Evaluating the Deployment of a Collection of Images in the CULTURA Environment

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Abstract. The paper reports on the effort of reconsidering the characteristics of the IPSA online collection of illuminated images created for specialised users, involving the redesigning of the interaction functions to make the online collection of interest for new and diverse user categories. The effort is part of the design and development of a new adaptive and dynamic environment that aims at increasing user engagement with cultural heritage collections and which is taking place in the context of the European CULTURA project[1].

Keywords: Cultural heritage systems, IPSA collection of illuminated images, CULTURA environment, archives, illuminated manuscripts, user engagement with cultural heritage collections.

1   Introduction

In our era the development of the internet and information technologies has assured access to a constantly increasing amount of knowledge for an unprecedented number of people. This easy access to information, the sources and reliability of which are uncertain, sets a new challenge for knowledge providers such as universities and libraries that have to reach the widest amount of end-users with high quality information. The main aim of these kinds of institutions should be not only to foster research and create new knowledge, but also to disseminate it to the benefit of the whole population. The accomplishment of this difficult task requires continuous interaction with end-users in order to draw a profile of the different user communities, to understand their interests, needs and expectations, and to make cultural contents more engaging and attractive for them.

In the context of the European project CULTURA[2], which aims to increase user engagement with cultural heritage collections through the development of a new adaptive and dynamic environment, we decided to open up IPSA[3], an online collection of illuminated images purposely created for specialised users, to new user categories

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such as students, users with an interest in art and the general public. This effort required our research team to face challenging issues concerning the characterisation of the new user categories involved and brought about meaningful thoughts and ideas that are helpful for similar challenging research projects.

2   Evaluations of the IPSA Digital Archive

IPSA (*Imaginum Patavinae Scientiae Archivum* - Archive of images to support the study of scientific research at Padua University) is a digital archive of illuminated manuscripts that includes both astrological codices and herbals produced mainly in the Veneto region, in Northern Italy, during the XIV and XV centuries. The online archive was created specifically for professional researchers in History of Illumination to allow them to compare the illuminated images held in the collection and verify the development of a new realistic way of painting closely associated with the new scientific studies that were flourishing at the University of Padua in the XIV century, particularly thanks to the teaching of Pietro d'Abano [1]. Disclosing new relationships between images is one of the main purposes of research in art history, because it brings further knowledge on a painter or an illuminator, on a work of art, or on a whole specific artistic period. According to this particular user requirement, in IPSA professional researchers are provided with tools that allow them to link and annotate images, so they are able to keep track of their considerations on the illuminations and their relations [2]. Selecting from a drop-down menu, professional researchers can choose between five different kinds of relation:

- **Copied in:** the subject of the oldest image is quite faithfully re-proposed in the newer image;
- **Same tradition of:** the two illuminations show subjects belonging to the same iconographic tradition; this kind of relation is valid both for images markedly distant from one another in time and for images close to one another in time;
- **Not related to:** the two illuminations show subjects belonging to different iconographic traditions;
- **Siblings:** the two illuminations were copied from the same model;
- **Similar to:** the two illuminations show some analogies, but it is not possible to further specify the kind of relation existing between them.

Furthermore, researchers can annotate the link, specifying the reason for their choice, or with other remarks on the two illuminations that they decide to link together. From this concise description, it can be easily understood that IPSA is a very specialist collection. This made the process of opening it up to new user categories with different interests and less knowledge on the topic even more challenging.

We decided to start our research with a series of interactions with undergraduate and postgraduate students in Humanities, not necessarily in History of Art. We involved undergraduate students in History and Preservation of Cultural Heritage, postgraduate students in Communication Strategies, in Management of Archival and

Bibliographic Heritage and in Modern Languages. We chose such a heterogeneous sample because we thought that users with a different cultural background would be more likely to focus their attention on details that may have not been considered by Computer Scientists or Art Historians.

We decided to start the evaluation campaign with students because we believed that they constitute the first step to approaching different kind of users, as they are half-way between professional users and the general public. Actually, the students involved were not acquainted with the IPSA collection or with History of Illumination in general, but they had a certain interest in the field of Humanities research, in the case of postgraduate students they had already developed a research methodology, and they generally had a reasonable knowledge of information technology tools.

