial one, or an individual private one. It reflects the statement made by the academic institution which is very concerned and interested in taking on the commitment to protect and manage their digital materials, preserving and creating organization in them in order to give access and distribution

to either target groups or everyone. Being targeted for a demanding public, it also serves teaching and research facilities and, thus, it demands rules, different funding and bureaucracy paths. More about the practical side of the project, see the last chapter of this thesis.

"A university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members.[5]"

For this project we will imput images from the university assets, a lot of them photographs with many decades preserved in digital form, that can be used on the most variable projects, in low resolution JPEG format so that anyone who wants the original image with full resolution must ask the university (DIIC) for it. We are using thumbnail representation for the browsing and search engine. The groups or individuals interested in this study are at first the ones that are a part of the University of Coimbra, more particularly the DIIC – Division of Image, Identity and Communication because they, more than anyone, will improve with the methodology. Addind to this main interested, other organizations that have necessity of a window to their identity – images, photographs, logos, historic assets – and in managing their visual assets internally should take some valuable information from this work. Obviously any person that needs pictures for projects, research or teaching, the users will be interested in this service. Finally any person like me that needs to do a similar project and is looking for guidance or ideas, methodology for the creation of this type of projects, better software analysis, uses of metadata, copyrights and ways to go ahead in the future.

In the beginning of my research plan I did some *"scouting"* on the state of the art, at what has been going on in the field and there are similar databases with similar purposes, and also with similar technology, feel and look like the one we are trying to create, but there are also some different ones. The commercial image databases that I found usually are designed to draw the user's attention while the academic ones are usually more layback at that point, as they have lower budgets (budgets in academic projects are almost always a problem, funds arent always available.) and are more service oriented than client oriented, interested on providing a good and direct service, without snags. So they lack marketing, publicity, and managing, constant work to improve it. This is one of the subjects that can and should be changed. The academic field (Universities, Museums and Archives already do something in this field but even so less of what they could) usually give a lot less importance to their visual assets in the evolution of the field of digital libraries, but because just now they are taking the first steps to achieve the digital

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[5] Lynch, Clifford, "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age", ARL: A Bimonthly Report on Research Library, no. 226 (February 2003), 1-7.

repository of a good document base (books, thesis, etc.) they therefore relegate the creation of visual repositories (good ones) to a third or fourth priority.

None of the encountered on this search had exactly the applications I really want even if they in their basics usually serve the same purpose. Some of the examples used Greenstone, others Dspace and others even different options, but when I did my initial research I based my selection on the feel and functionalities, because all database systems work alike with some modifications or adaptations. Ultimately this is not the best way to go, for a "normal" project. What has to be done is to understand what the client needs and go from there in the search of good software for its necessities. For this thesis the method was different because a thesis couldn't be just this project and a walkthrough on how it was done. That would be too easy and not master thesis material. Something new had to be included, a new perspective. And the one I choose to include was both the problems in digital libraries focusing on the image repositories, and the vision of how everything could be better, how a new perspective could bring a change that would improve the system used today and in the future. A MA thesis, as a piece of research, is supposed to *"increase the knowledge of mankind"* (transformative knowledge):

"The starting point for transformative knowledge is the realisation that there exists an intellectual or observational problem worthy of our attention. Such a problem exists simply because we realise that what we know does not quite explain the way the world is observed to behave. The realisation leads to an intellectual tension, a cognitive discomfort, a "mental itch". If this occurs, the researcher becomes infused with a burning question: how does the world "really" work? What is, really, that thing in our field of inquiry that so annoyingly eludes the mind's grasp, eludes our understanding?"[6]

I'm not trying to solve the secrets of creation, but an MA thesis is not simply using a tool, it's bringing something new, a perspective, a connection, a breakthrough. Therefore, while there are some projects which have been done, they are not what I have as an insight of what is needed in this domain. The first issue I have to clarify is that the project (the database creation) is a way for me to apply knowledge, a technical one. The written thesis is the novelty, the creation of more importance using the project as a learning platform for me and as an example to work on, and more important give some relevance to image repositories.

Clarified the conceptual problem, the changes I believe that can and should be made are, most of them, difficult to include in the practical manner on my project due to institutional

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[6] Ciolek, T.M. "From Private Ink to Public Bytes: the epistemological effects of Internet publishing on scholarship in the social sciences and humanities." Wasilewski, Jerzy S. and Anna Zadrozynska (Eds.). Horyzonty Antropologii Kultury [Horizons of Anthropology of Culture], Warszawa: DiG, Instytut Etnologii i Antropologii Kulturowej UW 2005, pp. 33-49.

boundaries, which I will also discuss on this thesis. Between the new perspective and the technology available there is forcefully a trade-off. A new intellectual goal can be reached by a technology proven by somebody else, and also the quality of an existing solution to an intellectual problem can be improved by a new technical solution. All this is expected to be described in the thesis. I believe that the visual repositories shouldn't be left aside, on a world where most things are visual for the user, and the digital era is most definitely a visual one.

The Digital Moment

1. Digital libraries: General environment.

Digital libraries are seen by some as the new format for the old libraries, for others only a new type of library, coexistent with the old system. The discussion of whether the old physical libraries will collapse and the totally digital shall prevail, or the discussion about the role, uses and concept of what is a digital library are both recurring topics on the field, making it a sometimes polemic issue and quite troubled waters of digital discovery and change. The most important issues addressed in the subject are preservation and diffusion (free if possible).
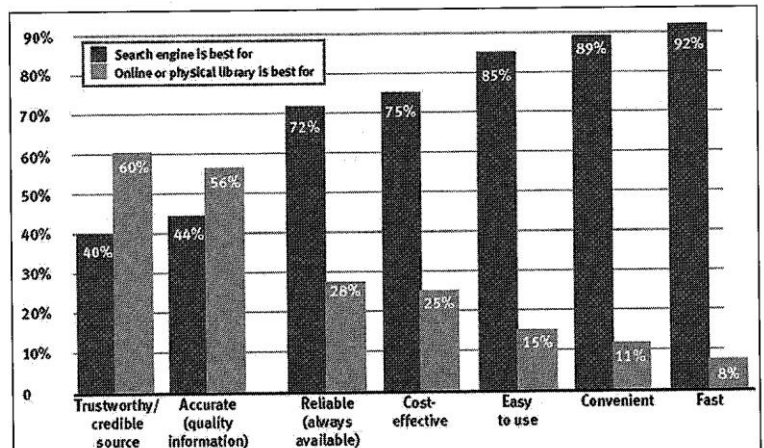
Diane Kresh. The whole digital library handbook. Council on library and information resources. American Library Association, 2007

"Digital libraries should give access to all human knowledge, to everyone, at any time, at any place, in a friendly environment, efficient and effective, breaking through all barriers of distance, language and culture, using the Internet and technology."[7]

One problem with this process is the cost. Digitalization costs money and time, creating the infrastructures to display them is not too hard or really expensive, but the strong unadapted copyright laws are a huge setback to any truthful progression. Anyway, the digital era is here to stay and prevail no matter the difficulties. The system of libraries and publishers slowly changes, knowing that nothing can be done against it unless ridding the wave and gaining something with it. PDF publishing is becoming regular every year. Digitalization is as easy as to print something, while beforehand it was expensive and unusual.

The digital library is not only a repository of data, but also has the previous roles of normal libraries and even new roles. They preserve; give extended access being online; they provide search engine that doesn't demand help of a librarian; they stimulate creation and culture, they backup files and register processes of creation of information. It helps creating

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[7] DELOS Network of excellence on Digital Libraries, Brainstorming Report, San Cassiano, Italy, 2001.

methodology about how to improve all processes of building a digital library and running it afterwards, making itself an active partner in academic communities, directing people to the information even if outside their boundaries (to other services, systems, communities or even specialists on any given area), disseminating information in a selective manner, filtering the credible from not credible information. The academic field is on the cutting edge of this digital libraries change, or it needs to be, as it is the intellectual representation of any society. Therefore, we need to take care of this digital change ourselves or the big companies will do it for us, as Google is an example. And what a very tricky road that is when we let private companies to take care of what are the intellectual assets of the world. Public initiatives like CEDARS (Curl Exemplars in Digital Archives Project), PANDORA (Preserving and Accessing Networked Documentary Resources of Australia), NEDLIB (Networked European Deposit Library) or Europeana, are doing exactly what was talked about, breaking through into the digital repositories and search engines.

This preservation we hear about includes all finance questions of management, staff, politics, technicians and methods for digitalization and diffusion (there is no use to digitalize valuable information to the public just to keep it stored without a real use). In Portugal the concern for issues of preservation and diffusion is not full matured. Much has been done in the past decade, and valuable projects made reality, but the institutions create obstacles that are based on burocratic confusion, some academic tradition, hierarchy, shortage of funds and delay bureaucracy, a lack of initiative to breakthrough in the field together with a lack of interoperability with organizations, within and outside themselves. However the change is catching us, even if we go slowly we go certantly ahead. It's imperative that we join forces and improve our work and cooperate. We talk about cooperation between all the different agents on this digital era, just like academics within the same university or institution, or between different universities, between publishers and the academic field, museums, archives, editors, producers of information, software creators, users and students as well as any staff with skills to help this change to happen in a good way, without collapse of the system or unnecessary battles that only cost time and money to everyone. This cooperation is important to create deals and protocols between all the agents, to reach some effective concense. This is so important because it reduces costs, time, improves diffusion and facilitates access to information to everyone. Creating links is the epithome of digital globalization and the academic field should be the first in line, somehow even leading the process of change and pushing society into it. To get this done the different sides have to decide protocols, set standards for metadata, for type of files, operative systems, so that the reality in the near future won't be one of incompatibility and missing links.

"One thing digital libraries will not be is a single, completely digital system that provides instant access to all information, for all sectors of society, from anywhere in the world. This is simply unrealistic. This concept comes from the early days when people were unaware of the complexities of building digital libraries. Instead, they will most likely be a collection of disparate resources and disparate systems, catering to specific communities and user groups, created for specific purposes."[8]

This reality means that cooperation creates a web of repositories instead of the megalomaniac idea that everything has to be at the same place. For example, isn't more ideal for every university to have its library digitalized content linked with other on some kind of google-like tool for academic purposes? The issues to be aware with in this system are clearly repetition (cooperation also means dialogue, and dialogue means protocols and strategies avoid this) and the multiple existence of operative programs to create and use metadata and files. Standardization of one protocol, one way of working, and one strategy should be the next stage. And a difficult one, be aware.

"There is no reason why can't digital librarians create new search tools, portals that connect all digital libraries, making new approaches to search. The network is that plus the community. The community is the other side of this coin, and it provides an environment to work instead of just a repository, an archive, that is a digital library, or a portal of digital libraries. people don't want only the material, they need to be connected to other people, be able to have an account with recommendations, with savings of data, with notation, with chats and help from the librarians. This will be the future, or maybe not. But I hope it happens."[9]

Concluding, the real challenge on cooperation is that cooperation needs to be structured to work and to encourage more collaborative efforts within the university and between more universities, so that this collaborative process enriches any individual faculty, from the smallest project to the national project, without creating more bureaucratic sluggishness, complexity or fatigue to the already full system. It's real challenging to balance the situation.

Coming back to one of the normal questions of digital libraries, the collapse of the physical libraries which seems to be a broken idea. The paper based collections will not go away that easily because of copyright issues that halt digital libraries expansion (how to effectively control copies?). For which reasons?

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[8] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.
[9] Rangel, Danny. "Digital library of 2025". Universitat du Koln – Final paper for Seminar "Digital Libraries". 2009.

- The public enjoy the physical materials in their lives,
- The danger of loss or corruption of digital information still makes the physical materials the more realiable source.
- All physical libraries provide a service that is valuable for the society which doesn't mean only diffusion of material to the public, also help in research, clean, quiet and cultural environments, etc. It is clear that that service will have to improve and change, to adapt. Technology will be a part of that adptation, not the factor that will shutdown physical libraries.

These are the reasons for the prevalence of physical libraries. However is a reality that this as been advancing to a more computerized society. Kids, seniors, adults, people from isolated places have more and more access to information via computers and the internet, and the technology advances every year to new software and hardware that helps the field to apply some of the dreams that weren't possible on the early days. These are exciting times to live on, that is for sure.

Before we go through more topics about community, digital environments and digital libraries, let's understand one concept first. What is digital content?

"Digital content is any content created, used, shared, accessed and preserved in a digital format." [10]

This concept includes data, photographs, text, graphics, 3D images, spatial models and maps, music, film, and sound, and all applications that help us make sense out of this content, enabling its use. Digital content is of easy edition, quick manipulation, easy duplication and diffusion, has flexibility to change, to correct and upgrade more content to the previous edition. The digital applications help the work run faster, efficient, accurate, in a more motivational flow, with more visual component, interdisciplinarity and at last more feasible as it opens a range of new possibilities. The advancing online digital content environments (communities), ideas and information, travel quicker than ever. Not only the data travels faster but the access is easier, faster and each year it extends its influence to all corners of the world. We have to recognize the internet as a living being, growing and evolving in total movement and that information that spawns inside of it works in the same way, evolving, changing and motivating the creation of even more information. This never ending digital change, provided by the technical evolution, creates a problem to the librarians because it demands professionals in libraries to be always

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[10] An excellent explanation of what is Digital Content -
http://www.digitalstrategy.govt.nz/Resources/New-Zealand-Digital-Content-Strategy

sentinels, to be always in alert and to check the digital publications from time to time to detect changes in it, finally saving the records of all the different publications.

> *"Research is showing that if content is not online, it is invisible to searchers, and the thoughts and knowledge contained are lost for many practical purposes. Internationally governments are responding by funding mass digitisation programmes for their nation's heritage, thus making film, sound, text, photographs, manuscripts, video and other media available on the Web."[11]*

For a further undertanding of digital content that is used and created by different communities, two types of digital content can be found within the internet, with different structures and objectives. They are not currently very easy to define, like anything in the digital world and internet. Being dynamic like they are the boundaries between them are very thin, and as more content goes online they began to cross over into each other like we see already happening in a more smaler extent. Coming back to the types of digital content differences, the most used and known is **informal content** which is information that grows on the web like blogs, emails, wikis, foruns, chats, youtube videos and others, which are made by anyone that can have access to internet and computers (which is most of the civilized world). This information is seen by academics as not totally credible, it can be contradictory sometimes and it generally lack a set of defined and enforced rules, but in the other end is free, accessible, easy to find and normally very interactive. This is a big part of internet and also a big part of why people use internet, because it is free of rules, free of constrainments, quick and any type of information can be found in the internet with just a few clicks of the mouse. They become a part of the giant web of information even if it is a not focused or durable information, as for each site or information that disappears a lot more come in and fill the void. It is a never ending process, some like the universe we live on.

The other content is **formal content** and, as the name states, it is owned and/or created by institutions or the state, like museums, archives, libraries, schools, universities, etc. Like anything from public origin, it is very well structured, ordered and with many rules, with every content being subject of rigorous quality filtering and checking of veracity/credibility both by peer-review boards of specialists. Ronald B. Standler advices about credibility in the internet:

> *"The traditional standard for credibility was either:*
> *1. Publication of a book by a reputable publishing company.*

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[11] "Creating Digital New Zealand: The Draft New Zealand Digital Content Strategy Discussion Document", Wednesday 20 December 2006. Page 11.

2. *Publication in a peer-reviewed, scholarly journal, such as those published by recognized professional societies."*[12]

This is the one we will see more in the practical project of a database, on the second part of this thesis. Inside the this formal content we can find **public content** and **private content**. The first one is obviously a public service and usually not made to achieve profit with its service to the public. The private is usually commercial and profit oriented, made basically by new industries like computer game companies, virtual reality simulations, music companies, animation companies, geospatial applications, and digital publishers.

2. Cooperation and communities.

Professionals and scholars in this field of work and related need to cooperate to help create this new world of digital information already on move, like the google initiative (digitisation of books and its diffusion), the Europeana, Bamboo project and others are showing. Bamboo is a project for the future in academic world and maybe outside it, the creation of a community of information that gives relevance to interdisciplinary information. How so, you ask? Well, Bamboo project enables connections, diffusion, interoperability and peer-review. This is made within a community but just not inserting books, images and videos in some blank scenery. These digital materials are inserted in forums, chats, services, applications with the possibility to post a work and see it peer-reviewed quickly, the possibility of getting to know people of the same area, people of different areas that may help you or vice-versa.

Image 1. Bamboo Iniciative Workshops and Meeting.

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[12] Standler, Ronald B. "Evaluating credibility of information on the Internet." www.rbs0.com/credible.pdf. May 2004.

All of this is possible with the existence of a digital library online that provides community service, possibilitates active users to be interactive, with quickness of input of information and giving suggestions to the users. Examples exist like Tycho[13], used by students to chat with libraries, or the Embry-Riddle Aeronautical University [14]in Florida, where students can use a forum to post messages and librarians can help, similar with the human contact of help found today in any reference librarian. Similar to when the email began to be used in the academic field of work, but is a slow revolution as usual mainly due to the current lack of standardization of the systems, metadata, and good will from people involved and copyrights.

"Libraries will need to enhance and upgrade current technical architectures to accommodate digital materials."[15]

Not only professionals and users need to change their minds and habits, but the infrastructures are as important as well, sustaining the system in its pillars with security. We need high speed local networks and faster connections to the internet, which has been happening since digital became a reality in our lifes; electronic documents management functions that aid in the management of digital resources; better search engines to index and provide access to resources (not enough to digitalize them for preservation objectives, they need to be available); databases in cooperation that support all the variety of digital formats, from images to video, a better and with more variety of servers.

When all this technical evolution happens and everyone hops into the same train of evolution, the digital library will be a collection of resources available and all the digital libraries, repositories, archives, etc. will be connected in the next stage of interoperability, where they are all integrated in one or more interfaces in the web or academic campus and will all be available and connected, containing primary materials in various digital formats (photographs, images, electronic journals, books, articles, pretty much everything) in good and functional indexes and finding tools.

"There are essentially three methods of building digital collections:

1. Digitization, converting paper and other media in collections to digital format.

2. Acquisition of original digital works created by publishers and scholars. Example items would be electronic books, journals, and datasets.

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[13] Baker, Mark A. and Matthew Grove. "Tycho: a wide-area messaging framework with an integrated virtual registry." In Journal of Supercomputing, Volume 42, Number 1, pp. 83-106,
[14] Embry-Riddle - http://www.erau.edu/
[15] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

3. Access to external materials not held in-house by providing pointers to Web sites, other library collections, or publishers' servers."[16]

The third option above is the most effective and possible way to increase the materials available to any user, locally or not. Connectivity between resources makes possible what one or even a group of libraries can't make possible, to gather information without expensive costs and with a good policy. Most important, instead of every library having to buy the same material, this groups or links between libraries reduce the overall cust of digital information. Every local library can now have good assets instead of each being an island of information, poor and isolated, next to bigger islands, much richer in information but also isolated. Acquiring digital resources or doing digitalization of all assets in house is truly expensive and demands staff with capabilities in the area. So, working together is the best way for institutions with common objectives to get more results and reduce costs and time. But the best thing out of this system is the reduction of redundancy, stopping the waste of resources when every institution acquires or digitalize the same resources instead of sharing them with each other. The tricky question in this situation is whether a digital library can be only a repository of linked materials, coming from external resources. This leads to the question of ownership versus access, plus the issues of local control and long term access and preservation of this information links (which leads to how can you control the links created all the time? They can become corrupted, changed, denied access for some reason, etc.).

Today the diffusion of academic or specialized information, being technical or scientific, is mainly based in periodic titles like magazines or compilations. The editors accept articles or ideas for publication but they are target of a long and meticulous revision by specialists on the areas in question, taking an huge amount of time (sometimes one year until publication) to be released and makes the flow of new academic discover, the breakthrough being very slow and demotivating. Today this is changing simply because the model is not good enough taking into account the technology and systems available, models that can move faster chasing the rapid innovation of the present scientific process. The authors publish the articles in the web, while the approval and revision is being done, in the form of reports or raw work materials. So what about the need to protect the community of the "*garbage*" existent in this type of diffusion model without barriers? Public peer-review is faster but who checks the veracity and the credibility of the study or article? The free market also has its setbacks. The web is too wide for everything to be reviewed but in closed groups of scholars, like universities, it can be done because all the professionals in the field are reviewers within the peer-review system. In this way some work has been done with some basic repositories of thesis, and other ones with digital

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[16] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

magazines, so the field is moving on the direction of digital scholarship. Changing the habits of professionals to do more digital information that can be published with celerity in the "*world*", in contrast to printed diffusion, is not an easy task.

The commercial advantages here are also enormous. Preservation of digital scholarship is now being used by databases with articles like JSTOR[17], a paid database that is largely used by researchers and even universities or others related institutions pay these services to be used by their researchers and members. Other commercial companies like TAP Information Services[18], a firm that provides consulting services to libraries and other organizations in the information industry, are also entering the market as providers of supportive services. It's a fact that digital service providers have taken advantage of this new market but it is also a warning that information should not follow the road of closed doors elitism, offering the same services to people working outside large organizations and libraries. How to reach the public? Maybe it would be an excellent idea for the academic world to take their role as "*elite*" and begin a change with articles, books, projects, thesis, images, videos, direct stream video of events and whatever more things we can think of, putting this academic repositories on the web for everyone in the academic world, from basic to expert and even make it available not only for academic users but for everyone interested, positioning the universities, archives or any other institutions related in the front of information making and managing. Paid or not is another question and it doesn't take relevance to the primeval question.