The first interaction with students was carried out in November and December 2011. We developed a series of simple tasks to make students interact with the system for at least one hour. A task oriented experience was considered the best means of getting valuable feedback from users, because from previous evaluation campaigns with professional researchers it was noted that the lack of motivation in using the system may reduce the effort put into learning how to use it, and this inevitably reduces the quality of the interaction. When we decided to involve the student community, we knew we needed to design at least two tasks that would require the students to interact with the system in different ways [3]. To get further feedback, after each trial, students were asked to answer an evaluation questionnaire prepared specifically for the occasion by a team of psychologists from the University of Graz [4], which has a long experience in such evaluations and which is a partner of the CULTURA project involved in the evaluation process.

The evaluation was divided into two parts carried out within two weeks, so we were able to make some basic improvements to the system based on the advice provided by the students between the first and the second session. For example, we developed a more practical and faster way to present the illuminations to the users. Indeed, some of the manuscripts held in the collection have hundreds of illuminations that in the initial version of the interface IPSA required some time to be loaded. From the first trial of the evaluation it was evident that download time was evaluated as negative by non professional users, who tend to browse many items from the collection while scholars have a more focused approach to the collection and did not highlight any latency issue. Therefore, in the second trial the images were shown divided into smaller groups, and the loading was faster and more engaging for non-specialist users. The second session was preceded by a short explanation on the basic concepts of History of Illumination and the IPSA collection, its purposes and meaning. We noticed that a better comprehension of the collection, particularly of the goals of the IPSA project, gave more motivation to the students, who found the exploration of the collection more satisfactory.

In April 2012 we carried out further interaction sessions with students, presenting the modified and improved version of IPSA. As we had verified that dividing the evaluation within a short amount of time is a good way to create a fruitful interaction process with the users, we decided to divide the trial into two parts also on this occasion [5]. 77 people were involved: 53 master students and 24 undergraduate students.

The interaction brought about new changes that further improved IPSA acceptability and usability by non-professional users, such as a relevant change to the interface between the first and the second trial with the insertion of a drop-down menu at the bottom of the wall of images that allows an intuitive search through all the illuminations contained in the manuscript of interest. Another issue during the first trial was the creation of a link between two images. In the previous version of the system, the setting of a link was not intuitive enough to be used by non-professional users. The user had to start from the illumination of interest and do a search to find a second image of interest. Throughout the entire process, a box with the status of the operation was displayed at the top of the page. For professional researchers in History of Illumination and History of Art, who are used to working with images, it is easier to recall the initial illumination, and generally they already have a research path in mind, so they are able to find a second illumination of interest more quickly. For non-professional users, finding the second image may require different searches and a certain amount of time, so in the meanwhile they may not recall the image with which they started. Following the observations of the students involved in the evaluations, the operation status box was enlarged and, what is most useful, it now shows the thumbnails of the selected starting-image, some help text, and large explicative buttons for completing the link, or for deleting the operation. The new way of creating a link was presented in the second trial and received favourable feedback. Moreover, students felt that their opinion was effectively taken into account, and hence were more motivated to carry out the second part of the trial.

During the first two years of the CULTURA project, 107 students were involved in the evaluation campaign, a remarkable number of users that provided us with precious information on how the system is perceived by non-professional users. One of the most relevant things that emerged from questionnaires and further discussion with the participants in the evaluation trials is the need of non-professional users to be guided through such a specialist collection as IPSA. Particularly, lack of confidence towards the collection generates the desire for a more collaborative environment, in which users can share their opinions and reflections, and benefit from the help of expert users. This is why students would also like to be able to open their research from the collection to the Web, in order to easily gather more information to fulfil the purpose of their research. Another important outcome was the need for a simplified interface that allows quick and easy access to the resources of the database. Finally, we noticed that when students were given time to freely interact with the system, they showed particular attention to the Renaissance illuminations held in the collection. This happened probably because Renaissance is the best-known artistic period in Italy and the most studied in high school, so for the students involved in the evaluation Renaissance illuminations were easier to appreciate and to relate to their personal cultural background.

All the considerations made thanks to this interaction led to the IPSA deployment in the CULTURA environment, as described in the following paragraph.

3   IPSA Deployment in the CULTURA Environment

Between May and October 2012 a subset of metadata from the IPSA collection was selected to be imported in the CULTURA environment for use as a case study to test the

new environment and its functions. This new environment was named IPSA@CULTURA to underline that IPSA content was being used with tools and services making up part of the CULTURA environment[4].

CULTURA provides a service-oriented architecture, where the user can interact with a number of functions that have been developed and are maintained by partners of the project [6]. The portal was developed using Drupal[5] by the research group of the Trinity College Dublin [7], which also developed the search functions, while our group provides two services. The first of these is an annotation service that allows users to add content to the illustrations and their metadata and share them with all users or a selected group of users. Annotations can also be used to create an explicit link between two illustrations, allowing the user an alternative way of expressing a relation between two illustrations, a feature which was also possible with the first implementation of IPSA. The second service our research group provides regards accessing the high-quality images of the manuscripts, which are automatically watermarked tracking the user ID that is replicated on the digital image background together with additional information about the collection and about the copyright owner.

Another important service is provided by Commetric, a company based in Sofia and specialised in social network visualisation. The visualisation tool allows users to explore the network of connections among metadata, for instance to find all the manuscripts that contain a given illustration or to explore the production in different geographical regions. This service, together with the possibility of annotating links between objects in the collection, is completely in line with the user requirements gathered during the first evaluation, because they also allow non-specialised users to navigate within the collection, either by following links annotated by other users, or by exploring the visual representation of the entity network.

Because evaluation plays a central role in the CULTURA approach, the user can also directly access an online survey developed by the University of Graz. This made it possible to match the qualitative impressions on IPSA@CULTURA with the user activity logs.

The first evaluation of IPSA@CULTURA was carried out in December 2012 with a group of 110 postgraduate students majoring in Linguistics and Communications Theories. As in the previous evaluation with students, they were asked to interact with the system for approximately one hour, accomplishing some easy tasks that made them use all the CULTURA tools: advanced search, annotations, bookmarks and two different kinds of visualisation.

Annotations (Fig. 1) can be private or public, or shared only with one group of people. This allows users not only to keep track of their thoughts on the illuminations, but also to share their thoughts if they want to compare them with those of other users, ask for advice or give suggestions. Shared annotations are a valuable tool for research groups, as people can work remotely and share their progress only with other members of their research group.
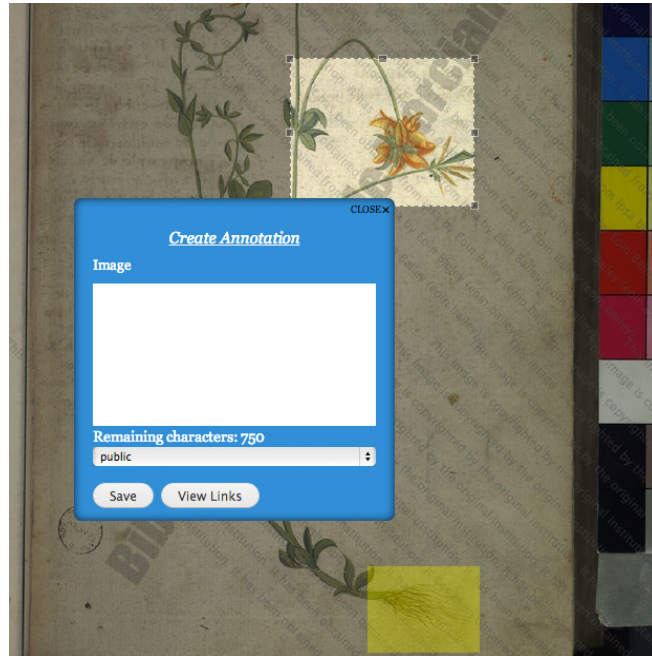
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[4] `http://kdeg.cs.tcd.ie/ipsa/`
[5] `http://drupal.org/`