As stated in the well known Bamboo project:

"Humanists (and librarians) have repeatedly drawn the analogy between the library and the laboratory. For the humanist, the library is his or her laboratory, the place in which is found, or hidden, the raw materials for research[19]. Therefore, libraries, both on campus and in the form of national and international consortia, need to be key players in conversations about digital scholarship and research."[20]

We have to see now how these digitized corpora will turn the wheels of research on every field, focusing on humanities because it is probably the field that most had to change with technology, being known for some resistant traditionalism and old ways of research. The tools today are inadequate for the current and future researcher, so it's mandatory that we learn and be able to manipulate these new digital corpora in cooperation with people from a multiple of

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[17] Jstor - http://www.jstor.org/
[18] Tap information - http://www.tapinformation.com/
[19] Unsworth, John, "The Value of Digitization for Libraries and Humanities Scholarship." Innodata Isogen Symposium, The Newberry Library, May 17, 2004, page 6.
[20] "Bamboo planning project: a proposal to the Andrew W. Mellon Foundation", January 28, 2008; page 12.

work domains, using the skills and vision of people from computer and information scientists, librarians, arts and humanities and even campus information technologists.

The collaboration between fields is important. What happens today is that scholars all over the world, not having more than basics on computer knowledge, try to use technology in their work and encounter obstacles, sometimes impossible to overcome, to reach into digital ways of information, making them waste a lot of time focusing on the resolution of technological problems instead of working into their research, or even having to create tools before using them. This transforms a project time of some months into years, so it is a significant problem and an actual problem. The solution is to overcome this and establish connections with all the fields above so that everyone has a good idea of each one's necessities and possibilities. The problem thickens even more when we think about the reality of the isolation between scholars within and outside fields. Let's imagine: you have created a tool, you use it, and maybe some scholar from the same institution uses it too, being your colleague. But no one will use it afterwards and eventually during some time it will become obsolete, not being upgraded in any sort, not being adapted to anything else. I truly believe that this can be changed with the simple, as stated above in this work, creation of digital communities. It's not only about the users and students, it is about the creators of the information, tools, methodologies, it is about a melting pot of production and stimulation of that same production, counter balancing the current isolation.

"What's the right software for doing this to that to get the other, and how do I apply it? This is a traditional problem in software engineering where the noble goal of reusing existing (correct) software, instead of writing everything from scratch (with all new errors), has mostly foundered on the lack of effective support for describing the required functionality and finding the piece of software that provides it (or something like it).(…) For users wishing to find the right applications and web services for their needs, and perhaps to compose them painlessly into new systems, the only current answer is to type something into Google and hope for the best."[21]

Observing what we just described until this page of work, we can say with certainty that a good model to function need a good, reliable and accurate search engine; melted with collaborative research to define ways of efficiency to use the new technology in problems or fields work in general; melted with information management systems to diffuse the information and tools created so that they don't get isolated and forgotten, and improve them with an effective intense generalizing, simplifying trend and making them the most user friendly as

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[21] "Bamboo planning project: a proposal to the Andrew W. Mellon Foundation", January 28, 2008; page 10.

possible. And this is not all. Not only the system has to clean himself to be more available to the users, expand its utility, and be consequently more used, but the professionals and scholars in the arts and humanities (or other fields with the same struggle) have to learn and maybe teach themselves so that they can learn the basics of technology or even more. They must understand how to use it properly and don't go against the technology upgrade that is so needed in our lives as researchers or teachers, scholars and apprentices. Because of the technological areas that receive currently more attention from society, the humanities and social sciences are becoming (and would have to) more relevant. The methodologies and social change are what will stand, what will create rules, policies and structure from definition of the way we are going and also how to reach our objectives in a effective and sustainable form, mending the fails of the actual system and creating the future scholar environments in and out the academic field.

The professionals involved in the Bamboo Project believe that we need interrelated strategies to make the leap into this digital scholarship:

"This may be a multi-part collaboration among computer science, humanities, information science, and campus IT working to recognize what can and cannot be generalized, and how to make this productive for the various partners, simplifying the way in which resources and tools can be reused across projects, disciplines, and institutions (whether such tools are locally developed or incorporate web services available on the Internet today) is fundamental to this endeavour."[22]

3. Web 2.0 and "*Mash ups*".

We have been talking about the theory but what is concretely the tool the academic field (and not solely) craves for? Further more I believe that the use of Web 2.0[23] tools are underrated between academic scholars, thinking that these are not well made or reliable. The Web 2.0 is the interactive social web, made by or for users, and it differs from the rest because it is direct and simple not needing any web design or publishing skills to any user to participate, create, publish and communicate his work to the world. The potential hidden in the web 2.0 applications is pure and free and can be used and refined by professionals in each of its fields. Within each of the fields of work and personal work we can easily find uses for tools created on the web 2.0 boundaries, sometimes with some very much needed refinement so that the tool can be adapted to our needs. Some good examples are blog tools like Wordpress or Blogspot that are already

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[22] "Bamboo planning project: a proposal to the Andrew W. Mellon Foundation", January 28, 2008; page 11.

[23] Web 2.0 - http://en.wikipedia.org/wiki/Web_2.0

used by some institutions as a good window for letting the public or users check and understand what is being done, what initiatives, courses, creations, tools, etc. spawn out from the institution. Quickly we can remember other forms of diffusion like chats, blogs, forums, sharing file systems like YouTube for videos or Flickr for images, user created encyclopedia systems like Wikipedia, social networking like Facebook or MySpace, podcasting and content hosting services. Many of the most popular websites are Web 2.0 sites such as Wikipedia, etc. All of them are community driven and excellent for open or even restricted production. The chaotic side of Web 2.0 can be restrained with the academic realible input into it, letting behind the perspective that Web 2.0 is only for informal information.

"These approaches define architectures and infrastructure that allow a community to productively collaborate to generate metadata, to construct and manage knowledge-bases, or to curate expert resources ranging from software to ontologies."[24]

This type of communities already exist on the internet, some stable and durable, others feeble and with quick downfall. They are open, public and chaotic (a somehow controlled chaos, but a very light control), however not the best for the academic world that needs a community more focused and less disperse. Even so, the ideas can be used to create communities adapted to the academic users and faculty members on every given discipline. These communities would have tools and technological infrastructures created by the already mentioned technical experts, helping users to create new contents, improve work and projects and construct databases of knowledge. All this will make possible to take the work into a new way using the tools so created, ask new questions, answer old questions in a new perspective, speed the rate of work done, create new scholarly products and, with internet, reach new audiences online, distributing data and intensifying the collaboration between researchers and organizations.[25]

A new good perspective for this new community served information system is the commercial potential in it. Linking organizations, libraries, scholars, students, universities with funding agencies (international or national), private companies, publishers, creating employment and careers but also projects, methodologies and new commercial partnerships between the corporate private world and the public academic world, which links the private funding with the public interest. All with planning and care because behind great potential are pitfalls that can mean problems. Problems like: copyright issues; shareholders; information privatization; loss of objectives and information which happens as a consequence from a

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[24] "Bamboo planning project: a proposal to the Andrew W. Mellon Foundation", January 28, 2008; page 11.
[25] Christine L. Borgman writes about this in 2007 on: Borgman, Christine. "Scholarship in the Digital Age: Information, Infrastructure and the Internet." Published by The MIT Press (October 2007).

bankrupt for example; change of owners and objectives of the private partner; all of them putting in risk months or years of hard work.

Mash-ups (web application hibrids) which are Web pages or applications that use and combine data, presentation or functionality from two or more sources to create new services, are an excellent strategy but they are in need of structure and standards to create a framework. We call this foundations. When we build a building, a corporation, a project or even a house of cards you need good foundations so that everything you connect doesn't come down with ease as a consequence of loss of connection, obsolete tools or lack of attractive elements. Every foundation needs to be interconnected, like the skeleton of a house, built to endure blow after blow and stand strong for the future. When talking about standards we have to leave out the idea of singularity. It is not only about standards within one project or institution, it is about the standards of all institutions and projects to generate interoperability between them, so that any content can be easily found and searched through appropriate metadata standards. This goes well beyond housing and archiving that alone are not enough. The Universities can use these tools to communicate with students, staff, research colleagues, as well as the wider academic community and make them interact with each other.

"The opportunity to experience first hand the sounds, moving images, photographs, or texts associated with events and subjects being studied in the curriculum, or through independent study, adds hugely to the learner's knowledge and understanding."[26]

This is done at some extent (it could be clearly better) in a governmental scope, but in non-governmental sectors the denominated service-oriented architectures[27] (with focus on the individual "*consumer*" rather than the organizational citizen) everything is done on the wild west of digital information, and competitive confusing rules is prefered over standards and interoperability. Community generated contents will be very important to our digital future and this is why it is vital to give this contents the necessary accessibility standards and protections so that their frameworks can be structured and less chaotic, combining its flexibility and fast innovation with order and long-term stability, in order to create effective collaborative environments to us all in the near future.

"How can a services architecture help us to move towards a package of core and common services that can be provided to all scholars and/or to disciplinary or functional

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[26] "Creating Digital New Zealand: The Draft New Zealand Digital Content Strategy Discussion Document", 20 December 2006. Page 11.
[27] Examples like Fedora and DSpace on management tools, SEASR in data analysis, Sakai and Moodle on learning management systems, and Open Content Alliance or Google and Six Apart as community collaborative systems.

clusters? And how could these services be woven together with mapping, news feed, bibliographic, blogging, collaboration, and other social tools available from the Web 2.0 world? From the commercial and Web 2.0 domains, applications are being created daily by "mashing up" tools to create new derivative works."[28]

4. Property laws and copyright.

Until now I mentioned a few times the issue of copyright laws and now, after talking about Web 2.0 and mash-ups, it seems to be the appropriate time to address directly this subject. First we have intellectual property[29] that are the rights of the creator of the product, then the copyright that is the totality rights of authors or creators on any original property to copy, distribute or adapt it (can be an individual property, or an plural property). These lasts rights last a very long period of time (+/- 70 years) until it enters the public domain and loses the boundaries that protect it. The emergence of Web 2.0 brought issues about property rights, especially in copyright and its digital counterpart DRM – Digital Rights Management, and infringement has risen at a global scale, consequence of the collaboration provided, public repositories and the information market in internet.

The biggest issue is the absolute obsolescence of the copyright system and its digital counterpart used presently for the digital world that we live in. This digital counterpart is the Digital Rights Management[30] that appeared along the need of a response to digital content and applications, tools and programs. Its management also was created to control access to technologies in order to impose limitations to the usage in digital content and devices, in an attempt to control the use of digital media that is copyrighted by protecting its access, copying or conversion to other formats by any end users.

Internet and Web 2.0 created bases for the freedom that prevails over control, because of its extension and the unreal possibility to track a good percentage of copyright offenders, even with the enforcing copyright laws against the issue of search

Image 2. Google company.

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[28] "Bamboo planning project: a proposal to the Andrew W. Mellon Foundation", January 28, 2008; page 16.

[29] Intellectual property (IP) refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce.

[30] Databases are literary works and therefore receive copyright protection from "Copyright, Designs and Patents Act" of 1988.

engines providing links to copyrighted files, as it happens with Google Books Initiative[31], showing that there is a lot of grey areas and shades within copyright and property laws. YouTube, Viacom, Google and others try to avoid most of the copyright issues, not by refusing to remove copyrighted material but by refusing to be active with their own enforcing rules of copyright, with the argument that they aren't authorities and can't prevent downloading and uploading, not having the power or resources to do it (refered as the *"magic wand"* defence). So they know the laws, but they can't enforce it.

"Abstractly, it is an impossible task. All entertainment media on the Internet (like everything else on the Internet) is just bits: ones and zeros. Bits are inherently copyable, easily and repeatedly. If you have a digital file -- text, music, video, or whatever -- you can make as many copies of that file as you want, do whatever you want with the copies. This is a natural law of the digital world, and makes copying on the Internet different from copying Rolex watches or Louis Vuitton luggage.

What the entertainment industry is trying to do is to use technology to contradict that natural law. They want a practical way to make copying hard enough to save their existing business. But they are doomed to fail.[32] "

One of the anti-copyright voices, Rasmus Fleischer[33], states that the cost of trying to enforce copyright is unbearable and that business models should strongly adapt to the reality of internet that is Web 2.0, where a big percentage of information is now residing, shifting clearly to public domains where users are the creators and publishers, and the darker shade of the internet that is uncontrollable piracy and diffusion without respecting copyright.

"The current paper-based concept of copyright breaks down in the digital environment because the control of copies is lost. Digital objects are less fixed, easily copied, and remotely accessible by multiple users simultaneously.[34] "

The argument of copyright defenders against the shift that is happening with internet diffusion is that it encourages people to create works of intellectual value because they are able

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[31] Of course that the Federation of European Publishers contests this view of "public service", and that is reflect of the on-going litigation in the US and France about the Google Book Search programme.

[32] Schneier, Bruce. "The Futility of Digital Copy Prevention." This article can also be seen in: **http://www.schneier.com/crypto-gram-0105.html#3**

[33] One of the founders of Piratbyrån, the anti-copyright organization that in turn once founded BitTorrent tracker The Pirate Bay.
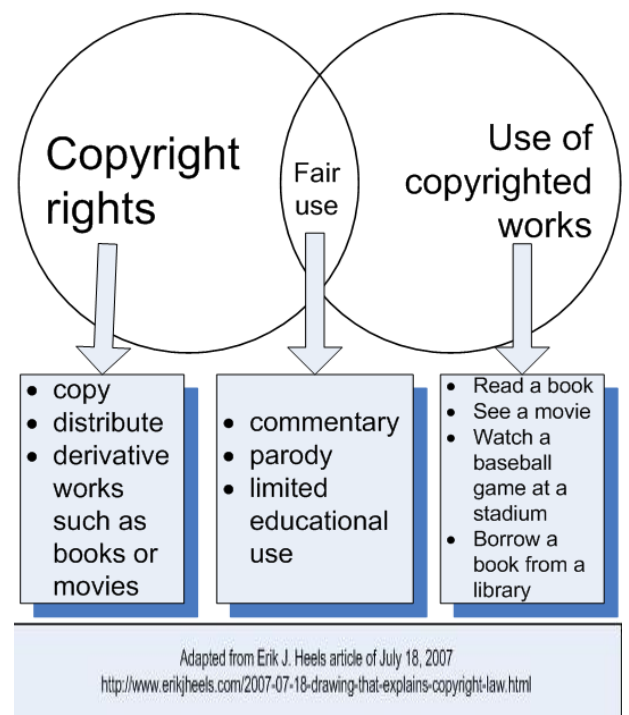
[34] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

to regain their expenses with the exclusive rights over the use of their work. But the new digital shift with internet has made it cheaper and easier for anyone to create material and diffuse it to global audience. This makes the creation and diffusion easier and faster, but most important, cheaper. Copyright critics state that is no longer necessary such a restrictive protection as the one proclaimed today, which prevents the creativity from flourishing and its diffusion to get to everyone. Web 2.0 makes this new freedom (with some chaos envolved) possible and alluring, and less people currently care about copyright creating without care for who takes their creation and diffuses it. I mean regular users and public, not professionals but even these have been going in the flow, realizing that its impossible to stop the shift. Publishers of music, books or images, programs, and so on, use watermarking as a way to protect their work. Watermarking is embedded information that is carried in the digital signal, it is very difficult to remove or, in invisible watermarking, difficult to even track and discover it in the file. In either one when the material is copied the information will be attached to it. The problem is that hackers clean this watermarking before diffusing it in the internet, and the already mentioned impossibility of enforcing the present copyright laws gives common public the idea of lack of consequences.

Ip's change, internet companies participate on this giving people ilimited downloads, and with everything against the copyright model (and DRM) existent today it is very dificult to go against this "flood."

Laws and measures aside, users infringe the copyright every second of the day and the law can't do much against this trend. The present paper-based concept of copyright fails in the digital environment consequence of objects being less fixed, being accessible to multiple users simultaneously and the control of copies being lost. The laws should change to adapt to all of this and it probably needs to be less restrictive, less rigid and be more adaptable. This is the heart of the relation between Web 2.0 and copyright.

Three ways to use copyrighted works

Copyright rights — Fair use — Use of copyrighted works

- copy
- distribute
- derivative works such as books or movies

- commentary
- parody
- limited educational use

- Read a book
- See a movie
- Watch a baseball game at a stadium
- Borrow a book from a library

Adapted from Erik J. Heels article of July 18, 2007
http://www.erikjheels.com/2007-07-18-drawing-that-explains-copyright-law.html

"There are only limited provisions in the Copyright Act that allow people to use copyright material without the permission of the copyright owner. Although none of these provisions apply directly to web 2.0 technologies, they can still be applied in this context. It is

important that staff and students using blogs, wikis, social networking sites etc. do so in a copyright compliant manner. [35]

We all realize that managing and protecting copyright on digital world, today and in the future, shall be difficult, with TV, movies, music and books, almost anything that can be digital. And if at the same time we need to respect the principles of freedom of access to information, well, the task turns even harder. For librarians and most professionals of the field there are no winners neither losers on this issue, they see change as adaptation to rapid technological change, which is never easy. There are always people against change, who are afraid of the unknown future. For librarians/archivists of today there are tools that can manage digital rights and make authentication systems for users, but understanding and making access to these tools is as important as the need to keep the restraints of the law adapted with technology in order to prevail. Publishers, information businessmen, creators, etc. own their copyright, but the major problem for professionals on public offices is similar with the one claimed by private companies we talked above. If they don't own the copyright of the material they hold, except they own creations[36], how can they enforce it? They state themselves as "*simply caretakers of information*" but they are being accounted for responsibilities by their housing, linking and providing material with copyright, which turns difficult any serious digitalization project that provides access to the information freely and that is really the ultimate objective. So they have to develop tools and processes for managing the copyright that allows them to provide the access to users without violation of copyright. These are called rights management functions and they are: usage tracking; identification and authentication of users; providing copyright status on the digital objects (watermarking and metadata); restraining them with fees like charging for copies or passing the requests to the publisher or owner and restriction of copies available.

The last new term is digital databases. These are collections of independent works, data or other material and the doubt existed whether it would be a publication or not. In 1996 the database rights were created to specifically protect copying and dissemination of information in computer databases. They are the base of this work because digital libraries are in its basics, digital databases.

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[35] Thomson, Helen. "Wikis, Blogs & Web 2.0 technology", University of Melbourne copyright office, 2008. Page 2.

[36] The University owns copyright in all intelectual work and teaching material created by professional staff. Students own copyright for their work done and third party workers or companies have also the copyright of their work unless they signed a contract giving them to the university.

"Copyright in databases therefore seeks to protect the intellectual creativity of the author. The author's time, skill and labour must be directed to the selection and arrangement of the database, and not the mere gathering of information. Simply arranging a list of names in alphabetical order, for example, is unlikely to meet this standard."[37]

So what can be done against all the copyright issues and areas? First the problem has to be approached by each player's singular questions and problems. The biggest issue on the table is copyright, so let's start with publishers. Publishers need to be sure that they will continue to have a business model that works for them in the digital era, recognizing that academic research is to be free to end users and that they should concentrate more in offering services to institutions; working together with them without over-capitalism exacerbation; offering PDF publication; taking advantage of the digital technology to cut space between them and end users.

Next we have the other end of publishers, Institutions. They need time and organization to change gradually to this new system of operations. Time to adapt their technology, bureaucracy, methodology, minds and flows of funds, to make sure of how effective can this change be and take a decisive commitment. A big part of any researcher or faculty life is publication of articles, books and communications. To authors, what matters is that their academic work and careers are not damaged in any way by being published in digital format. They need to be sure of how official and respected this type of publishing is and that it is a way of attracting high audience ratings, a good peer-review tool and that their curriculum gains from adapting to the new technology.

Last we have libraries that have an important role in all this. They are crucial on developing methodologies and workflows on this new digital publishing world, rearranging the libraries existent today to a more accessible and online organization while managing their resources and funds with care so that the old system doesn't collapse, instead slowly shifting into digital system.

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[37] "Database rights: the basics", OUT-LAW - http://www.out-law.com, Pinsent Masons lawyers. September 2008.

Chapter II – Imagining Images.

1. The State of art and future.

On this chapter we are going to adress the core subject of this work, digital images (digital photography, scanned images, etc.). Libraries[38] are still trying to operate these new digital publications under the legal deposit law, saving e-journals as also both offline and online digital publications. They believe they are a component of any nation heritage and because that it falls into the preservation responsibility of national library's.

"*Although legal deposit may not be the silver-bullet solution to archiving e-journals, it is clearly an important component of the preservation matrix. (...) once material is preserved, it may be possible to revisit the trigger events that allow access to the content and even to permit remote access in narrow circumstances.*[39]"

Unfortunately images aren't well covered by most countries and libraries, as they don't count them as work under the law of legal deposit[40], like stated on NLA (National Library of Australia) and in general in other countries. Not even figuring as relevant in the *"Report of the Working Party on Legal Deposit"* from the British Library[41], or the legal deposit laws of Australia.

"A work can be a book or a periodical such as a newsletter or annual report; a newspaper or a piece of sheet music; a map, plan, chart or table; a program, catalogue, brochure or pamphlet. In some states, it also includes material published in electronic format such as computer disks, CDs and DVDs.[42]"

When I speak of images I clarely don't mean any photograph made by me for any reason, in my private life, has to be deposited. That would be nonsense. I talk about this in the context of this work, in the context of data bases. Data bases are made now as repositories,

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[38] Libraries have published output; documentary archives have documentary output of public institutions; broadcast archives have radio, television and film output, but image repositories have little output on images.

[39] Kenney, A et al. "E-Journal Archiving Metes and Bounds: a survey of the landscape." CLIR pub 138. 2006. http://www.clir.org/PUBS/abstract/pub138abst.html

[40] Legal deposit is a statutory provision which obliges publishers to deposit copies of their publications in libraries in the country in which they are published.

[41] British Library: Report of the Working Party on Legal Deposit: http://www.bl.uk/aboutus/stratpolprog/legaldep/report/

[42] On the "Legal Deposit" laws in AUSTRALIA, October 2008.

some public others paid, and even others just for preservation. All that databases of images, much of them of public interest, and of interest to preserve, are not taken into account when talking about legal deposit. A digital image, in a digital data-base, is published, even if not in the traditional manner. That is the word to fight here, tradition. Publishing concept in the internet is almost anything, which is much to preserve[43], but data-bases filled with historical images, event images, conceptual images, much with a paid service[44] where they offer a service to people shouldn't be viewed as in need of preservation? Shouldn't the nation library have a copy of this images for future preservation, and for any public need? The reason for the comparison of images to E-Jornals was not for no end, it is a paid service and is seen as a publication, even with the same premisses of images. In one you have an abstract and you have to pay to see the entire article. On the the other you have a thumbnail, that shows an idea of the image, and then you have to pay to receive the entire image. I really don't see the difference. Much of this is a consequence of the previous slides and microfilm system already mentioned, this publications which are traditional are usually well preserved and referred in the legal deposit laws, that is why it is not mentioned on legal deposit, as shown by the. To end this subject, public digital image archives are in few numbers (like the example of NASA[45] that is very high standard and a real good repository) and private digital image archives exist but with low standard in service and images. Maybe this will continue to be like this even with everyone in the planet realizing that images are so important in this visual world we live in, like the expression *"a picture is worth a thousand words"* reflects since 1921 until present time, but I hope we see a strong change.

Proceeding into the digital image realm, copyright of photographs is similar to any intellectual property. Under the law, the photographer owns copyright over its work and has control over copies, transmission and reproduction, just like any other intellectual property; unless he falls on the category of employee and in that case acting on behalf of his employer and this one will own the copyright; or in third party situations were there is some agreement to give the copyright. When museums started to introduce their image bases accessible on the internet the general paranoia by all agents involved, about having digital pictures of their assets or archittecture with copyright all over the internet, accessible and downloadable to everyone, was huge and this histeria wasn't totally real. The risk for digital pictures in the internet is comparable to the same to pictures in published works because of nowadays excelent scanning technology (in both sources the images are not as good as the original material). Adding to that,

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[43] Even with some projects that are trying to save twitter conversations, e-mail chains, blog posts, if they contain important information for the society to preserve.

[44] An example of a paid online database is Gettyimages (www.gettyimages.com), a private company that sells private images. But much other exists, public and private, that have the same way to work, a paid service for digital materials.

[45] To check on the actual visual quality of nasa pictures repository: http://www.nasaimages.org/

usually the tactic of picture databases is using low resolution pictures or visual watermarked pictures that are not suitable for commercial use. So there is no reason for any more paranoia. However some serious concern is justified. The advent of Web 2.0 and digital cameras made it more easy and flexible to share images in digital format to a broad range of users, and with a struggle of both ends for copyrights. Taking this in mind, I don't say that the concern from professionals of the field and publishers isn't justified and real, just that paranoia is too extended. There is no reason for a big paranoia, the solution is an adaptation.

The difficulty to protect intellectual property is a big barrier to any real investment in interactive digital media. But the biggest barrier for exploring the potential of culture diffusion through new technology is no doubt the inability of copyright owners to adapt their objectives and priorities to the evolution we are all experiencing, missing on the big picture of internet and digital era, the diffusion at a worldwide perspective. The evolution can't be restrained to this problems forever, and proof of that is that change begins to happen in areas like music, digital publishing and image sharing, and the term "*sensible copyright exploitation*[46]" starts to be a well used expression even with its problems, moving farther from the already discussed copyright protectionism.

"Many people feel that technology must address the problems created by the technology, since changing law follows rather than leads always and is always too late."[47]

Some good initiatives[48] follow this line of thought just like encryption of files, copy restriction and watermarking as already mentioned, per-copy/per-access charging, and specially for images that are the main question of this thesis, low resolution images displayed instead of original good resolution that puts at risk any image of being exploited and also visual watermarking like a logo, digital signature or both.

Explained as it was the question of copyright, will universities or other academic institutions accept the costs and shift from analogue slide libraries to digital image repositories and new technology? Everything points to the coexistence of this two systems for some years ahead, before a strong and durable shift. The university administrators, as they see their budgets grow shorter, will always want to control content costs. In the other half, faculty members

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[46] The concept of fair dealing (USA has broader concept than UK and in some other European countries the concept is even more limited) does not provide realistic solutions.

[47] Besser, Howard and Robert Yamashita. "The cost of digital image distribution: the social and economic implications of the production, distribution, and usage of image data: final report." Berkeley : School of Information Management and Systems, UC Berkeley, 1998.

[48] National and EC developments on legal harmonisation, the international discussions of GATT, G7, WIPO, the US Office of Technology, Japan's Institute of Intellectual Property and several other initiatives in Japan are focusing on the problems of IPR and digital imaging, including the concept of central registration of image copyright and "one-stop" rights clearance.

desire more ongoing access to images as they need them more for their researches or in their teaching. As seen from digital publication of articles like JSTOR[49], and from the changes in digital library collections (academic or public) that already subscribe this services, images may also be in the same way of evolution when we see happen the shift from ownership of property to ongoing subscription of a service that will provide the images access (or books, or articles, or any intellectual property together on separate) as long as the subscription remains paid. It is a commercial world and providing a service in the long term will yield more benefits for the commercial end receivers, and for the users.

Are the changes worth the trouble and economic resources? It is not a matter of choice. The academic community is the paramount of information in any field and, being so, it can't afford to give that role in the future to private sectors that will, make no mistake, take on the job if left aside by academics, and that is a very dangerous situation that will probably cost more in long term to universities. For this to happen tools have to be developed, locally or not (locally initiatives at the faculty level are encouraged), that store, receive requests and deliver digital objects in a good presentation scheme. Adding to that, they need to be easy, powerful and durable to be able to provide the academic community and outside users good ways to reorganize images, prepare them for presentation to the students, build thematic web pages, research, creation of projects or presentations, and a multitude of tasks, providing with this a quality public service.

Bottom line all the higher education community is enthusiastic and the goal is giving access to images or information from any cultural heritage repositories. The question of economy rises once more and academic community have to endure costs of conversion of analogue slide libraries, conversion of infrastructures, and conversion of systems and staff, all of them expensive, which raises the question on the community about going for it or not, after recognizing the hard economic choices they have to take.

One of the conversions already commented before, is of actual systems to be able to integrate at their best all this delivery system tools. Standards and common practices need to be developed within the structures of academic world.

"(...) Such traditional processes, though forming the basis digital library work, will have to be revised and enhanced to accommodate the differences between new digital media and traditional fixed media."[50]

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[49] *"Not–for–profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive of over one thousand academic journals and other scholarly content. We use information technology and tools to increase productivity and facilitate new forms of scholarship."* - http://www.jstor.org/

[50] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

This restructure demands resources, mainly financial and time. It is true that the infrastructure needed to support overall digital image distribution is much heavier than in analogue systems, but the real costs happen at the beginning. The first push forward is the harder to make only because the infrastructure has to be made usually from scratch, to incorporate the already existent system, or even to replace it. This cost diminishes when everyone starts using the system within the community and begins sharing the information, infrastructure, costs and staff, transforming something that looks impossible to bear to a more feasible rewarding situation. Also, with the improvements in technology a multiple variety of automatizations become possible in a variety of tasks just like cataloguing, collection management, actualizations, backup creation, damage control, and statistics of usage. This automatization of tasks brought also some energy to the existing professionals of all fields, taking some of the weight of their shoulders which makes possible for them to concentrate in other important tasks like metadata production, web site creation, improvement of search engines and catalogue engines, user assistance and much more. More important, it releases more funds which eliminate the necessity of local storage of physical books and all related paper work to archives, and less preservation measures are required. Even so, much has to be done.

"Automation has been introduced into some areas but bibliographic control, access and dissemination are still limited[51]."

2. Changing issues.

If in the future the complete conversion to digital world shall happen, there will be a relevantly lesser need for a physical staff, facilities (without items to "*check out*" or "*check in*") because no large physical space is needed for storage and all the other factors already mentioned will happen in a very larger scale, in the complete digital future. The fact is that the physical concept is less needed. However, digital environments need online storage like server space, and even workstations for accessing the now virtual material. So the physical turns into digital using digital space that also costs money but is infinite. It is a good trade and even with all the costs annexed it costs less then a physical building, rooms, preservation, etc.

The staff will still be needed but with alternate skills. Librarians and experts in the field are needed for support, to select images, metadata and manage the collections. But more than

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[51] "Developments in electronic image databases for art history" presented at conference "Managing Networked Information", Victorian Association for Library Automation (VALA) 7th Biennial Conference, Melbourne. 1993

that, technical skills are in demand to support the system like computing, programming, access professionals and so on.

"The digital distribution environment, as a whole, appears to be good for individual usage, and provides access from multiple locations[52]."

We need to look outside university for support. That can be found in other public institutions just like museums. Museums have in their objectives image storage and distribution of their assets, they are leaders in the digital image distribution and collection managements and because of that they are a clear example of the struggle and achievements, a role model. They will definitely be important partners in this work to help leverage all the costs of cataloguing and tools creation. Strong connections should happen between academic community and museum community to enable museums in providing a service in teaching, investigation or even publications to universities. These two proud communities need to be in the same wave within the digital era for the best interest of both, saving costs to universities in purchasing images for academic use, in the struggle to change their analogue slide collections and cataloguing systems to digital.

Some projects are being done, as MESL - Museum Educational Site Licensing Project, a cooperation between seven collecting institutions and seven universities, working on defining the terms and conditions for educational use of digitized museum images and related information. The concept of MESL has begun to motivate the origin of other projects of digital distribution consortia after its end on 1998. Examples of that are the Museum Digital Library Collection (MDLC), the Art Museum Image Consortium (AMICO) that ended on 2005 and was somehow replaced by ARTstor which continues the non-profit objective of building and distributing more than one million images in many areas of humanities, or even commercial initiatives like Corbis or others that attempt to provide digital images to the enthusiastic market.

"The (MESL[53]) was the first large-scale attempt to take a collection of images and accompanying metadata from a variety of museums and deliver these in digital form to university users over campus networks. [54]"

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[52] Besser, Howard. "Network access to visual information: a study of costs and uses", 65th IFLA Council and General Conference, Thailand, August 20 - August 28, 1999.

[53] MESL provided access to over 4,500 images through a collaborative effort of the Getty Information Institute, the Eastman House, the National Gallery of Art, the National Museum of American Art, Harvard University Art Museums, three other museums, the U.S. Library of Congress, and seven universities.

[54] Museum Educational Site Licensing Project (MESL) - http://cidc.library.cornell.edu/about/mesl.htm

The universities like any system need to support them to the maximum possible extent. For that to happen I don't see any wrongdoing in exploring paid distribution of images with excellent resolution and high standard metadata to high paying image customers from advertising agencies, press operations, book publishers (even school manuals), travel agencies, basically any other media that use the images for private or public purposes and with profitable objectives, or even simple individual consumers. This will in fact help to leverage the cost of any university distribution system.

"With the steady growth of computer power, rapidly declining cost of storage devices, and ever-increasing access to the Internet, digital acquisition of information has become increasingly popular in recent years."[55]

"Digital information is preferable because of convenient sharing and distribution[56]*".*

Distribution is important in this ever increasing access to internet, making acquisition of digital information popular at the present time due to potential growth of computer power and lower cost of storage devices. Giving access to unique and irreplaceable digital images to the community is a necessity and for that it should be the strategic plan of any institution. This digital information upheaval, and the system supporting it, made possible storage to be less of an important issue and the amount of data usually required to represent images and analysing them shall not to be an impossible barrier. Consequently motivating research to the almost ignored image databases all over the world, academic communities included. The focus research on the present and near future is of search indexation, tools and metadata. Search engines are difficult in images because of derivation of semantics from content, consequence of its metadata. We will address this further on the third chapter.

In addition to the tools used for image manipulation (as for example of Photoshop, that continues to improve itself and evolve), to search engines, interfaces and new metadata sets, other tools for examining, organizing or/and storing images are being created and researched presently. This shows that image databases are becoming better supported by a system of tools and software, becoming much more used in teaching[57] and research, even with the remaining lack of departmental recognition over the use of digital images.

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[55] Ze Wang, James; Jia Li; Desmond Chan; Gio Wiederhold. "Semantics-sensitive Retrieval for Digital Picture Libraries." D-Lib Magazine, Volume 5, Number 11. November 1999.
[56] Ze Wang, James; Jia Li; Desmond Chan; Gio Wiederhold. "Semantics-sensitive Retrieval for Digital Picture Libraries." D-Lib Magazine, Volume 5, Number 11. November 1999.
[57] Ohio State University and the C olumbus College of Art & Design are an example with their use of digital images in history of fashion courses, which are accessed by virtual databases or website, even Facebook (use of Web 2.0).

"Over the last century, comprehensive visual archives have been assembled by individuals, commercial photographic companies, museums and libraries. These collections of photographic reproductions have generally been arranged in very idiosyncratic ways to suit the conditions unique to their owning institutions.[58]"

Who can have the responsibility and expertise to create this system and supporting it with tools in the academic community? Librarians, archivists, departments, central computer services, third party professionals? The only effective way to go ahead is to have a consortium of experts from all the different expertises. One person from the department for which the database is being created, other from the software background easily found on the central computer services, someone from librarian or archives background for the methodology and metadata and probably someone to manage the group that has some copyright knowledge mixed up with team management, using the same principle of interoperability from digital communities. We have examples of this type of strategy. A good one is the University's Digital Access Coalition[59] that consists on a cooperative effort from librarians, archivists, curators, technologists, and teaching faculty from all departments on the university to develop a new ways of organizing, accessing, and using the Universities multiple collections.

The shift between analogue slide image system and digital images has to be slow, however a decisive step. Administrators of departments want to move quickly into digital format, usually in two steps: first only for internal consumption which needs less protection and managing, then for publication of their images to the exterior extending the users and opening the "doors" to everyone in the world. Administrators want to make the change to high technology in order to show technical evolution and also work and desire for the transformation. This is desirable to happen, but what is needed is a good use of these efforts for new technology. A centred and objective method of rational transition to the new system supported by administrators and users, would be the best option. Change from analogue to digital demands space and labour, precious values of any university, and to try to force the change too fast making a clean cut from older technology instead of a gradual change has true expensive short-term conversion costs. A good example is the MESL program already mentioned before, that gathered information about this type of transition proved that the base cost, instead of what may

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[58] "Developments in electronic image databases for art history" presented at conference "Managing Networked Information", Victorian Association for Library Automation (VALA) 7th Biennial Conference, Melbourne. 1993.

[59] A part of Cornell University formed this group in 1992 that took care of MESL implementation on its facilities. All of the information can be seen in Cornell University MESL Technical report. http://cidc.library.cornell.edu/reports/mesl.htm

be thought, will increase with a digital collection even with ease of time and conversion of all campus.

The conversion is not the only problem. "*Converting*" the faculty to accept change is always harder, especially because slide libraries in comparison with digital libraries require little technical infrastructures to use and store. Departments have gathered images after images in their slide libraries during their years of existence from a variety of sources other then museums and internal property, and because of that they are customized to their environments and end-user driven processes alredy well understood by faculty, with metadata customized to the local needs of each department and only used by faculty from that department that help on the information isolation. Image repositories, given its importance, demand more attention. They evolve at the same rate as text sources in the academic community. Letting the comparisons between digital and analogue go by, digital system is an improvement and analogue will remain respected as an important step in image usage in the history of various fields of work.

"In comparison to the sophisticated developments in text storage and distribution, the continuing provision of visual material solely in the form of slides and photographs is "distinctly archaic" and yet these forms continue to be the standards by which electronic alternatives are judged.[60]"

Digital images open the range of possibilities with its interdisciplinary distribution. They have a role in linking departments that show their interest for images of other disciplines to improve their teaching and research materials, enabling new initiatives that connect two or more disciplines. Images are reaching forward to that kind of initiatives as we can find image use and analysis in any discipline, which shows the importance of image databases. But will the faculty and its students accept the use of digital image repositories, changing from the use of analogue slide libraries that constrain users in means of access and use? MESL interviews show that enthusiasm is high about the potential of change into digital images, opening the door for new ways of research, teach, gather attention and information, using reconstructions, image manipulation, analysis and learning interaction.

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[60] "Developments in electronic image databases for art history" presented at conference "Managing Networked Information", Victorian Association for Library Automation (VALA) 7th Biennial Conference, Melbourne. 1993.

"Our analogue circulation study points to significant interest in cultural heritage slides from other disciplines, and most promotional talks for digital images insist that digital distribution schemes will appeal to wide interdisciplinary audiences[61]."

3. Funding options.

The cost problem was already mentioned in this work and we will go deeper into that question. Maximum access to their specific core audience, to preserve content, to ensure its access by future generations, and all this with the aim of long term service. These are the responsibilities of public initiatives and they have to respond accordingly. For that to happen two different goals have to be reached:

- The process of preparation consists in content selection, image and text data preparation, and its transmission.
- The process of delivery consists in preparing images, preparing structured data, technical development of functional tools and providing security/access control to databases.

All of these objectives stand under the responsibility of respecting the intellectual property of right-holders together with a very limited control by government or European Union rules about marketing their services. Adding to the problem, finishing a project that has in its core digital content and/or technology[62] is never possible because there is no end. This "incompleteness" is normal on the digital world which is in constant movement. There is always something to polish, to add, upgrade, connect, extend or perfect. So it demands continuous funds and work.

(...) Contrasting their radical flexibility and mutability with the glacial nature of scholarly communication in the fixed and frozen world of print-based publication[63].

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[61] Besser, Howard, and Robert Yamashita. "The Cost of Digital Image Distribution: The Social and Economic Implications of the Production, Distribution and Usage of Image Data." "Chapter 7 - The MESL Experience versus Slide Libraries: Comparison and Analysis." Berkeley: School of Information Management & Systems, University of California, 1998.
[62] Digital humanities and the digital publishing.
[63] Kirschenbaum, Matthew G. "Done: Finishing Projects in the Digital Humanities", University of Maryland, Digital Humanities Quaterly, Volume 3, Number 2, Spring 2009.

This creates struggle between university administrators concerned about conversion and content costs, and the faculty that wants to access images for teaching or research objectives. It creates also delay between actions with the bureaucracy and slow processes. In the middle are the museums consortia, high standard public partners in this scenario and with the already mentioned image distribution that is so important. They see this conflict as a delay to their objectives of ongoing flow of revenues from ongoing image distribution and access. Can university administrators perpetually release heavy funds for licensing images from museum consortia? Also private companies are in frenetic search of public partners for initiatives profitable for both, not just in money but also in achieving important goals. Further ahead on this sub-chapter we will talk more about this.

The groups participative in all this are content creators, publishers, technology companies, organizations, schools, universities, libraries, copyright holders, industries and even end-users. All of these elements make part of the living ecosystem of image repositories and digital libraries, turning them attractive and profitable. It is a business and this "*stakeholders*" take from it what they can and need. Content creators and publishers want compensation for their work (copyright is included on their work tasks), vendors and other intermediaries want the new market to give them profit for a long time, as also technology companies and industries. All they have one thing in common, they want the ecosystem to live and grow. By last, end users from all ranges want to use the images and search engines, or data bases, in a more ideal way. They want to interact with the information and receive images in the most perfect resolution possible, without many worries about copyright or high costs. All the rest need to adapt and improve to be able to respond and live in the changing ecosystem.

Who funds this new ecosystem, and the new method of delivering and interacting with it that in the end supports it? A good range of institutions, (public and private) offer grants to this type of projects in technology, in update and/or construction. There are various grant types, taking from the example in the U.S. (that gives great attention to digital libraries) that has within its academic borders corporate grants, educational technology grants, federal grants, funding school technology, government grants, K-12 grants (grants for public and private schools), library grants, museum grants, non-profit grants and university grants[64]. These grants provide budget support for direct costs, including personnel, hardware and software, training, travel and other costs related to the implementation of the proposed projects.

Other great ways to cut costs and share budgets are partnerships. Federation of libraries or universities departments uniting for these projects are examples of this option. Forming a single database for the management of several collections (fuelled from several institutions) or creating a separate retrieval database fed by several collection management databases, are

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[64] More about Grants for development of Libraries and museums see:
http://www.technologygrantnews.com/grant-index-by-type/library-grants-funding.html

excellent paths that federations for the purpose of access to images can choose. Paid services are also a choice profitable for anyone. Going from subscription fees, sale of images or other information formats, they can provide continuous revenue to the institution vaults being a long-term service.

Another type of partnership is the one between public and private institutions. Public-private partnerships started with the funding of public work that was not related to cultural projects, but with the rise of this digital-technological moment it became an obvious step to take. Its advised not to choose this kind of connection, taking into account the problems that can happen when a public institution with clear public objectives meets a private institution that demands profits. But there are a few options that are available and even desired to enable great projects, solve problems and deliver high quality services for the welfare of the public and the private sector. Public institutions (libraries, archives and other cultural institutions) can have in their list of objectives to make their collections freely available over the internet; promote open search; improve the user experience in their collections, and even in some cases that don't care that much about copyright; facilitate sharing and replication of content (open repositories). It was stated by the commissioner of the recent final report on public private partnerships (PPP's):

"Public-private partnerships for the digitisation of content should be encouraged to make information available online, as well as the private sponsoring of digitisation projects.[65]"

Public-private partnerships[66] solve the problem of funding. Generally the public institution has the information, the raw materials, and also has the access and authorization to manage and use it. Private institutions, in the other hand, have the money, technology and technical expertise which cultural institutions naturally don't have in their staff, to do the job. Digitalisation is one of the well-known support that private players can provide, but also programming, technology, virtual space and preservation is necessary. Private sector funding is a critical component for any public cultural institution to go forth with their projects, as to provide enhanced access to resources so important for the public sector [67]. Not only the funding is important, in the context explained before during this work about the importance of digital today, but there is also the expertise and technical knowledge that can be supplied, to suppress the necessities of new users and their needs and expectations for the near future. Public

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[65] "Final report on public private partnerships for the digitisation and online accessibility of Europe's cultural heritage", i2010 EUROPEAN DIGITAL LIBRARIES INITIATIVE, high level Expert group on digital libraries, sub-group on public private partnerships, May 2008.

[66] "Any collaboration between public bodies, such as local authorities or central government, and private companies tends to be referred to a public-private partnership (PPP)." – From BBC News website.

[67] Examples include: access platforms, search and retrieval, scanning, optical character recognition (required to convert images to text), rights control and content management.

institutions can take advantage from the development expertise of private companies to do sales (managing profits and costs) and marketing (captivating new audiences). The danger exists because the possibility of capitalization of cultural information, or even worse, privatization exists. These partnerships can even make background political shifts and plays.

"Private partners may also provide weight to lobbying efforts to increase government funding.[68]"

Excellent examples are Google and the University of Michigan (Google – Michigan project[69]), the British Library and Cengage Gale, Libreka[70] in Germany, even Google and University of Coimbra[71] the important Open Content Alliance[72] that was established in 2005 and has 50 partners of different backgrounds.

Joining the public responsibilities with the private interests is the main objective with PPP's, but what do the private companies may gain with this partnerships? How can they be attracted to this type of workflow? As anything inside the private sphere, the objectives can be very abroad but they fit better under commercial objectives (profit, marketing, projection), or under corporate social responsibility in society (also projection, cut taxes and have a good relation with the government). The first one is made to gather new digital markets or niche project possibilities, access material both out and under copyright laws. This can be made with the association with strong public brands/institutions. Google digitalisation projects are clearly a way to avoid copyright by associating themselves with a public institution that has the copyrighted material. Obviously this captivates attentions and lawsuits.

"The issue of digitizing books and putting them online is at the center of this $125 million lawsuit, currently pending in a federal court in New York. In the lawsuit, authors and publishers sued Google for copyright infringement in its Google Book Search program, which has been scanning and indexing millions of books from the collections of major libraries.[73]"

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[68] "Final report on public private partnerships for the digitisation and online accessibility of Europe's cultural heritage", i2010 EUROPEAN DIGITAL LIBRARIES INITIATIVE, high level Expert group on digital libraries, sub-group on public private partnerships, May 2008.
[69] A ground-breaking partnership to digitize the entire print collection of the Michigan University Library: http://www.lib.umich.edu/michigan-digitization-project
[70] Libreka – a biblioteca universal de livros em língua alemã: http://www.goethe.de/ins/pt/lis/wis/sbi/art/dig/pt2913809.htm
[71] UC web page, news of 11-07-2008 - http://www.uc.pt/tomenota/2008/20080711_3
[72] A collaborative effort of a group of cultural, technology, non-profit, and governmental organizations from around the world that helps build a permanent archive of multilingual digitized text and multimedia material. - http://www.opencontentalliance.org
[73] New York Law School Public Interest Book Search Initiative - http://www.nyls.edu/news_and_events/releases/public_interest_book_search_initiative/

All of this has the obvious objective of more stable revenue streams. The second one is a lesser objective but also important. Demonstrating social responsibility in form of donation or sponsorship brings results to private companies in the form of brand projection in society, in improvement of the relations between private sector and the government which helps on deductions of this kind of contributions in order to reduce taxes and/or have other fiscal benefits[74] (examples of countries inside EU where the legislation was made to aim this behaviour by the private sector are Spain, France or Italy).

On this service equation, right owners contribute to the PPP's collections with materials, funds and open projects (using open digital repositories). But why do they contribute to this PPP's? Well, their collections are the pillar of these projects which makes them unquestionably important. And they have all to gain with the exposure. Making the work visible and more important, searchable, increases the potential of revenue (with users entry fees) and attention expected (with peer-review) within and even outside the academic community. These results are better to important works that target small groups and markets, which usually don't have much of attention in a normal way.

4. Accessing information.

In the early days of digital repositories it was assumed that restrictions to information for the objective of splitting high-quality information from low quality, or even garbage (a big amount of information garbage his a part of the internet "anatomy"), were not an option but a necessity, mandatory for any serious distribution.

But is this true? The only incentive for high quality information creation is money for authors and publishers? For the case of public or private companies the objective of public duty to make governmental data available, marketing opportunities or promotion are the normal incentives. But on the past years, primarily from this last decade, internet changed this flow to a different view. Publication does not demands money or status[75], it also comes spontaneously without incentive, sometimes by will, other times by free time or necessity of exposure. Maybe being creator of something is a desire and the big internet can suppress that desire.

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[74] Like the Cervantes Virtual Library that is a PPP's initiative. Two key private sector partners to this project have charitable foundations, probably also for this purpose.

[75] As budgets shift from publication to creation, with digital publication costs being very low, two things happen: First people search more the internet as a place to publish information in a lower cost, fast and reaching their desired audiences and users search it as a good source of free reliable data.

On an academic perspective is best to eliminate barriers from access of information and its active use. That is why we see the current trend of scientific research online publications in huge volumes with open access, thing that didn't happened ten years ago but today is seen as a normal situation. The main question focus on the problematic if the information created without payment or status is of high quality, at least enough to provide security to the user.

"Most open-access web sites do not generate revenue. They are supported by external funding, usually by the producers of the material on them.[76] "

The view from professionals on this matter[77] is that control is needed at some extension, so I will approach more that access option. Federations of institutions are an effective way to control access to information that needs to be protected. We know that it is impossible to federate all libraries in the world, at least for the near future. But federating pockets of institutions is possible and has been done within a field or fields of work.

"Though these resources may reside on different systems and in different databases, they would appear as though there were one single system to the users of a particular community. Within a coordinated digital library scheme, some common standards will be needed to allow digital libraries to interoperate and share resources[78]."

So we don't have a fully connected academic community of information, but we will have small, medium and even big groups that have connection between them in interoperability. This narrowing of fields in closed groups that we will call federations brings not only a reduction of technical and political enforcement to create common practices, but also create better access protections and practices. Rights and permissions are vital in helping these federations to have some degree of control over their images, enabling them at the same time with the possibility to insure funds to themselves in the form of access fees or paid information. This can be done in the form of authentication logs that are very similar to usage logs[79]. Authentication logs are effective in capturing temporarily the users ID's at the time of their login, classifying them in sorted tables by their diverse permission groups like college, department, status, campus, etc. With this is possible to provide demographic data of usage, disciplinary affiliations and locations.

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[76] Arms, William Y. "The Web as an Open Access Digital Library." Cornell University. 2000.
[77] See Faculty Inquiry on this work, pages 86-94.
[78] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.
[79] Usage Logs are records of system traffic, sometimes identifying specific types of transactions between the institution and its users.

The determining old question is Open versus Restricted access. And because that the field struggles for the two access options, each one with their cons and pros. By the side of institutions that deposit and manage these collections, easy copying and existing piracy created the need to have access requirements in order to control their images and also who reaches them. These obliged institutions to reach into new managing tools that support this change with flexibility and in the same time provide a good range of terms and conditions. Using encrypting systems that hide information to users that aren't properly authorized to access it is a usual technique; unfortunately the information for various reasons loses its commercial value. We already know that especially within academic world access balances itself between more free and facilitated access to information (cutting costs and time delay), and the protection of the system. That includes how to manage sensitive, private, or protected material by copyright resources without damaging users, universities and privacy issues.

This problem has been in the professional minds since the 90´s. Federations of institutions are very concerned since then in this problem and its solutions. The best example is Digital Library Federation[80] (DLF). In 1998 the major research libraries and archives in the United States, the Center for Research on Information Access (CRIA) at Columbia University, and the Information and Intelligent Systems Division of the Computers, Information Sciences and Engineering Directorate of the National Science Foundation (NSF), joined forces to reach this solutions. 12 years passed and where are we now? Europeana, DELOS[81], ECDL[82] and DLF continues to evolve in this area and others are showing, which proves that digital revolution is a slow and dedicated process, continuous in its evolution. Inside universities the example of the Visual Information Access[83] (Harvard) shows that these practices are important to the faculty, while using the restrictions that they need to protect themselves. They are open to the general public but all high resolution images are only accessible to the university community.

"The data and images (...) being provided solely for the purpose of teaching or individual research. Any other use, including commercial reuse, mounting on other systems, or

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[80] Digital Library federation website, without alterations since June 2010: http://www.diglib.org/

[81] Partially funded until the end of 2007 by the European Commission Sixth Framework Programme within the Information Society Technologies Programme (IST), it is specialized on Digital Libraries and its research, also technology transfer. http://www.delos.info/

[82] European Conference on Research and Advanced Technology on Digital Libraries, is a European forum that focus his research on digital libraries and associated technical, practical, and social issues, meeting the needs of a large and diverse constituency, which includes practitioners, researchers, educators, policy makers and users. http://www.ecdlconference.eu/

[83] This system catalogues the visual resources owned, held or licensed by Harvard, focusing on artistic and cultural materials.

other forms of redistribution requires permission of the appropriate office of Harvard University.[84]"

Still concerning images, there is much to be done with policies of access to images and their reproduction. Today a lot of restrictions hinder the use of images in humanities. This hasn't change rapidly partially because, in comparison with textual databases, there is a lack of interest by image repositories. Also partially because of copyright and ownership contends. Institutional repositories act as copyright holders (who owns the copyright of the images) and not only as owners[85] of the data, merely because of fear and agreements with authors and publishers. As custodians of culture they have to change in order to remove restrictions from the public users, they have to realize that scholarly publishing is safe and provides better control over fowl use of images, or even misappropriation of data owned by the institution.

Scholars and other related professionals need to be aware that costs exist. They are probably already an important part of the equation and will be even more in the near future. We need to understand that information is not free, at least not high quality information. It can be controlled to have leverage so that the cost is reasonable, but it will always have a cost. Digital media needs a group effort in order to be available to humanities researchers, and scholars are in that group to share costs of digitalization, distribution, tools development, etc. Fees for information will be part of any scholar menu.

For the objective of innovating systems concepts are very important. They help to skip second intentions and detours from the right path. One good example is the difference between authentication and authorization in image repositories that manage their collections, being public or private. Usually when you enter any system what happens is that you need to authenticate yourself with a password and name, or you are automatically authenticated by some system connected by your computer (yours or the department).

"A user's role or roles might be established or negotiated in different ways, for example, through a campus-based proxy service or authorization scheme supported by a directory database, by membership in a professional society, or by acceptance of a charge to a credit card."[86]

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[84] Harvard University Library **-** VIA (Visual Information Access) in http://via.lib.harvard.edu/via/deliver/home?_collection=via

[85] Restrictions to cultural heritage items (like images on this case) come from ownership rights, not intellectual copyright like is usually thought of.

[86] Arms, Caroline. "Enabling Access in Digital Libraries: A Report on a Workshop on Access Management." Council on Library and Information Resources. February 1999.

This happens with the clear intention of regulation. The system will monitorize all your actions and check if your authentication gives you the authorization with to do them. Confused? No need to. It is very simple. Authentication is the way you define your identity, authorization will check if the task or operation you are trying to do is right by what identity you have. Let's use the example of a university. Different authentications allow you different authorizations[87]. The user can be a student, professor, researcher, etc. Inside each of these roles there can be a huge variety of hierarchies. It can be from within the university, maybe from other academic institution that has cross library protocol, or they can even be from outside the academic system. Users can also have many roles that give them different authorizations to access different information, to creation, tools or even administration capacities. The different roles that grant you different authorizations can even restrain how you use this freedom, allowing you as user to a tool or data for some task only, and block you to others. So if you are authenticated by the system as student, the system will then authorize you to different tasks, making your role in the hierarchy the main issue for the extent of someone freedom on the given system.

"A faculty member may, for example, act as teacher, author or creator, researcher, consultant, or private individual. It would be impossible, participants argued, for an individual to declare that access to a particular article was being sought in conjunction with only one such role.[88]"

Well maybe it is not that simple, lets admit. The concept is simple but when applied into practice it becomes complex. A management system of any type of data needs to be simple so that it can be well accepted by users. Complexity may discourage the users to pursuit information. Because of that we need to be aware of the quantity of restrictions and privacy[89] in our management systems. For the best of all academic interests.

And the situation gets even trickier. Aside the distinctions of roles within the users, between authorization and authentication, we have also distinction between access and use. For example, data can be accessed by users but not used. What happens usually is that when we create information is for the intent of being used, published, quoted, etc. We want the information to get used, to have purpose and utility to society or communities. If for all the reasons already mentioned, we tight control to access with the fear of bad use of the given

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[87] Market forces will determine which technical barriers to impose and technical improvements for authentication to create. Market controls creation because without funding and revenue things are difficult to continue.

[88] Arms, Caroline. "Enabling Access in Digital Libraries: A Report on a Workshop on Access Management." Council on Library and Information Resources. February 1999.

[89] Any system is obliged to protect the privacy of users from detailed tracking and disclosure of use that would compromise a right of any user.

information (instead of its use for teaching and research contexts), then we end up containing it and information constrained normally will not get used. What would be a perfect system? A well balanced one. Because of that tight difficult balance, no system is flawless and to find a well balanced system is almost impossible. This balance really means balance between restrains to access and open access. It is clear that data must be protected as any property, but the objective is to give unlimited access to specific user groups within a community because they are clearly interested in the resources for the right purposes[90]. At the same time, not to close it to much. Enclosure will only create a wave of problems like cutting access from people outside that community, not stimulating curiosity and not fomenting new research interests, result from lack of exposure using this exaggerated protection.

5. Metadata and Images.

We have already talked about metadata before on this work, but now it is time to expect all its complexity and importance. Because is central to digital repositories and their development in the present or future, metadata has a major role on this environments. Professor Manfred Thaller one day told me: "D*igital systems depend on metadata*". Couldn't be more true a statement. This is no strange practice anyway. Since modern libraries exist, even without being digital, librarians catalogue material on libraries together with descriptions of the material within library walls, to make possible the task of finding something and group material by sections. Let's now travel further into the subject.

Metadata is the core of any information retrieval system, so is very important in digital archives. But what is Metadata? Metadata is information within the digital file, formed in its creation or imputed afterwards for a more complete identification and cataloguing in some system. It contains the description, identification, recording, direction, copyright statements and file access control of any digital object. Is a reality from blogs, to images in some personal web page, to social profiles or academic works.

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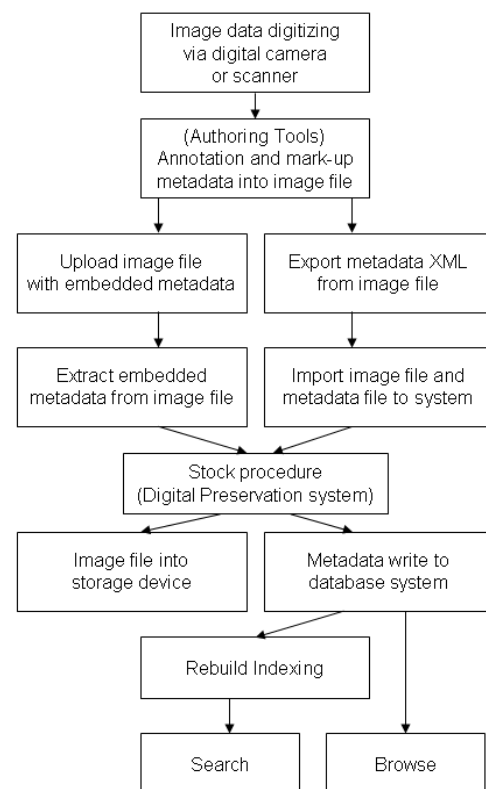
[90] Creating sanctions for abusers and procedures to deal with them. Abuse could be punished by taking privileges within the system for example.

"Metadata is the data that describes the content and attributes of any particular item in a digital library. (…) Metadata is important in digital libraries because it is the key to resource discovery and use of any document.[91]"

For digital images the situation doesn't diverse much. Image metadata merely shifts to a more technical format. Height, width, colour modes, colour deep, resolutions, compress rating, creation dates, are examples of how more technical aspects image metadata can have. None of this information is what we usually need to find something we want. That is when descriptive metadata that coexists with technical data enters. Information like locations, photographers, people in the image, events depicted in the image, keywords and subjects within the image make part of the metadata usually created by the user/professional.

In images descriptive metadata is harder to make then documents. Within metadata semantic groupings, there is a multitude of individual metadata properties. Some metadata properties are typically objective while others are subjective. Images are less objective[92], which means that the same image can have different descriptive metadata if created by two distinct professionals, only because images can simply be perceived differently. A basic image can have an amazing amount of information which can be very important for researchers and teaching in the future. With more accessible technology available and better metadata standards, it is expected that image repositories evolve in a quick burst in the near future. Strangely distribution of digital images is underdeveloped if compared with textual database. Just check how much publishers of pictures exist against publishers of texts. It is overwhelming. This tendency is easy to explain. Historically text files are used far longer time then images for research or learning practices, even before electronic systems. Universities are no exception. But what is the severe problem with metadata? A common standard which refers to the lack of interoperability between the areas that create and deal with digital objects and their metadata. This includes universities; software manufacturers; general public and private databases, and so on, all of them in a big confusion. This leads to confusion which only damages the academic field.

Since de 60's[93] it is well acknowledged by anyone in the academic and library communities that there is a need of change to a more inter-institutional cooperation in order to

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[91] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.
[92] Google is creating a technology that will produce an application to recognize texts within images, not only useful for manuscripts but also for writings in images. Also the Apple's iPhoto application has a face recognition engine that enables users to search photos by the faces in them.
[93] Standardize practices were at the time needed to make full use of the emergent computing technologies. For that to happen, cataloguing rules were created. MARC (Machine Readable Cataloguing) standard and AACR (Anglo-American Cataloguing Rules) were the products of that same need.

better rearrange the information stored and its use. Since those times we evolved in terms of archives and metadata. Because of those efforts during all this decades, today we have large union catalogues, collaboration between institutions in cataloguing projects and effective databases. But in the digital era metadata needs improvements, it will always need. So the problem is still up-to-date and the subject still needs development.

"At a time when digitization technology has become well established in library operations, the need for a degree of standardization of metadata practices has become more acute, in order to ensure digital libraries the degree of interoperability long established in traditional libraries[94]."

First then any deepening in the standardization of metadata subject, lets understand how metadata divides its needs. Metadata is categorized in three different and complex, but connected types, consequence of the complexity in metadata requirements of digital objects. Depending on the required needs existent, we can have all this metadata types or only one. A complete system uses them all:

1. **Descriptive (or content) metadata** contains information necessary for the identification of digital objects through the usual catalogue information: Title, author, keywords, abstract, subjects, etc. It is what the digital object is, its core information that users need to find it and understand what it addresses.

2. **Structural metadata** deals with connections between objects assembling them into groups, necessary for searching in databases (chapter 1 links with chapter 2, the images of individual pages that make up a digitized book, for example).

3. And Administrative **metadata**. This metadata type is necessary to manage databases. It is important for professionals that manage the system but also for applications to recognize certain details in the digital object, in order to work properly. This metadata includes rights management information, technical information about the digital object (like colour, ID number, archiving dates and other image manipulations) and the digital provenance, which refers to the creation and subsequent treatment of the digital object. In addition it stores information about decisions and actions about its preservation. Inside administrative metadata we have access metadata. As the name indicates, it is about metadata for the users. This stores information about the copyright agreement in

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[94] Gartner, Richard. "Metadata for digital libraries: State of the art and future directions." JISC UK. JISC Technology and Standards Watch. April 2008. Page 3.

detail with the user or client and, more importantly, the users management, controlling what was mentioned already on this chapter in "accessing information."

The combining of this metadata triad is essential for any complete quality metadata, and it has until now mitigated the need of a single standard. Without any part of this puzzle, the information takes the risk of not being found by users or well administrated by the institutions. So how can we standard three complex different necessities? Combining metadata standards seems to be the best way to go for now. Choosing a set of standards linked between them seems to be a clear option because none of the metadata schemas on their own completes the complexity of necessities that exist in databases. But if you join them they form a pretty effective system that provides a complete solution. Supporters of the concept of metadata as more heterogeneous agree to the three principal metadata standards and their use them combined or even individually. This goes against the perspective of a single metadata standard that uses a more homogeneous concept, very much similar to traditional libraries that use the respective national metadata format, following the MARC21 model[95].

The difficulties yet exist. This merge would be of little consequence for the objective if the standards fail to address the metadata needs of the digital library community, or worse, if they turn out to be too complex and closed they will shift into an obscure metadata standard that no one uses. And when the organization that creates the metadata scheme sees some change or even an end what happens to the information so carefully made? That is why standardisation is needed, mainly to diffuse and protect information. There is a need for authority in metadata of course, for control, protection and usage. This was true in 1998, and remains actual nowadays.

"A global scheme of unique identifiers is required, one that has persistence beyond the life of the originating organization and that is not tied to specific locations or processes. These names must remain valid whenever documents are moved from one location to another, or are migrated from one storage medium to another.[96]"

Another option is creating a single standard that combines all the above solutions. It is possible and even avoids clashes or duplications between them, but is hard to reach any consensus between users, database and software creators. One good example of single metadata

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[95] MARC21 is an acronym, used in the field of library science, that stands for MAchine-Readable Cataloging. MARC21 is based on the coding which allows users of different software products to communicate with each other and to exchange data. MARC is an acronym, used in the field of library science, that stands for MAchine-Readable Cataloging. (Already existing in XML format).

[96] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

standard that is used is DCMI – Dublin Core Metadata Initiative, which it will be explained further on this chapter. But the best example is METS[97] schema, which is a standard for encoding descriptive, administrative, and structural metadata.

The problem of interoperability between schemes is well discussed in the field of work, as shown by the 2006 proposal by Microsof in their support of the RDF[98] – Resource Description Framework, or better, the proposal by the 2007 Metadata Working Group[99] (MWG). This last one is a creation from a partnership of Apple, Adobe, Canon, Microsoft, Nokia and Sony, with the goals of preservation and improvement of interoperability in digital image metadata, and the development of applications or services for supporting this same metadata.

Interoperability is a good point to focus. Digitalization technology has become a well established addiction in library operations, making now an integrate part of the library and archives of any sort. We can even say with certain that archives are dependant of technology at this point. It couldn't have happen in other way. Like any alteration to processes and operations due to technology, it needs effort to continue the long established degree of interoperability that we have seen all this years before in traditional libraries. Among the academic community it has become more crucial in order to ensure this continuity. Metadata is what makes everything possible for its strong applications, and standardization of metadata is important because improves interoperability between archives and institutions. It was about this interoperability we were discussing on the first chapter, when we gone through the community subject. A digital environment that cooperates within itself depends of metadata, even if the metadata is not standardized in one single code. OAIster[100] is a good example of that same interoperability so needed and wanted. With providing basic cross-searching of over 23 million resources from various open archive collections (1,100 contributors until now) encoded in simple Dublin Core, this project of the University of Michigan University Library tries to reach the high goal in digital library world: information free, open to anyone, easy access and academically oriented. This follows the idea of a community driven by multiple institutions, a huge digital library managed by public

Image 3. Process of digitalization.

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[97] METS uses XML schema language of the World Wide Web Consortium, and it's maintained by the Network Development and MARC Standards Office of the Library of Congress. It's a Digital Library Federation initiative.

[98] Standard model for data interchange on the Web http://www.w3.org/RDF/
See also: Extensible Metadata Platform on http://www.adobe.com/

[99] The Metadata Working Group (MWG), a consortium of leading companies in the digital media industry formed in 2006: http://www.metadataworkinggroup.org/

[100] Managed by OCLC today, that is a co-operation between 27,000 libraries, archives and museums in 171 countries. For more information: http://www.oclc.org/

interests and not private interests like Google (which is not a big bad wolf, I want to add, not being Anti Google and clearly recognizing its accomplishments and efforts.). Effective metadata standards that at the same time are responsible and accepted by a majority will make this scenery real.

By accomplishing some secure degree of standardization the field of digital archives will reach a new integration level, enhancing greatly the possibilities of collaboration in the near future. What stops this evolution? The complexity of metadata and the number of metadata standards available (consequence of different needs of each project or institution, and also free will) makes difficult to any single standard to take on the task of managing all metadata needs. Various metadata standards coexist already referred. In library communities the standard used is METS (Metadata Encoding and Transmission Standard) together with MARC Standards Office (core cataloguing scheme). And in moving pictures multimedia development, MPEG-21 standard and DIDL[101] (Digital Item Declaration Language) are the ones used. In archives community the standard used is EAD (Encoded Archival Description), for museums the choice seems to be SPECTRUM. So as we can see, each sector chooses metadata for their necessities. Some from habit because they use the same since the beginning, others because would mean expenses and time, and others just simply because there is nothing better right now for their necessities. Even with the differences we can see some degree of standardization within them, which unveils that a unified metadata strategy works and it is sought for the sake of everyone involved.

For images, the focus of this work, standards populate the field such as: Exif for photographs, DIG35 from DIG[102], IPTC[103] for the news media images, XMP, and ISO JPEG 2000 that uses XML[104] format coding. JPEG 2000 is the evolution of JPEG which supports more structured embedded metadata. This image format is being used by digital media industry like the well known Adobe, and is very well accepted in the academic community as the best option[105] (as also .Tiff) for its quality in compression. JPEG2000 Alliance[106] includes 360 Systems, Analogue Devices, Digital Rapids, the Fraunhofer Institute, Front Porch Digital, intoPIX, Media Links, Media Matters and others. For all this ISO JPEG 2000 is seen by a

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[101] DIDL and MPEG-21 Metadata Standards: http://standards.jisc.ac.uk/catalogue/DIDL.phtml
[102] "Digital Image Group" now part of International Imaging Industry Association (IIIA).
[103] An International Press and Telecommunications Council creation.
[104] XML began life in the 1960s as SGML (Standard Generalised Markup Language), a system for tagging up electronic texts using semantically meaningful tags.
[105] Lowe, David and Michael J, Bennett, "A Status Report on JPEG 2000 Implementation for Still Images: The UConn Survey" (2009). *UConn Libraries Presentations.* Paper 21.
See also for statistical perspective of this survey: Lowe, David and Bennett, Michael J., "Digital Project Staff Survey of JPEG 2000 Implementation in Libraries" (2009). UConn Libraries Published Works. Paper 16.
[106] A informative blog article that contains personal arguments of the author about the JPEG2000, in: http://dltj.org/article/video-jpeg2000-alliance/

tenuous majority of professionals to be full of potential to maybe soon be used by the companies and universities still using the other image format standards available.

"One problem with the widespread acceptance of .jp2 is the fear of future migration. However, I have heard that migration projects of tiff formats haven't gone smoothly either[107]."

Still some technical problems not related with metadata are addressed when talked about JPEG 2000 and professionals are trying to improve the product. Among current implementers, JPEG 2000 is viewed more for access and not for archiving, but on the "*Harvard University Library Open Collections Program Final Report*" it is stated:

"Adoption by Office of Information Systems of the jpeg2000 standard for archival master images stored in the Digital Repository Service.[108]"

Together with Harvard, the Library of Congress supports JPEG 2000 in their "*Digital Format Registry entry for JPEG2000*". Catching the wave of JPEG acceptation two metadata standards are more used in this image format standard. MIX from NISO[109] and Dublin Core. One technical and other descriptive (we will discuss more about metadata types in this chapter). MIX is an XML schema made for technical data elements required in the task of managing digital image collections all over the world. It is a joined effort from three big authorities in this field: Library of Congress' Network Development, MARC Standards Office already mentioned and NISO Technical Metadata for Digital Still Images Standards Committee. It is the key standard for this type of metadata presently.

Dublin core is more directed to the public sphere and to the individual user, with elements focused on the objective of facilitating the discovery of objects in a networked environment such as the Internet. It was developed to be simple for better use by authors and researchers. Dublin core is accepted by community as the better standard, due to its simplicity and its accuracy to the most required information by users.

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[107] Lowe, David and Michael J. Bennett, "A Status Report on JPEG 2000 Implementation for Still Images: The UConn Survey" (2009). *UConn Libraries Presentations.* Paper 21. http://digitalcommons.uconn.edu/libr_pres/21

[108] "The Establishment of a Scalable Workflow for Digitizing a Wide Variety of Materials." Section 2.3 of the Harvard University Library Open Collections Program Final Report.

[109] National Information Standards Organisation (NISO).

"The Dublin Core concentrates on describing intrinsic properties of the object. Intrinsic data refer to the properties of the work that could be discovered by having the work in hand, such as its intellectual content and physical form[110]."

Library communitie	METS; MARC Standards
Moving pictures multimedia development	MPEG-21 standard and DIDL
Archives community	EAD
Museums	SPECTRUM
Images	Exif for photographs; DIG35 from DIG; IPTC for the news media images; XMP; ISO JPEG 2000; MIX from NISO; Dublin Core.

Table 1: Metadata Schemes mentioned in the text above.

If all this support and improvement continues it will show that the secret for unifying standards into one is to create and support an effective, simple and complete standard. The rest happens alone like a normal *"natural"* cycle where the support creates motivation for more effective development, and this effectiveness creates more support, and so on and so on. Shows also that the academic appraisal is very relevant in the acceptance of standards, and without financial attachments or need of profit that could make them partial to supporting some standard, they gather a satisfactory credibility from the field. Unfortunately a definite metadata standard that works for everyone doesn't exist now and probably will never exist. Each project, each department, each institution has its own needs and changes metadata schemes to adapt to its necessities. While developing image databases, decisions will be needed about what image you are describing and how to create the relationships between the various possible elements of your image.

Nonetheless, standards can be accepted in each field of work for the existence of interoperability between data and institutions. The interoperability can be reached with the already mentioned METS standard, developed by the Library of Congress for the clean purpose to control of lose mixtures of metadata schemas. Each metadata standard suppresses different needs. So METS works using XML to make the rules that control which various metadata elements can be put into work together without creating technical problems in reading the

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[110] Weibel, Stuart. "Metadata: The Foundations of Resource Description." D-Lib Magazine, July 1995.

metadata to machines or applications. More important, a joined effort of two partners (MARC Standards Office and Library of Congress) created a metadata schema to library applications named Metadata Object Description Schema (MODS). MODS is in the XML schema language of the World Wide Web Consortium as well, and is intended to complement other metadata formats, in order to provide offer more advanced cross-searching facilities, with a element set richer than Dublin Core.

"It's possible, for instance to use Simple DC and VRA Core for descriptive metadata, the METSRights schema for copyright information and PREMIS for preservation metadata."[111]

The confusion on metadata standards can be greatly reduced if a strategy of standardisation like the one described is adopted by the various communities. This change will be reflected with the need of less personnel, today needed in the creation and management of the digital collections, but will also reduce the financial costs in the process. So this trend of standardization will certain continue. And for users the consequence will be the appearance of federations of institutions, merged together in the objective of making possible for collections to be co-searchable, which will make the life of researchers, teachers, all professionals involved and common users much better. Even if takes more 5, 10 or 20 years from now. It will be an improvement comparable to the internet ("Semantic Web"[112]) that today makes easier our life, even with all the questions raised and problems created.

Image extracted from:
http://www.emeraldinsight.com/fig/0150260406004.png

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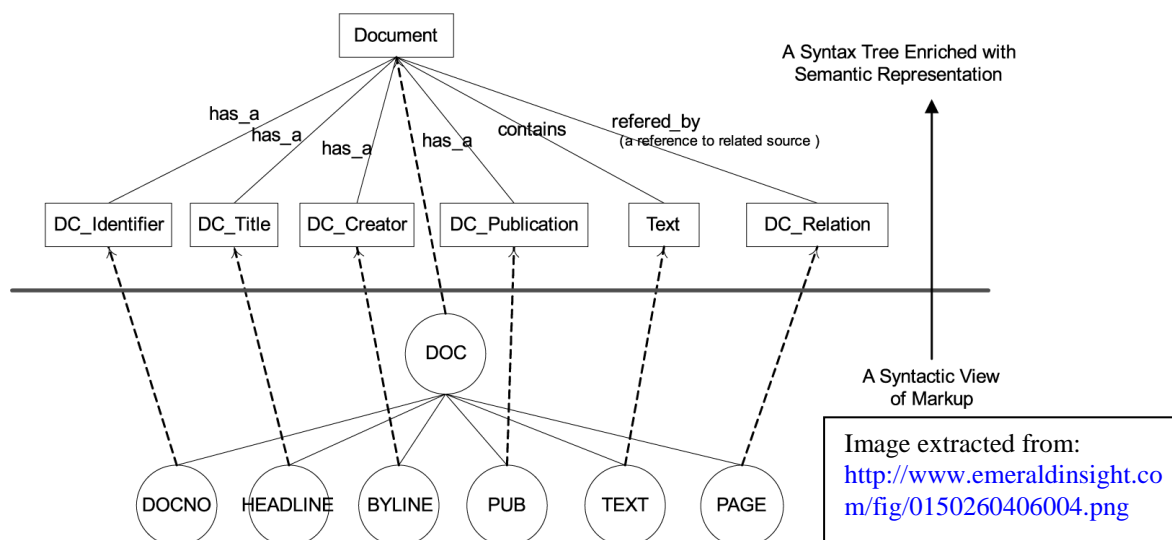
[111] JISC Digital Media (formerly known as TASI) provides advice, guidance and training to the UK's Further and Higher Education community. More information in: http://www.jiscdigitalmedia.ac.uk

[112] The evolving of World Wide Web into a recognized information data base of global proportions, not only chaotic data that lacks credibility.

Why this didn't happen yet? The professional community involved with databases and metadata don't apply resources for this improvement to happen. They don't assume or take the task of deciding a unitary system of metadata truly necessary. Not even trying to arrange a possible protocol with software creators and many publishers to choose a well balanced and effective metadata standard. This would redefine much of what is done today, in the noble objective of making information available without problems of interoperability of systems. In the general opinion of the professionals that write about this subject, this all is a strategy error. A big one I may add.

This bad management when choosing what is needed raises a well-known problem. Should university archives and libraries have copies of the digital objects available, or should they become just a portal, directing the users interested to the publishers websites? Cultural communities, like history for example, need images and the university can't provide them (image repositories in universities are usually not very complete or full in quality, consequence of the historical issue already discussed). So the professional has to go outside the university library and archives to reach these supplemental images. When a new image reaches the university what happens because no protocol or standard exists is that usually new metadata as to be embedded, and they need to be sure that the system used recognizes the image and check its copyright. Until we see more standardization the solution keeps being local content, so the consensus is that the local production has to increase and improve in quality.

"Because faculty content needs can be robust and shifting, a digital image distribution scheme will almost certainly also need to give faculty the option of integrating locally produced material.[113]"

In conclusion, what is perceived to be the key issues for universities at the present are:

- **Interoperability**: Integrate consortia provided images and metadata with images acquired elsewhere.
- **Input**: Allow and encourage professionals to change descriptive information of images.
- **Tools or applications**: Improve the community with creation of valuable tools.
- **Academic community**: Provide this same tools or systems to campus users, opening and expanding knowledge.

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[113] Besser, Howard. "Network access to visual information: a study of costs and uses." 65th IFLA Council and General Conference Bangkok, Thailand, August 20 - August 28, 1999.

Chapter III – A real case.
Perspectives on creating an archive.
1. Introduction.

"Annie Ure, as indeed most educators and curators in the last millennium, would regularly present students and other visitors with comparable material through visual aids: illustrated catalogues and other books; stacks of postcards; box after box of photographic negatives; and, at best, expensive museum quality photographs (almost always black-and-white, given the relative clarity of b/w as a photographic medium)[114]."

The example shows the past, however the future is now. Today repositories of images already exist and others are being developed right now, that changes all the process described above. From educators to researchers, they all use these image repositories as the new slides, the new photographs and the new catalogues, all online and digital based. This deeply impacts the academic community and the acceleration of e-resources changes all the system, including the role of media-culture professionals.

The present need for repositories of images requires technical prowess of some kind to make them real. This creates a problem to picture managers, research professionals and teachers that need to build this solutions made by large collections of digital objects just by themselves. Many of project managers are required to do all of this even with no training on how to do it properly. Because of that we rely on each others to be able to exchange knowledge and experience on how to do this projects, how to recognize and avoid the pitfalls, which technology is better to use depending on the needs and how to keyword large assets without taking a huge amount of time. All of them questions to be solved with care in order to avoid future re-works of your project, minimizing the time needed and the unknown factor when building a repository for the first time.

In the words of Amy Smith:

"At this point, between ten and fifteen years into the game, our imaging standards, images, and imaging tools are responsive and sturdy enough to continue to provoke the combination of uncertainty with optimism (even, occasionally, vision)...[115]"

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[114] Smith, Amy. "VLMA: A tool for creating, annotating and sharing virtual museum collections." Creative Commons Attribution Non-Commercial licence. Digital Medievalist. 2008.

[115] Eaves, Morris. "Picture Problems: X-Editing Images 1992-2010." Volume 3, Number 3. 2009.

2. Going Digital.

The product developed in Coimbra is a database for images that are the property of the University of Coimbra, and it is under the management of DIIC, the department that handles the images, identity and communications of the University of Coimbra. The product is named AIUC (Arquivo de Imagem da Universidade de Coimbra)[116]. This project appears to satisfy the existent need for organization on the DIIC.UC[117], particularly on the area of managing tools in the digital archive of images. The objective is clearly to impute all the images existent on the DIIC.UC right now, and make them available for users on a controlled and simple environment. Also, after the initial stage where the structure is created, the task will continue to be done with adding new images over time, easily updating the collection. The main objective is to create a search engine to DIIC.UC to improve the work of the professionals in providing images in a more effective manner, and to enable all community of the University of Coimbra to access images for any purpose defined on the request. The images and its suporting search engine would in a first stage directed for the university community, and after that for commercial use by people outside the university that have any monetary objectives.

Screen shot 1. This initial image was created by DIIC to show their necessities. It also explains the specifications demanded by the DIIC on the beginning of the project. They were however flexible.

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[116] [In English] Image Archive of Coimbra University (IACU).
[117] DIIC – Department of image, identity and communication of the University of Coimbra.

Above all the objective is the one to create a good and pondered metadata about all images considered, which will make the search engine easy and organized, for simple and/or Boolean researches. This practical project will even eventually make possible to get commercial advantages from these images copyrighted by the University of Coimbra, depending on the users. At last, the methodology behind the project is the strategy to its good conclusion. The theory, seen a little bit secondary in digital projects because the focus falls more on creation, development and applications, is totally relevant for the project and for the field, making it possible to map all differing phases and techniques used in the database design.

Conceptualizing what was the major problem even before the project began was not difficult. Since the start I knew that the changes believed to be necessary for this project to be complete were, most of them, difficult to turn into reality. The difficulties imposed by the institutions are harmful to the evolution into the digital era on whatever type of repository. Because to the institutional boundaries that make part of our lives in the modern academic life, all changes in the system are a big complex question. First of all, all the *"pieces of the puzzle"* in any project need to be in co-ordination. This means that all the individuals, departments or bureaucracies need to be fulfilled and in agreement. Bureaucracies included the use of the same software already used on the university (if you want to use other, you need to prove the university computer system managers that the software can't satisfy your necessities. Only then the case can be studied), the process of buying virtual space (or anything that demands payment) demands a process of slow bureaucracy and takes forever, a web page had to be requested and took another slow process, the project needed the appraisal of every department involved in order to move forward. Any step demands a slow process that makes a project of 6 months turn into almost 12 months. On this particular project the problems experienced were the slow bureaucracy already mentioned before, lack of will by some professionals because of internal (much of the times from professional or academic disagree between departments) faculty issues that had nothing to do with this particular situation, absence of virtual space for all the university services which halts projects that need the space to be created, obstacles in unlocking funds. In conclusion from all that was just expressed, there is too little space to innovate and no freedom to just develop solutions to long existent problems without having to go through barricades of obstacles of the most distinct directions. It is almost as if the system discourages you from going forward with all this demanding and slow process. The solution is simply just keep moving forward, to struggle in order to make one little step at a time to reach the major objective, and one major objective leads to more milestones in an ever improving process.

"Universities and the emerging digital distribution consortia both need to look closely at which university units will be responsible for contracting for and/or providing digital image

distribution services. This will make a difference both in terms of service and funds available for such an endeavour.[118]"

       Technically, every repository must be clearly easy to the user. Easy to the user and easy to the person/s that continuously inserts more images or information into it. If the structure of the project is simple, so is the way to use it. The university user can ask for images by personal request to the university, but also the economic possibility should be explored too. If, like in this case, the university owns the copyright of the images in its repositories, it has the responsibility of exploring all the different possibilities, the economical one included. The university has to provide images to the users on their academic walls and for the users of the academic system (other universities with who they should have protocols for exchange of images for academic purposes), but at the same time they should provide them in a monetary cost to outsiders that want to use them for their private purposes, like travel agencies, book editors, writers, private institutions of information, the media, web pages, etc.

       For this system to work we chose to use thumbnails for better browsing, giving free access to the user that will be able to browse the database and find images with low resolution[119] in JPEG format embedded with a watermark. JPEG format is a high quality image standard for storing large image assets. Moreover, it guarantees great technical security with resistance to bit errors as well as keeping quality when transmitted, migrated or compressed. More important, JPEG proved itself to be durable and resistance to becoming obsolete, one of the great fears in digital formats. Migration of formats is possible but very expensive. Takes time and staff for it to happen, and distortion or information loss is inevitably when data is migrated from format to format.

*   "Over the long term, materials stored on older media could be lost because there will no longer have the hardware or software to read them. Thus, libraries will have to keep moving digital information from storage medium to storage medium.[120]"*

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[118] Besser, Howard and Robert Yamashita. "The cost of digital image distribution: the social and economic implications of the production, distribution, and usage of image data: final report." Berkeley: School of Information Management and Systems, UC Berkeley, 1998.

[119] Be careful with the image resolution. Too poor a resolution can drive users away and not express the quality of the images. Too good a resolution risks copyright protection of images from unlawful copying and future exploitation. A good idea is to be on a reasonable center between these two extremes, because none of them are a good option.

[120] Cleveland, Gary. "Digital Libraries: Definitions, Issues and Challenges", UDT Occasional Paper #8, March 1998.

Comparative study	TIFF	JPEG 2000	JPEG
Lossless Compression	√	√	~
Lossy Compression	√	√	√
Large Images Management	√	√	~
Quality Compression	√	√	√
Region of Interest	~	√	~
Error Robustness	√	√	~

√ = Optimal   √ = Low   ~ = None

Comparing file format robustness[121]

An important step in creating a project just like this is to be sure to have a good number of images already waiting for a digital structure and diffusion. For this, if your department is made of photography and/or slides it would be wise to transform them into digital format[122]. You don't have to discard the analogue system but going digital is recommended, accepting the new information technologies to diffuse and preserve all the images. It will also improve teaching and research, giving more use to the images that don't exist only to be stored. So many high-definition images, plus safe copies, plus low-resolution images and thumbnails can only mean the need for a lot digital space. High-definition images occupy a large amount of space, sometimes hundreds of megabytes of data. That is one of the larger costs on any project (and the biggest on this one), right after personnel payment.

On this project it was also needed to hold the low resolution images, metadata and thumbnails of the images. This financial effort is more for the future than for now, where the already available digital space would solve without trouble the present needs, but in the future the database will have more images and it is preferable to solve the problem now then to mend it in the future where a huge amount of effort and time was already wasted. The images with the original quality and format of this project are stored in a protected virtual space, not connected to the internet or any other system (only the DIIC staff as access to them by their computers or directly on the disc servers). When the user chooses the images he wants, he then requests the original good resolution images without watermarking, paying for it in commercial situations or just having free access in the cases where academic purposes exist. A log of usage is also mandatory. Who asked for that image/s? When, why, for what purpose? Was it possible to supply the service or was refused by some reason? Which one? How time took to provide the

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[121] Buonora, Paolo, and Liberati, Franco. "A Format for Digital Preservation of Images: A Study on JPEG 2000 File Robustness." D-Lib Magazine. Volume 14 Number 7/8, July/August 2008.

[122] Check if the copyright or licensing your institution has doesn't restrict or even prevents conversion. If your images don't have copyright or licence you might want to check: Creative Commons, a flexible and open licence standard.

service? And so many questions more. Why bother the creator and librarians/technicians with these questions? Because they make possible to introduce better control into the repository, to improve the system and to continue a line of work taking the information into account, to evaluate the database and its service. In that way they are able to do statistics that are so useful to see if the platform is supplying a good service or which good implements were well accepted by the users, and even what areas can be improved.

This evaluation is needed to improve the service, to go further, to evolve. Unfortunately barriers halt this evaluation at a certain degree. Digital libraries field concentrates on creating, implementing and innovating, which leaves no room to an evaluation that consumes time, money and commitment; it is seen as not a necessary task. No time for it when so much is left done is the normal thinking, but when a field lacks evaluation it languishes slowly and evolves without guidance. Evaluation helps a project to live up, not to stop after is created. It guides the project to the right path when it finds what is being done wrong and right, which means constant production, tuning, care and control. The complexity of digital systems makes them hard to be evaluated by normal measures. They need to be evaluated within a standard that understands multidisciplinary and technological complexity, having the sense that experimentation in these projects is a part of the environment and it should be encouraged even with the danger of failure or the fear from change. On this project there are several possible evaluations. Statistic studies, using the statistic option that the software provides, gives the professional a vision on what images are more searched and what fields need a more increased attention. The administrative metadata gives the possibility to see the same as the point before, adding study about who inputs data on the DIIC.UC, like the periods when that input is more intense or low and dates when more requests are made. Also it provides information on which companies or departments are already getting used to the database and which ones are needed to focus on to better reach them.

After understanding what the necessities were, the next step was to choose software with a good metadata standard. A good metadata standard that would be able to respond the typical questions from users: Who took the image, who owns it, who is in it, why is this image interesting and what it portraits? Where it was taken? When was this image created or modified? The main requisite was that it needed to be open source software. For this project the resources were minimal, and so it was integrated into the already open source but personalized software that the university uses in general. Academic institutions like libraries and universities should be careful in using companies or private software to create their repositories, the protocols should always be very clear. If your budget is low like the one in this project, then open source will be a good option, and they populate in numbers for you to choose. Options exist like Fedora[123],

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[123] Fedora (Flexible Extensible Digital Object Repository Architecture): http://www.fedora-commons.org/about

DSpace[124], Greenstone[125], Omeka[126], and many others. It is even possible to create repositories using development tools like PHP language or mysql[127] without having much monetary costs. If you want to use a commercial solution some possibilities available to academic and cultural institutions are: iBase[128], Innovative Millennium[129] or Third Light[130]. All of them good for image management projects.
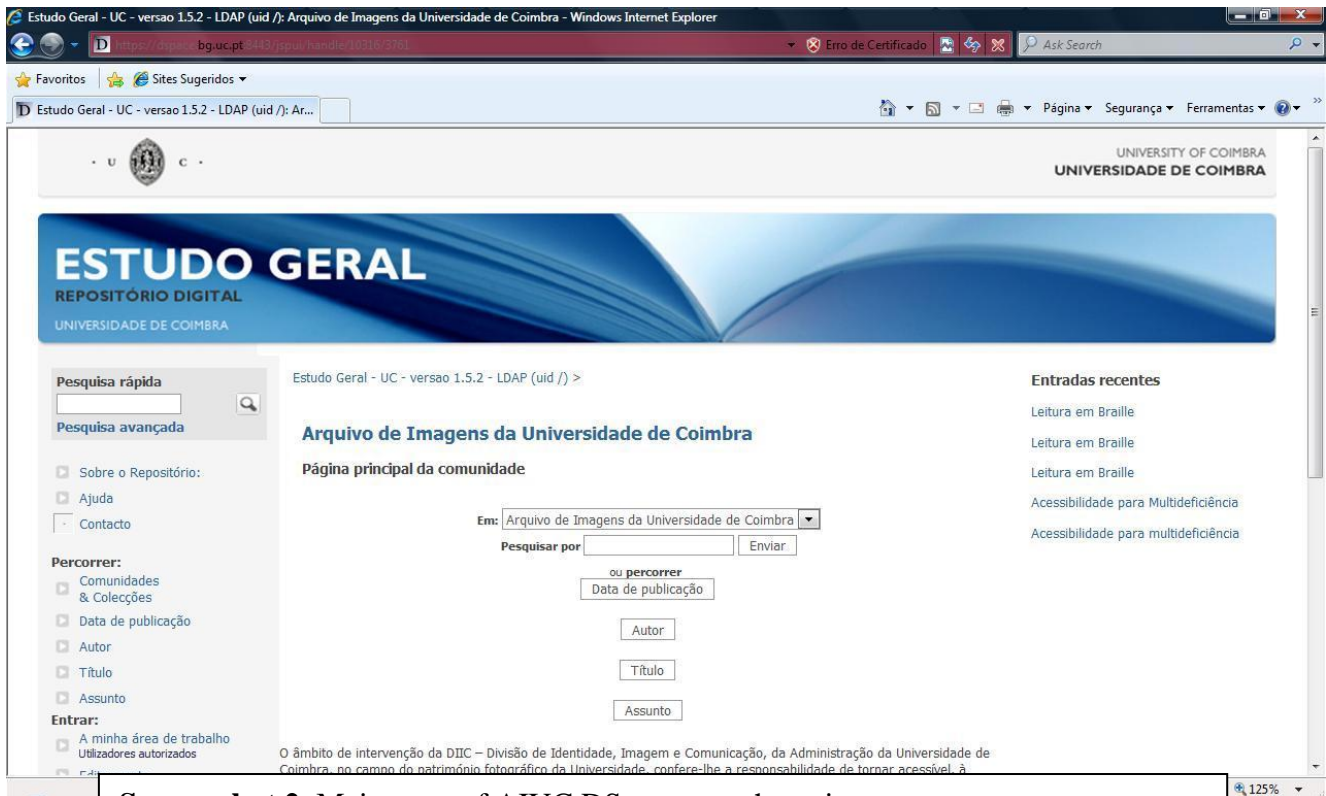
Screen shot 2. Main page of AIUC DSpace search engine.

On this project two choices were at the table: DSpace and Greenstone. DSpace ended being the chosen one because the university already was using DSpace for the digital textual objects in the digital online repository, with a variety of thesis, articles and academic magazines, and was not reasonable to use another one that could create technical complications. After understanding that the software could be used also for images, the choice was self-evident. The

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[124] Software for academic, non-profit, and commercial organizations that are building open digital repositories. http://www.dspace.org/#

[125] Software ideal for building and distributing digital library collections: http://www.greenstone.org/

[126] A free open source web-publishing platform for libraries, museums, archives, collections and exhibitions. Http://omeka.org/

[127] Mysql software of database production: http://www.mysql.com/about/

[128] http://www.ibase.com/

[129] http://www.iii.com/index.php

[130] http://www.thirdlight.com/

chosen metadata standard was Dublin Core[131] that was ideal because of its broad metadata elements. Some few additional metadata elements had to be created in order to adapt it to the project needs. The idea of any project should be simplicity, and this metadata standard combined with this open simple software creates a fruitful environment for success to happen.

"The less complex a system of access management, the more readily it can be adopted technologically and organizationally, and the more acceptable it is to all involved in its implementation.[132]"
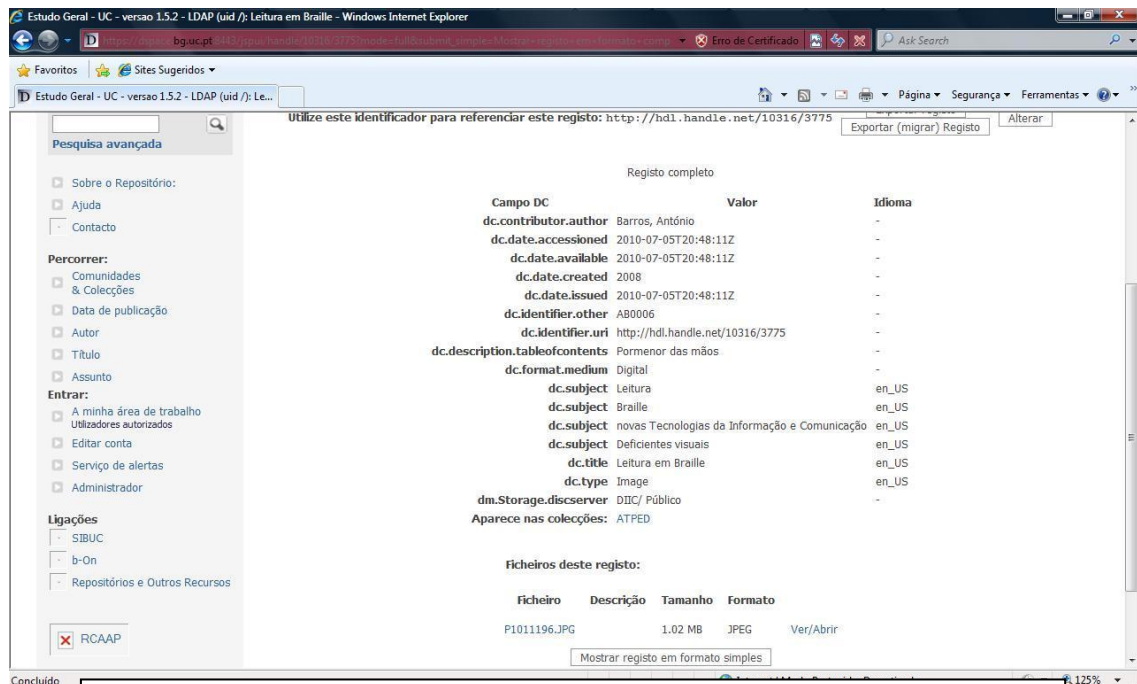
Screen shot 3. Display of metadata of an image. (thumbnails still not activated).

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[131] Dublin core Metadata Standard explained in: http://dublincore.org/documents/usageguide/
[132] Arms, Caroline. "Enabling Access in Digital Libraries. A Report on a Workshop on Access Management." Digital Library Federation. 1999.
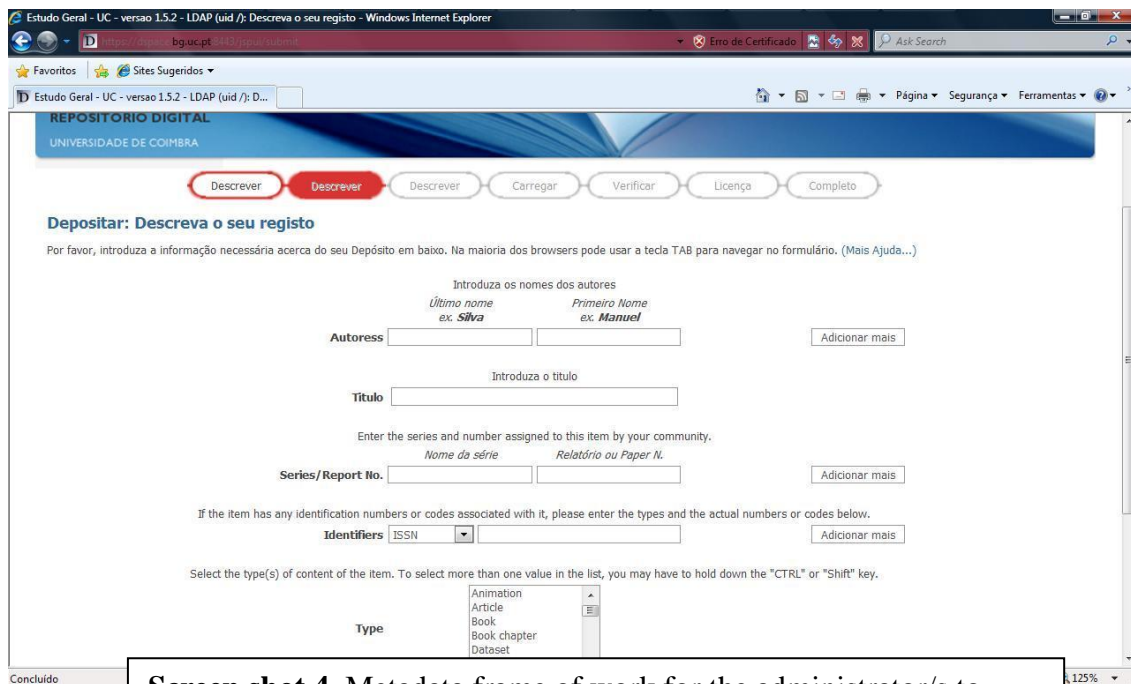
Screen shot 4. Metadata frame of work for the administrator/s to deposit metadata to each individual image at a time. On the top in red, it shows the flow of work of the metadata input different stages of work.

DIIC necessities	Dublin Core
1. Title	1. Title
2. Author	2. Contributor – Author
3. Index / Keywords	3. Subject
4. History	4. Description
5. Copyright	5. Rights – holder
6. Year	6. Date – created
7. Format	7. Format – mimetype
8. Registration n.°	8. Identifier – other
9. Dpi's	9. Format
10. Suport	10. Format – physical medium
11. Notes	11. Description – tableofcontents
12. ID	12. Is Automatic

Table 2: Dublin Core (DC) and Project DIIC Dublin Core: A Comparison.

New DIIC metadata:	
13. Box nº 14. Cd nº 15. Disc / Server	13. Storage – box : in which box the image can be found. 14. Storage – cd : in which cd the image can be found. 15. Storage – discserver : in which Disc or server the image can be found.

Table 3: New administrative metadata in DIICMeta (DM)

| Administrative Metadata New DIIC metadata	
1. Reception date	1. Request - Reception – date when the request is received
2. Sendind date	2. Request - Sent – date when the image is sent.
3. Entity	3. Identity - Entity – company or department that makes the request.
4. User	4. Identity - User – user that makes the request
5. Matter	5. Matter – reason for the request.
6. Status	6. Status - If it was sent, if it is on hold or if it was rejected.

Table 4: New user metadata in DC structure, named DIICMeta (DM)

The tables above show the changes that had to be done to adapt the Dublin Core for these project necessities. Twelve fields of the Dublin Core standard supplied the needs of the project (as seen in table 1). The remaining fields were not of our interest and were discarded for other more needed. That is seen in table 2, with storage field and all his three qualifiers, and in table 3 with the administrative metadata of request, identity and matter. Right at the start of the project the understanding of what were the most important elements was clear. Index/Keywords that are designated by Subject element, History that is designated by Description element (background of the image), Author that is designated by contributor element (author qualifier) and Registration nº that is designated by Identifier element (other qualifier) used to achieve a better catalogation and identification of the digital objects. The registration number is as important as the traditional ISBN number in any library. For that reason this number and its supporting pattern strategy (AB0001, AB0002, AB0003...) must be permanent even when migrated. Therefore it is highly recommended not to use the location as identification. For this project we decided to use the author name (ex. António Barros – AB) because it's the most secure. The local might change when someday images change hands in the university, the author will never change, and it lasts indefinitely.

"Digital Images can be very complex to describe and before you can even begin to say anything about an image you need to be very clear about what you're actually focusing on."[133]

These four strong elements are the base identity of any digital object on this image repository. They give the most important and desired information on search elements possible for the user and manager, still respecting the needs of order in the institution. Understand also that it is not demanding to have fifteen metadata elements, that it was just a coincidence. These facts reveal that even with the very broad elements, Dublin Core needs adaptation from project to project and doesn't solve every need, what gets more complex when dealing with digital images. Digital images are harder to index with metadata then other digital materials mainly because they are images and have different layers of subjective information within. So it depends on who inputs metadata, if he can relate to the subject in the image in order to explain it, to be able to express all of the layers in the image, and if he can contextualize the image and its theme.

"A digital image may contain many different layers (e.g. a particular landscape, a drawing of that landscape, a photograph of that drawing, a digital scan of that photograph). Each of these "images within the image" will have its own context (e.g. a geographical location, an art collection, a photo album, a folder on a server). (...) Much of the work involved in scoping image metadata is therefore deciding on what detail the identifiable users of your images require, and how best to achieve this detail given the likely constraints of time and resources available.
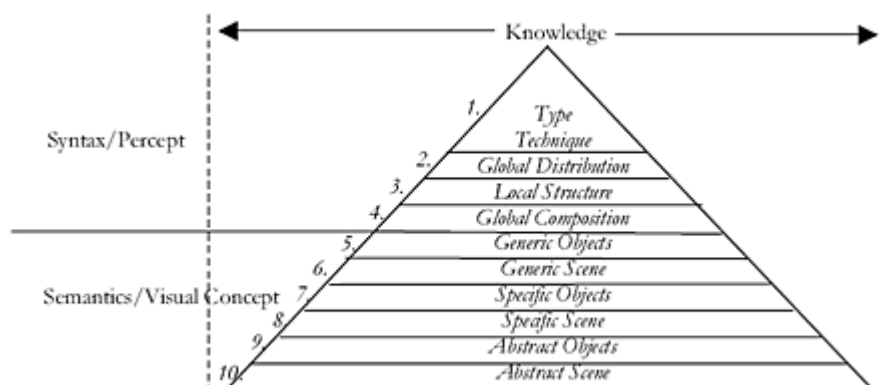

Alejandro Jaimes and Shih-Fu Chang (2000).
Jaimes and Chang produced a pyramid model of the layers for describing images.

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[133] JISC Digital Media (formerly known as TASI) provides advice, guidance and training to the UK's Further and Higher Education community. http://www.jiscdigitalmedia.ac.uk

It is important to do research at this stage. Research about what subject you are indexing to avoid errors, or you get poor metadata, and poor metadata turns a search engine a poor one. The administrative metadata supplies the need of the DIIC of control and saving records for evaluation studies. On this project, the scheme (<u>see page 89 and 90 of this thesis</u>) was delineated to be functional both for user and admistrator. Because of that, a new interface was defined to be included into the DSpace only accessible by the administrators, where this administrative metadata could be included. For that purpose a registration with each informative element from the administrative metadata (see the table 3) was designed, and in this way all registrations will be carefully saved in a safe manner and closed from the public.

A last advice is for everyone to be careful with their project or department images metadata. You should give them the metadata right away when they are created, so that later the professionals don't have to contextualize, remember when it was taken, who took it and even why. This avoids problems, delays and efforts further on.
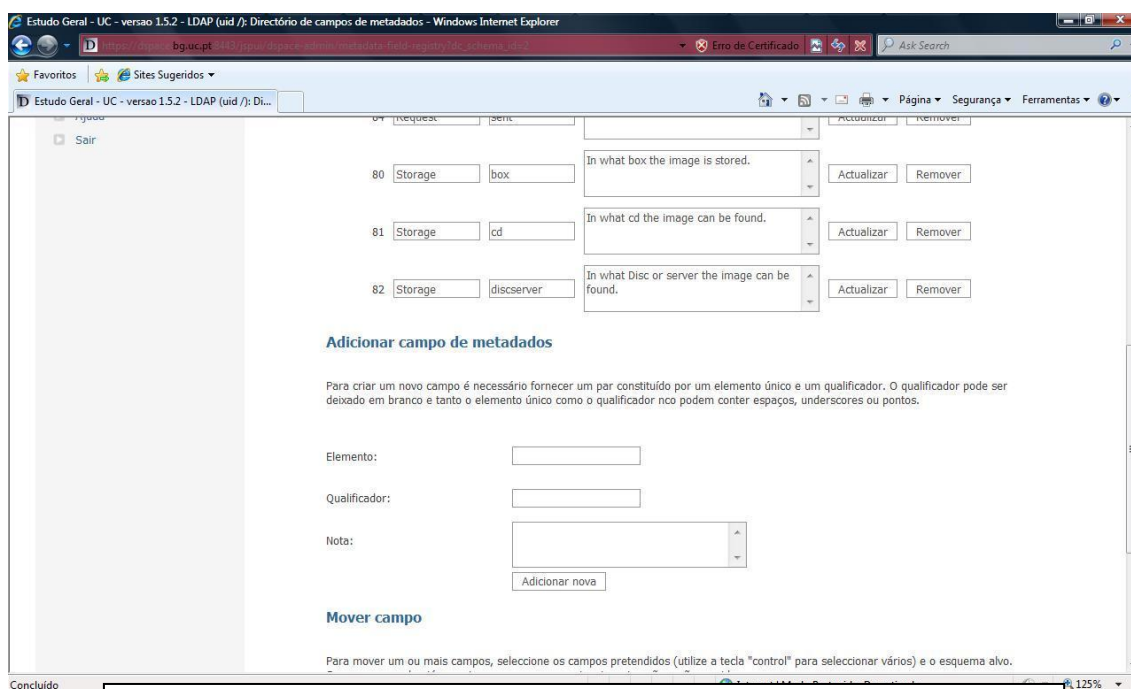
Screen shot 5. Main frame in metadata section. Adding a new metadata element.

So until now we have mentioned several software solutions and they are all enough to create the basis of a good platform. They are indeed good starting points as they have all a similar software language. But for a complete platform they need to be usually changed by the user (sometimes changes at its core, other times just little adjustments) to be suited for any particular project. Adding to technical changes and metadata elements changes, also installing and creating new applications for the users are part of the bases for any project of this kind to

keep refreshing itself and keep giving a better service each time a new application appears (Web 2.0 already explained before is a good example for the applications on a database that is at the same time a website, but even apple uses apps to continue to attract users). Without this the projects stays confined within walls, trapped in an evolutionary road that leads nowhere, crystallized and without movement. A project like this has to be in constant movement or else the public sees the project as something static and static projects on the web exist in great number, forgotten and unused. Always remember that the user has to be treated like a client, a consumer. It demands the service at its best and we have to provide it, more and better.

Then what can be done to prevent creative stagnation? New applications that make the site interactive are welcome but also something as simple as new images at decisive moments. The user should be able to ask for photographs at a different level already mentioned here. A request like: "*I need a picture with the university and some students in front*" is something already done, because this type of images already exists in the database, but what about: "*I need pictures for that event in the university, can you please go there and take it?*" And maybe faculty users can apply pictures to the university, adding quality to the database. I mean apply instead of add merely because they have to go by the DIIC (or other department) evaluation of quality, instead of being a free adding of images to the data base. Metadata can be enhanced also, connecting images with other images forming a web of images related with each other. What about connecting images to text? Imagine an image that shows the university old library for example, and that is related with the book about it by some author, and that book relates to a movie done about it, which connects to another image related, in an interactive process of searching. Who can do these connections between Medias? The ideal is a board of professionals that combine technology understanding of the process, and the knowledge came from research of what the images express, its history and layered subjective information.

Connection is the big concept in projects of the digital world, and connection to the users is vital for projects to remain alive. Using web 2.0 like a window to the academic field to achieve that effect, therefore leaving behind the old though of "*is not relevant for a high standard field as the academic one to have blogs, podcasts, social pages or forums*". The private companies do it for commercial purposes. The academic world that has the tradition of holding the responsibility of being at the vanguard of innovation on almost any field is going to be left behind on this evolution?

As we can see, many solutions exist today for these projects. However the wait for a great tool of this kind that is build especially for this objective will continue. Maybe these hints will help software builders, who know. One of the big problems is a non existing protocol for a "unicode" between companies of this field.

"The set of managerial and technical activities involved in software engineering appears to be somewhat orthogonal to core research activity in the humanities, being concerned more with the production of research-enabling software systems than the research itself.[134]"

Software creators and providers create software and applications at an incredible speed, but they don't work aside between themselves in projects, and because of that they much of the time end with software that can't be linked, with applications that aren't compatible, which prejudices it. If you ask the academic community they will probably tell you that they need better build and complete tools for their research, without the problem of compatibilities or complications that make a professional researcher stall its work to resolve technical problems. In order for this services to be able to be put together with the intention of achieving a common goal and with predictable characteristics.

"The emergence of information and communication technology has repositioned the frontiers of academic library resources, operations, and services as well as expectations of user groups. (...) Academic libraries must embrace this scenario. (...) When such a step is taken, academic libraries must remember expandability, flexibility, and compatibility[135]."

In these particular projects concerning digital images, maybe the solution has to come from the academic world that understands more about the questions of complexity of the tools versus simplicity of software, and the importance of interoperability between the universities and related institutions to create protocols between them in order to share images. This service-oriented sotware creation has the DSpace or Omeka software in the image databases, or even Moodle on project managing, to prove that is perfectly possible of doing.

"Beyond the technical, major organizational and infrastructure issues have yet to be resolved. Although service-orientation is beginning to become more widespread in commercial IT, cross-organizational services are still relatively rare, particularly on a large scale, and most service-oriented implementations are intra-organizational.[136]"

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[134] Gold, Nicolas. "Service-Oriented Software in the Humanities: A Software Engineering Perspective." DHQ: Digital Humanities Quarterly, Volume 3, Number 4. Fall 2009.
[135] V. Anunobi, Dr. Chinwe "The Role of Academic Libraries in Universal Access to Print and Electronic Resources in the Developing Countries." Library Philosophy and Practice 2008.
[136] Gold, Nicolas. "Service-Oriented Software in the Humanities: A Software Engineering Perspective." DHQ: Digital Humanities Quarterly, Volume 3, Number 4. Fall 2009.

Moving forward on the methodology, to begin the repository we decided that the best method was criteria-based selection. This means that over the thousands of images to format, create metadata for, to resize and rename, some needing digitalization, some needing migration (basically all the tasks that can and will probably appear), we choose a few, a sample that has diversity highlighting the collection strength, in order to insert them into the repository with the objective of testing it and make a good strong start.

After chosen the groups and images decided more important as they show high intellectual value and long-term use, we started the arrangement of the portion of a collection that reflects the collection general content and are viewed as having more demand over them (demand creates access, the university is pressured to make what is needed for the images to be accessible). The smaller a collection more manageable it becomes and
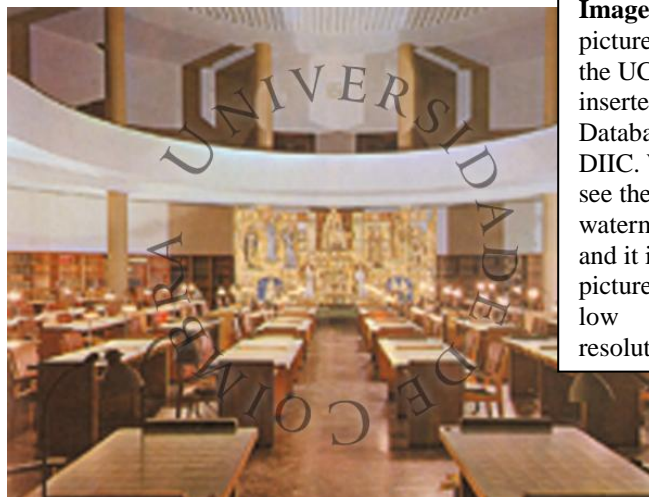
how larger it becomes more difficult it is to manage it, to achieve control. So sometimes is preferable to have a smaller collection that has highly value. In this case we began with 208 images which is a really small sample, and the university decided to state the obligation of 500 images per year minimum so that the repository doesn't get unused or forgotten, motivating images to continue being inserted. These 208 first images are to be installed in deferred, using dreamweaver XML files were created and the metadata was formed, with the files delivered in separated files. All this images needed treatment in watermarking and resize, but also naming. Naming is important to improve identification so all images had to be renamed to be the same of its metadata. On the beginning the idea for this project was to have 1.200 images in 6 months, but that number decreased as the project flow changed and both bureaucracy and time entered into the equation. So don't be afraid when this happens with your project. It doesn't means that your project is doomed to fail, it only mean that you should rearrange the priorities and numbers to fit the situation, in order to keep the project alive even in a slower speed of production.

The public targets for this repository at the present moment are: students, faculty (including departments of the UC) and researchers from the UC. Latter on after some experience, consolidation of the service internally and a lot more work into copyright issues that includes protocols with the authors of the images, promotion of the service and the always needed proof of a good and needed service, the target can be extended to invited guests, companies, external independent professionals. Any other national or international university (or any credible academic institution with which some protocol can be arranged) with the interest for accessing UC images are encouraged to engage into conversations with the UC, in

order to set protocols. These protocols should express very clearly all the access rights and they should state that the UC his granted with the right to access the other party images.

Access management systems have some complexity and this one is no exception. Two ethic rules need to be followed. Privacy is the first one. Privacy for the users, being them whoever they are, is mandatory because it is a right of the user and would be an abuse of privacy if the UC would try to track or disclosure its users. Any transaction of images, money or messages should be done between the service provider (in this case the DIIC.UC) and the user. Logs are kept in a safe manner, without any disclosure or use in marketing, never releaved to any third parties. Logs should be for the DIIC use in any study never revealing the user or just to evaluate the service and improve it in that way.

The second one depends on who the user is and relies on good-faith and common sense from both parties. With users from the UC it should exist a healthy relation of trust, where the user reads the copyright rules when using this service, and agrees with them trusting in the DIIC.UC. On the other side the DIIC.UC needs to trust their users when doing the rules and applying it. On external users the issue becomes more complex, there is a need for more restraints and control on whom gets the image/s and what can they do with them.

"Users and providers would each prefer to depend, in an access management system that implements these agreements, on reasonable barriers against abuse rather than complex restrictions that inhibit use."[137]

Access to the DIIC.UC is going to be made without registration and authentication. It is going to be an open access repository with a search engine. The pictures with low resolution, watermarked and the copyright rulings in the web site that contains the repository are factors good enough to restrain the use and control what end the images will have. It is the only protection that was decided to have, without restraining too much the user, turning the repository unattractive for use and ultimately forgotten. Maybe in the future some kind of simple authentication system will be recommended for controlling the external users in the commercial addition to the repository, a new addition.

So the different stages that happen in accessing the repository were already explained. Resuming, first the user has access to the images, which is open access. Then he makes the request. If the request is accepted then the image is consequently replicated and sent to the user for specific objective/s. Any other unauthorized objective that is seen is a break of commitment to the copyright laws. On the other side, other stage that doesn't implies the user starts. The professional that controls the repository receives the request, after confirming the credibility of

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[137] Arms, Caroline. "Enabling Access in Digital Libraries. A Report on a Workshop on Access Management." Digital Library Federation. 1999.

the user and briefing with the DIIC.UC responsible, the professional sends a replication of the image in perfect conditions and without any watermarks (invisible watermarking is possible, but for the moment internally there is no need for overprotection). The last task is to save this service into the image administrative metadata[138] that is only available to the DIIC.UC (like mentioned before on this chapter). The objective of this last task is to give the project control of its services, evaluation of the efficiency and how needed is the service. Also this administrative metadata is an important record for the future, historically and for future studies.

"When considering a database system for storage of your metadata, it is important to keep in mind whether you intend to provide some or all of your metadata as a web service.[139]"

In a last stage of the project, giving a personal design to your database is a move into personalizing it, creating a defined identity and turning it visually and commercially attractive. However remember always to make it simple, complexity turns the user tired and unwilling to use your database again. An image repository should be a mirror of itself, expressing what the contents are. When done inside an academic institution it will have to respect different pre-requisites and standards in order to be accepted. This is an obligation of the university with the objective of having a unique image and design pattern, just like what happens in the technical part.
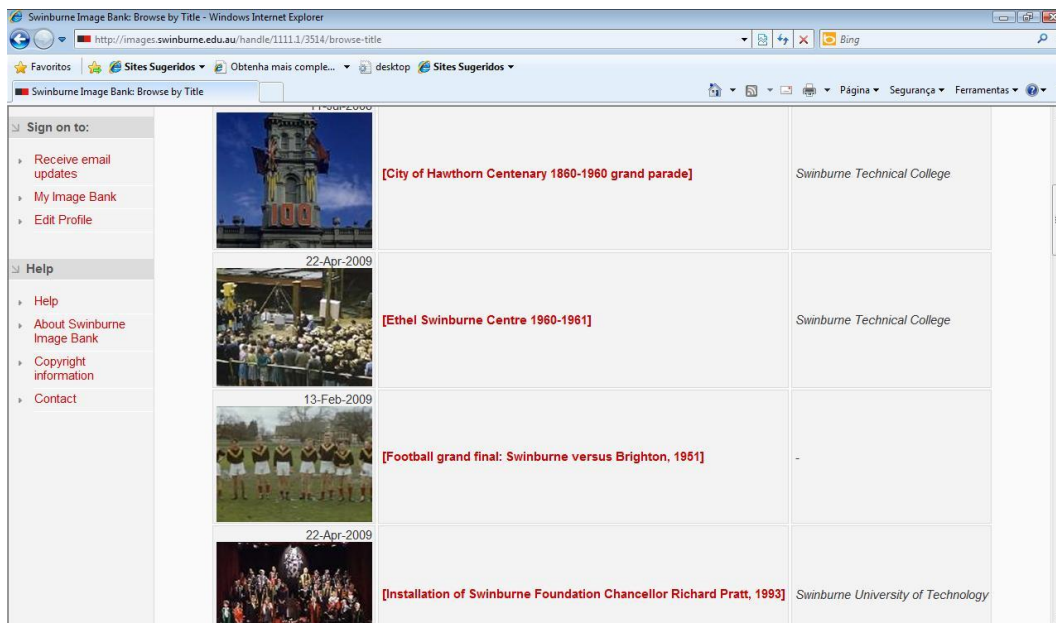
Screen shot 6: Swinburne Image Bank. An example how an image repository created using Dspace can be personalized and how it looks.

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[138] See - Table 3: New user metadata in DC structure, named DIICMeta (DM).
[139] A. Morris, Robert. "Image Metadata Standards and Practices." Department of Computer Sciences, UMASS-Boston. Page 19.

Concluding, digital projects are hard work and planning, but more important no digital project is over. It is a continuous process of improvement and enhancement. So never think your job is done because there is always something more to do and plenty of room to improve.

"It was easy to measure progress as I ticked off tasks in email messages to the archive's editors. In time, when enough of these individual tasks were "done," the project might be finished. Or would it? How do we know when we're done? What does it mean to "finish" a piece of digital work?[140]"
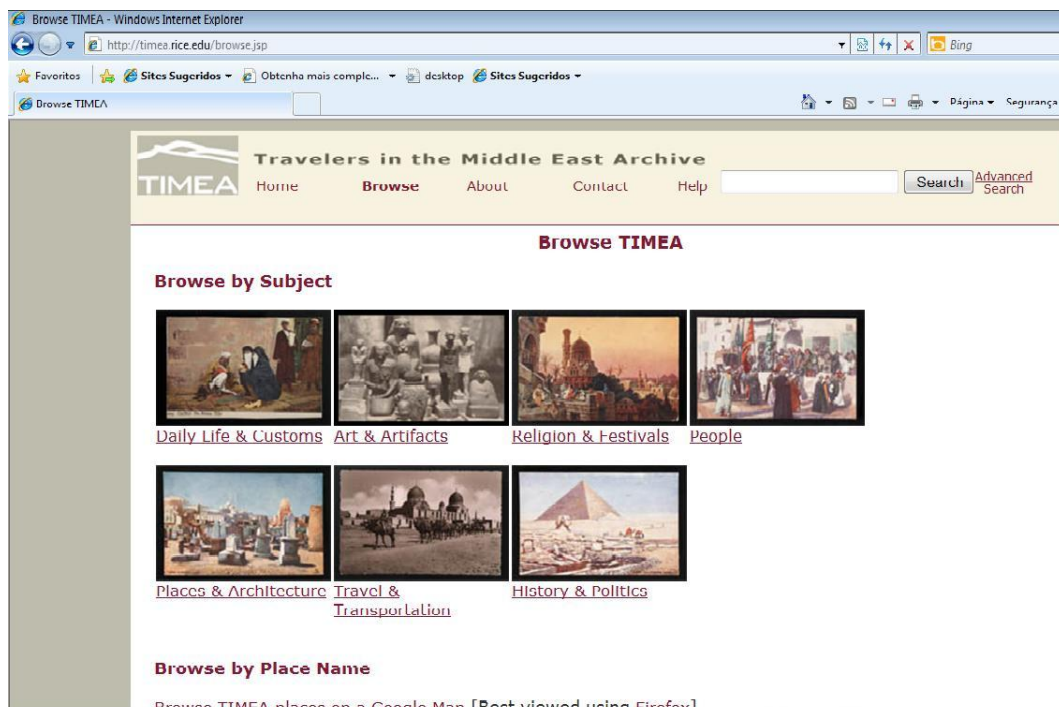
Screen shot 7: Australia & Rice University's Travelers in the Middle East Archive, TIMEA. Other example how an image repository created using Dspace can be personalized and how it looks.

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[140] Kirschenbaum, Matthew G. "Done: Finishing Projects in the Digital Humanities." University of Maryland, Digital Humanities Quaterly, Volume 3, Number 2, Spring 2009.

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Web Links:

Concepts by the users:

What is Web 2.0:

http://en.wikipedia.org/wiki/Web_2.0

What is Digital Library:

http://en.wikipedia.org/wiki/Digital_library

What is Digital Content?

http://www.digitalstrategy.govt.nz/Resources/New-Zealand-Digital-Content-Strategy.

What is Legal deposit:

http://www.bl.uk/aboutus/stratpolprog/legaldep/report/

What is Text-Mining: http://en.wikipedia.org/wiki/Text_mining

What is Slide Library Concept: http://en.wikipedia.org/wiki/Slide_library

Others:

Fedora Data Base Software (Flexible Extensible Digital Object Repository Architecture):

http://www.fedora-commons.org/about

iBase, commercial software for image managing: http://www.ibase.com/

Inovative Millenium, commercial software for image managing:

http://www.iii.com/index.php

Third Light, commercial software for image managing: http://www.thirdlight.com/

DSpace, Software for academic, non-profit, and commercial organizations that are
building open digital repositories**:** http://www.dspace.org/#

Greenstone, Software ideal for building and distributing digital library collections: http://www.greenstone.org/

MySQL is the world's most popular open source database software: http://www.mysql.com/about/

Omeka - A free open source web-publishing platform for libraries, museums, archives, collections and exhibitions**:** http://omeka.org/

RDF – Resource Description Framework, standard model for data interchange on the Web: http://www.w3.org/RDF/

Metadata Working Group (MWG): http://www.metadataworkinggroup.org/

The Dublin Core® Metadata Initiative: http://dublincore.org/

Dublin Core metadata standard guide: http://dublincore.org/documents/usageguide/

Guidelines for handling image metadata, Version 1.0.1. February 2009: www.metadataworkinggroup.org

DIDL (Digital Item Declaration Language): http://standards.jisc.ac.uk/catalogue/DIDL.phtml

JISC Digital Media (formerly known as TASI) provides advice, guidance and training to the UK's Further and Higher Education community. http://www.jiscdigitalmedia.ac.uk

JISC Digital Media has surveyed a range of image management software developers to gather specific information about their systems. These are the responses from Greenstone: http://www.jiscdigitalmedia.ac.uk/stillimages/advice/image-management-greenstone/

A informative blog article that contains personal arguments of the author about the JPEG2000, in: http://dltj.org/article/video-jpeg2000-alliance/

Adobe Software Company: http://www.adobe.com/

PERL is a highly capable, feature-rich programming language with over 20 years of development: http://www.perl.org/about.html

Visual Resources Association: http://www.vraweb.org/about/index.html

Art Museum Image Consortium (AMICO): http://www.amico.org/home.html

The **Open Content Alliance** (OCA) is a collaborative effort of a group of cultural, technology, nonprofit, and governmental organizations from around the world that helps build a permanent archive of multilingual digitized text and multimedia material: http://www.opencontentalliance.org

OCLC today, that is a co-operation between 27,000 libraries, archives and museums in 171 countries. For more information: http://www.oclc.org/

Museum Educational Site Licensing Project (MESL):
http://cidc.library.cornell.edu/reports/mesl.htm

List of Data Repositories:
http://www.diggingintodata.org/Repositories/tabid/167/Default.aspx

The Canadian Architectural Archives Digital Image Repository:
http://www.ecuad.ca/node/1198

Nasa Image Repository:
http://www.nasaimages.org/

The Digital Gallery provides free and open access to over 700,000 images digitized from The New York Public Library's vast collections**:**
http://digitalgallery.nypl.org/nypldigital/index.cfm

Google-Michigan Digitalization project:
http://www.lib.umich.edu/michigan-digitization-project

Harvard University Library: Visual Information Access:
http://via.lib.harvard.edu/via/deliver/advancedsearch?_collection=via

Faculdade de Belas Artes da Universidade do Porto - Lista de bases de dados de acesso livre: http://sigarra.up.pt/fbaup/web_base.gera_pagina?p_pagina=2448

Base de dados do Centro de Documentação 25 de Abril:
http://www1.ci.uc.pt/cd25a/wikka.php?wakka=fotospo

Libreka – a biblioteca universal de livros em língua alemã:
http://www.goethe.de/ins/pt/lis/wis/sbi/art/dig/pt2913809.htm

List of information technology Grants:
http://www.technologygrantnews.com/grant-index-by-type/library-grants-funding.html

Identidade Visual da Universidade de Coimbra: http://www.uc.pt/identidadevisual

Digital Library Consulting are experts in the development, customization, and support of software for presenting digital libraries on the Internet. They focus on two core products **– Greenstone and Veridian:** http://www.dlconsulting.com/

Defining Image Access - Requirements for interoperable discovery and delivery of image data stored in DSpace, EPrints and Fedora-based institutional repositories using a data web approach**:** http://imageweb.zoo.ox.ac.uk/wiki/index.php/Defining_Image_Access

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Objectivos do Projecto:

- ✓ Proporcionar um instrumento simples de utilizar, sem necessidade *tutorial* para utilizar – *user friendly* – e interactivo que facilite aos visitantes do site a possibilidade de aceder à base de dados e a todas as imagens lá contidas, até 28 de Junho de 2010;
- ✓ Criação de arquivo de imagens, onde seja tudo simples de encontrar e, mais importante, que seja algo permanente para que a informação não se perca (de acordo com o documento anexo);
- ✓ Possibilitar a anexação de novas imagens e novas informações ao projecto ao longo do tempo, actualizando a colecção, melhorando-a e completando-a (de acordo com o documento anexo);
- ✓ Completar a colecção com *metadata* para cada ficheiro (de acordo com o documento anexo);

  - o *Aumento do prazo para final de Setembro 2010.*

- ✓ Resolver uma necessidade do Gabinete de Comunicação e Identidade da Universidade de Coimbra, que é ter uma base de dados disponível para a sua colecção de mais de 1000 imagens (de acordo com o documento anexo);

  - o *300 Imagens até finais de Setembro. 208 já prontas com metadata e entregue á responsável pela introdução dos dados do SIBUC.*

- ✓ Formalizar um método de organização que seja simples de compreensão a todos, que se torne uma ajuda qualitativa a outros projectos futuros tal como os projectos presentes;
- ✓ Realizar um trabalho teórico que possa realizar essa mesma formalização, descrita no ponto anterior, mas que também sirva de relatório ao projecto em si;
- ✓ Habilitar um operacional no DIIC a manipular a aplicação, fornecendo todos os códigos de gestão da base de dados;
- ✓ Criação de um *Walkthrough* dentro do projecto teórico que ensine o novo responsável a usar o software, onde clicar para fazer tal processo, introduzir novos dados, etc;

  - o *Ainda sendo preparado. A tese está pronta, falta apenas um relatório sobre o trabalho para ficar no DIIC, explicando a utilização da base de dados e estratégias para o futuro.*

Scheme of works of AIUC:

Interface principal
(rosto em Silva)

Contém:
Texto introdutório
Slide show (20imagens)
(tipo o modelo digitalia)

Links do lado esquerdo:
Glossário
Ficha técnica
Contactos
Link para página da pesquisa em
DSpace

**Interface - Página de pesquisa
Dpace**

Contém:
Sistema de busca.
Texto introdutório
Texto de copyright
Pastas com as imagens
Destaques na tabela do lado direito
Browse pelos seguintes campos:
Autor - contributor
Data – date created
Nº de registro - identifier
Palavras-chave - subject
Titulo - title

Nas imagens:
Link para interface de registro (para
acesso dos administradores)

Design:
Banner no topo
Titulo
Thumbnails

Interface de registro – Formulário para os administradores do DIIC

Formulário de novo registro posicionado do lado esquerdo. Contém:
-Data de recepção
-Data de envio para o utilizador
-Utilizador que fez o pedido
-Entidade que fez o pedido
(ou entidade do utilizador que fez o pedido)
-Assunto (razão do pedido, para que fins)
-Situação (enviado ou rejeitado ou em espera)

Registros anteriores (formulários antigos) Posicionado do lado direito. Com Links para os ver na totalidade. Guardados em lista de forma cronológica para facilitar a sua visualização.

Esquemática do Interface:

Banner

Pesquisar por: quem fez o pedido e por data. Assim, por exemplo, se pesquisar por uma entidade aparecem me todos os pedidos dessa mesma entidade.

Browse simples por ordem alfabética

Formulário novo com um campo para cada elemento informativo:
-Data de recepção

-Data de envio para o utilizador

-Utilizador que fez o pedido

-Nome da/s imagen/s pedida/s

-Entidade que fez o pedido
(ou entidade do utilizador que fez o pedido)

-Assunto (razão do pedido, para que fins)

-Situação (enviado ou rejeitado ou em espera)

Lista dos registros já existentes por ordem cronológica:

Exemplo com os campos necessários básicos (clicar para ver o registro completo):

11/10/2010
AB0001; AC0010 BGUC

Questionário:

"Academic users value their personal space highly.[141]"

- *In the words of one librarian in one Digital Library Federation meeting, users want the library to "make the connection and get out of the way."*
- *Giving them the free will to exercise their personal responsibility or to have the "right to do reasonable things and the responsibility not to do unreasonable things."*
- *They would expect any access management system to allow them access to all the information that they are entitled to have access to, inform them of their privileges and responsibilities, and explain how they can negotiate additional privileges.*
- *They expect patterns of use permitted for print publications to carry over into the electronic environment, making the change of systems less distressing.*
- *They also expect that publishers will somehow guarantee that the content they are accessing has not been corrupted inadvertently or maliciously.*

Estas situações acima descritas foram as conclusões chegadas numa conferência da **DLF nos Estados Unidos em 1998**. A minha intenção é entender o que mudou entretanto, se é que mudou alguma coisa, o que surge do pensamento académico de docentes e estudantes depois de 12 anos.

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico:

1. Espera todas estas situações acima descritas?
2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?
3. Preza o seu espaço pessoal digital?
4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?
5. O mundo digital académico necessita de "*policiamento*" para manter a informação fidedigna?

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[141] Enabling Access in Digital Libraries: A Report on a Workshop on Access Management by Caroline Arms. 1999. Council on Library and Information Resources.

Resposta 1#
University Student

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Quando pesquiso, espero encontrar toda a informação que existe na área de interesse e ter acesso a ela ou ser rapidamente informada da forma como poderei obtê-la caso esta não esteja disponível a todos os utilizadores (mas preciso de saber que ela lá está!)

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Claro que isso seria o ideal. Fico por vezes desolada por não ter acesso a alguns artigos que não são gratuitos nem subscritos pela minha faculdade, mas também compreendo que cada editora possa fazer a sua escolha. No meu caso tenho sempre a possibilidade de contactar o meu peer e pedir-lhe pessoalmente acesso ao seu trabalho.

3. Preza o seu espaço pessoal digital?

Não entendo muito bem a pergunta mas se se relaciona com a privacidade em relação a tudo o que publico na web, não tenho ilusões sei que fica disponível para qualquer um e por isso tenho algum cuidado nas informações que disponibilizo.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Dentro do mundo académico penso que pode fazer sentido maior liberdade. De qualquer forma necessita sempre da identificação de utilizadores.

5. O mundo digital académico necessita de "policiamento" para manter a informação fidedigna?

No que respeita a artigos publicados isso está feito visto estes passarem por uma rigorosa fase de selecção. Tudo o resto necessita, claro.

Resposta 2#
University Student

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Seria agradável encontrar todas as condições supracitadas, mas nem sempre é fácil encontrar uma base de dados que as forneça, ou pelo menos de um modo claro.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Se entendi bem o conceito de informação digital, desde que não haja conflitos com direitos de autor, penso que sim.

3. Preza o seu espaço pessoal digital?

Sim.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Creio que ainda existe a necessidade de manter algum sistema de protecção. Infelizmente hoje em dia é difícil acreditar que todos os utilizadores vão fazer uma boa prática de algumas informações digitais que possam estar disponíveis ("boa vontade").

5. O mundo digital académico necessita de "*policiamento*" para manter a informação fidedigna?

Se existir um modo de controlar quem infringir as regras sem ser um Policiamento muito visível, melhor ainda.

Resposta 3#
PhD Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Sim.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Sim.

3. Preza o seu espaço pessoal digital?

Sim.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Controlo por parte de quem? Do "bibliotecário"?... Tenho uma certa reticência em transformar a produção e difusão de conhecimento científico numa espécie de Wikipédia sem regras claras...

5. O mundo digital académico necessita de "*policiamento*" para manter a informação fidedigna?

Se te referes a processos de peer-review, claro, é a metodologia que hoje garante a evolução do conhecimento científico. Não é perfeito, mas vai resultando.

Resposta 4#
PhD Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Sim.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Sim.

3. Preza o seu espaço pessoal digital?

Sim.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

É necessário um controlo no acesso à informação, não num sentido de restringir a sua consulta, mas no sentido de proteger o seu conteúdo.

5. O mundo digital académico necessita de "policiamento" para manter a informação fidedigna?

Se o conteúdo dessa informação após autenticamento se mantiver inalterado, não haverá uma necessidade de "policiamento". Por outro lado se essa informação não for imutável e estiver sujeita a alterações, nesse caso sim, será necessário um "policiamento".

Resposta 5#
PhD Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Sim

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Obviamente. É a partir da informação existente que se pode criar e complementar os conhecimentos existentes.

3. Preza o seu espaço pessoal digital?

Sim, mantendo-o actualizado e com a imagem que quero transparecer.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

O sistema deve ser protegido devidamente. Talvez não se relacione muito, mas a maioria dos sites públicos e acessíveis ao um número vasto de pessoas têm uma política de privacidade e até existem patentes virtuais e licenças (exemplo: http://creativecommons.org/). A ideia era mostrar que é necessário proteger o conteúdo que se disponibiliza online e que já existem meios gratuitos para isso.

5. O mundo digital académico necessita de "*policiamento*" para manter a informação fidedigna?

Sim.

Resposta 6#
PhD Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Obviamente que sim, de outro modo é-me mais prático o acesso à internet porquanto é rara a informação "actual" que não está on-line.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Na minha opinião tal questão nem deve ser posta hoje em dia!

3. Preza o seu espaço pessoal digital?

O espaço pessoal digital encontra-se actualmente ao mesmo patamar que qualquer outro tipo de espaço físico ou incorpóreo…

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Na minha opinião é de criar um ponto intermédio de estabilidade entre o controlo e a liberdade, quiçá partindo de um esclarecimento "controlado" que, por si só, será a base para um usufruto responsável no qual o controlo externo se assuma meramente superficial.

5. O mundo digital académico necessita de "policiamento" para manter a informação fidedigna?

É uma falsa questão, passo a explicar: actualmente a wikipedia é um dos meios mais usados para a busca de conhecimento nas mais variadas áreas e qualquer leitor especializado irá certamente encontrar erros nas páginas dedicadas à sua especialidade. Deve-se sim investir tempo na "educação" das pessoas para que aprendam a ter um filtro próprio da informação, algo do género: deve-se goglear os tópicos que se pretende mas sabendo contrastar (filtrar) essa mesma informação. Ou seja, o mundo digital não necessita de "policiamento", necessita sim de "educação"!

Resposta 7#
Master Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico, quando usa informação digital (ou se fosse proporcionado) para pesquisa, ensino, artigos, citações, etc.

1. Espera todas estas situações acima descritas?

Não totalmente. Por exemplo, entendo que a biblioteca não faça apenas a "conexão", mas que toda a instituição faça parte do processo da relação utilizador/conteúdo, não seja o acto de fazer uma selecção de material adequado, mesmo arranjar um mecanismo de "aconselhamento" tendo em conta o assunto a pesquisar, etc. De resto, concordo.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Entendendo que a informação digital deve, também, gerar receita para uma série de pessoas (autor, editor, etc.), penso que, pelo menos, no mundo académico a informação digital deveria ser disponibilizada de forma livre e gratuita – as nossas propinas deveriam pagar tudo isso. Já quanto à utilização fora do mundo académico, entendo que poderá acarretar custos, defendo é custos menos elevados.

3. Preza o seu espaço pessoal digital?

Sim.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Penso que tudo o que é "produzido" dentro do mundo académico, por académicos, deve estar disponível para essa mesma comunidade académica de forma livre – ressalvando os devidos direitos de autor, claro. Contudo, esse acesso deve ser, e principalmente o uso dessa informação, sujeito a algum tipo de "controlo" para que não seja usado "indevidamente". Quanto ao "utilizador tem uma responsabilidade diferente" é que nem sempre pode ser verdade, daí acreditar que se deve sempre ter algum tipo de "controlo".

5. O mundo digital académico necessita de "policiamento" para manter a informação fidedigna?

Sem dúvida, se por esse "policiamento" se entender uma entidade correctora.

Resposta 8#
Master Researcher

Com tudo isto em mente, por favor dê-me uma pequena perspectiva sobre o assunto na sua visão como profissional académico:

1. Espera todas estas situações acima descritas?

Sim.

2. Sente que a informação digital deve ser disponibilizada de forma livre dentro do mundo académico e até para fora dele?

Sim.

3. Preza o seu espaço pessoal digital?

Claro.

4. O controlo é necessário para proteger o sistema de acesso indevido, uso impróprio da informação? Ou deve se dar uso ao que chamamos de boa vontade do utilizador dentro do mundo académico, visto que o utilizador tem uma responsabilidade diferente?

Um sistema de acesso dirigido apenas ao mundo académico iria restringir a informação tornando a fonte de infromação académica numa "fonte fechada". Muitas pessoas fora das universidades têm interesse por assuntos académicos, principalmente alunos do ensino secundário, e assim estaria-se a impedir o seu acesso a esta informação. Até mesmo os alunos das universidades têm dificuldades em encontrar determinada informação porque muitas vezes estão restriras apenas aos professores. Falando por experiência própria, estas situações dificultam muito o trabalho e desempenho de um aluno.

5. O mundo digital académico necessita de "*policiamento*" para manter a informação fidedigna?

Uma vez que concordo com o livre acesso à informação penso que seja necessário algum tipo de controlo para que nao perca a sua autenticidade.

EXAMPLES OF METADATA CREATED SCHEMES FILLED.

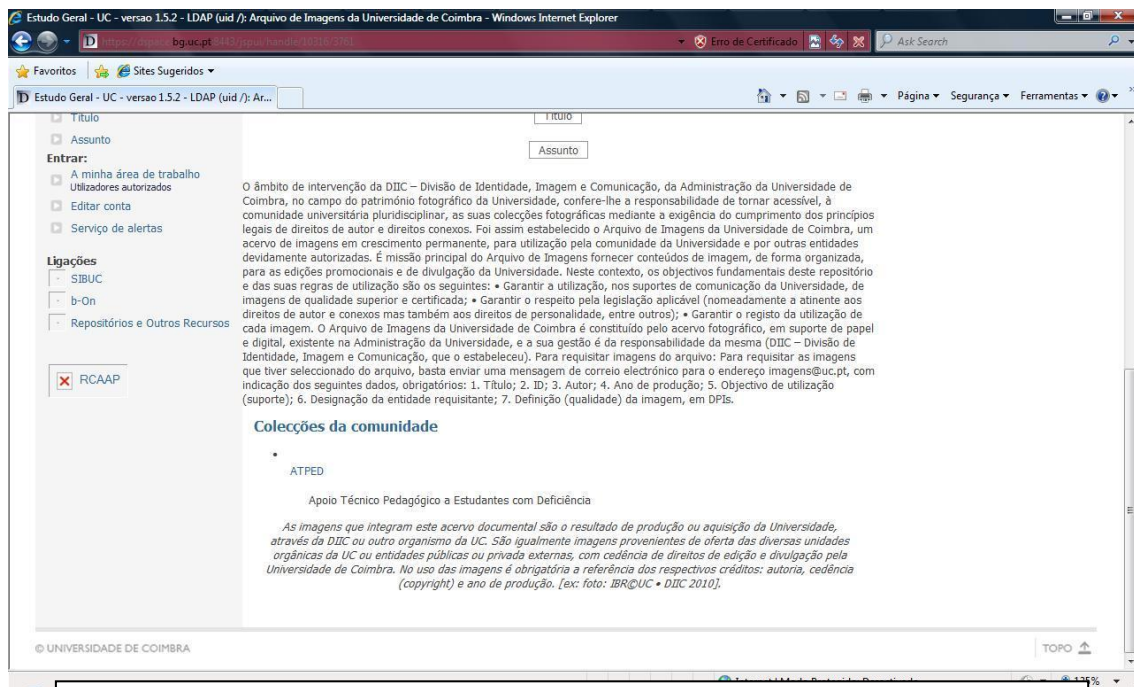(missing spaces on DPI's are consequence or mid-work process)

ID	0164
Título	Museu da Ciência
Autor	Museu da Ciência
N.º Registo	MC0001
Copyrith	UCDIIC
Ano	2007
Index	Museu da Ciência; Fachada Principal
Caixa n.º	
CD n.º	
Disco/Servidor	DIIC /Público
Notas	Fachada Principal
História	Antigo Laboratório Chimico, Guilherme Elsden, séc. XIX. Requalificação em 2004-2006. Projectista Arqtº João Mendes Ribeiro, Arquitectura Lda.; Atelier do Corvo
Dpi's	
Formato	JPEG
Suporte	Digital

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|	
ID	0144
Título	Museu Académico. Pasta de Luxo de Medicina
Autor	Museu Académico
N.º Registo	MA0004
Copyrith	UCDIIC
Ano	2002
Index	Museu Académico. Pasta de Luxo de Medicina, 1904-1905
Caixa n.º	
CD n.º	

Disco/Servidor	DIIC /Público
Notas	Museu Académico. Pasta de Luxo de Medicina, 1904-1905 de Júlio Vieira de Figueiredo Fonseca, quintanista de medicina.
História	Museu Académico, 1987
Dpi's	
Formato	JPEG
Suporte	Digital

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ID	0128
Título	Jardim Botânico da Universidade de Coimbra
Autor	Delfim Ferreira
N.º Registo	DF0003
Copyrith	UCDIIC
Ano	1993
Index	Estátua de Avelar Brotero, 1887; Jardim Botânico; Vista lateral.
Caixa n.º	
CD n.º	
Disco/Servidor	DIIC /Público
Notas	
História	Escultura de Soares dos Reis, séc. XIX. O Jardim Botânico foi fundado no tempo do Marques de Pombal, 1773, com uma área de 13,5 hectares. Estátua de Avelar Brotero, 1887. O Pedestal é da autoria de arqtº. Tomás Augusto Soler e executado nas oficinas do escultor Moreira Rato.
Dpi's	
Formato	JPEG
Suporte	Digital

Other Screen Shots from the AIUC Project:

First page of the DSpace Search Engine. The text explains the project and on the bottom the collections and the copyright text.
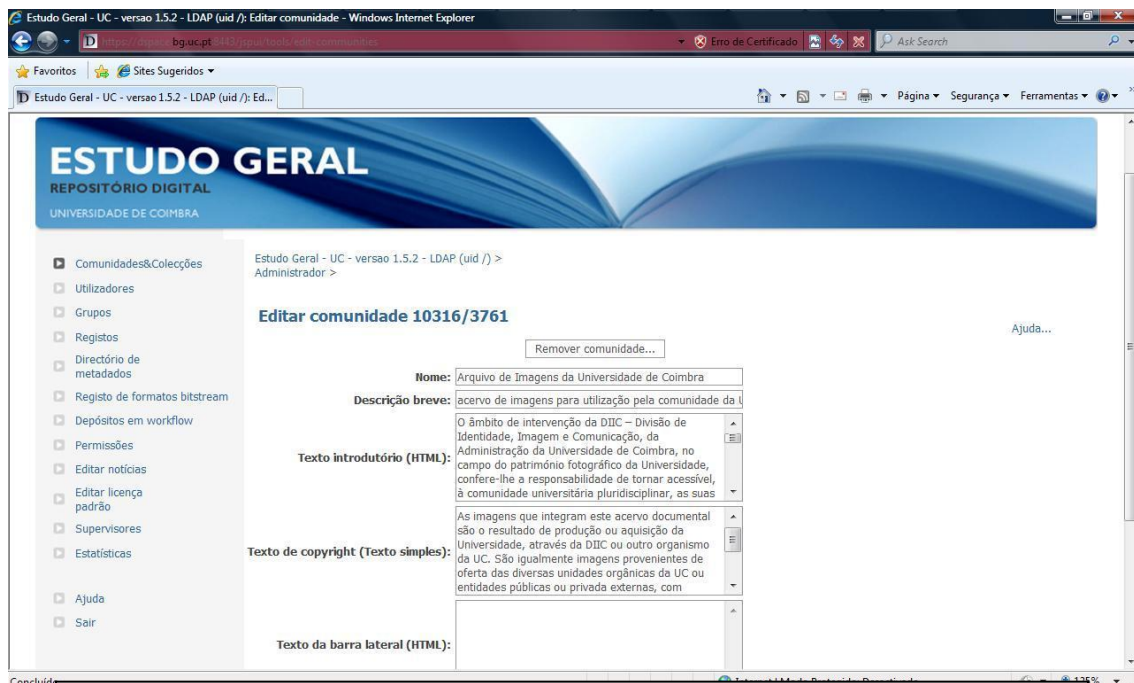
Estudo Geral – digital repository [General Study – digital repository]. Administrator work frame. On the left table all different subjects that can be changed, like metadata and permissions. On the middle the description, copyright text, etc. can be added and modified.