Fig. 1. Annotations in IPSA@CULTURA

Visualise IPSA Collection

absenço's and absinthium's and artemisia's and assenzio: medico ne illustra
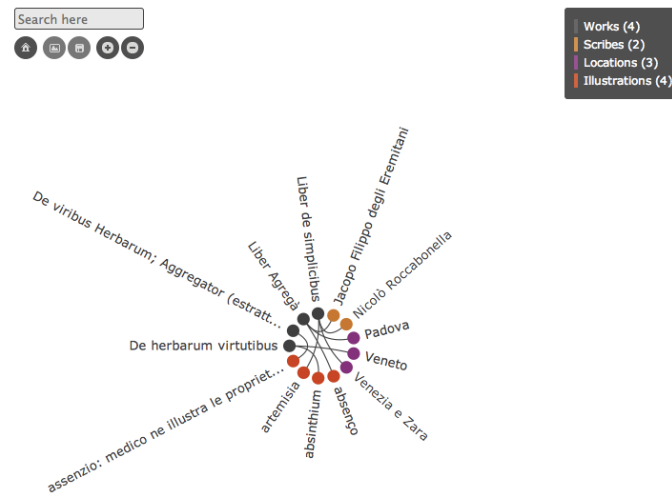le proprietà a un giovane's works

Fig. 2. "The wheel" in IPSA@CULTURA

Visualisations represent another useful tool, particularly for non-professional users, because they allow the connections between the manuscripts and the illuminations of the collection to be checked in a single glance. The visualisations (Figs. 2-3) also provide links to other online informative resources such as Wikipedia, Google, or Bing, thus addressing the need of non-professional users to get further information on the cultural context and content of the collection.
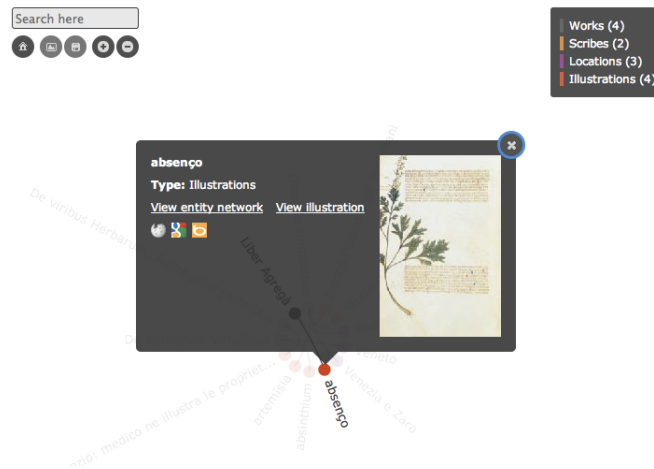

Fig. 3. By clicking on each dot of the visualisation, further information can be obtained through the entity network and links to other websites

Tasks were structured as follows: firstly, each student was assigned a plant name and had to search for an illumination containing that plant, and then annotate it with personal observations. Afterwards, they had to choose one of the two possible visualisations, and by doing so, they verified if the same plant is represented in other manuscripts. If this was the case, they had to select at least one more illumination, and to annotate or bookmark it.

As in the previous evaluation with students, the participants expressed the desire for an introductory explanation of the characteristics of the collection, and the need to be guided in the exploration of the database. As a result, they were particularly delighted with the annotations tool, since it constitutes a way to share one's impressions with other users and to ask for their opinion, and a means for professional researchers to register useful recommendations and indications for non-professional users. This generates a problem concerning the authority of the annotations, so many of the students observed the need to have users sign their annotations. In this regard the annotation tool also tracks the ID of the user who created an annotation, but during the evaluation exercise we had to create a number of test accounts which by their nature provided no information about the users.

The desire for a simple interface emerged as well, and since for some of them visualisations were not clear, they proposed the use of icons to indicate the different entities in the network, such as a book for text, a pen for author, and so on.

Finally, students proposed connecting the system to social networks, and this is not surprising at all, since social networks are hugely widespread, especially among young people.

After testing the CULTURA environment with other students, the following step was to verify whether this new system, which already takes into account the needs and desires of the student community, will turn out to be engaging and interesting for the general public as well, but without losing its effectiveness as a research tool for professional users. That is why we planned three additional evaluation exercises, the first of which involved interested users from the general public: this is described in Section 4. The second and the third evaluation exercises are scheduled for April and September 2013, and they will involve non-domain professional users and postgraduate students with different fields of expertise attending a European Master. The organisation of these evaluations is described in Section 5.

4   Interaction with Members from the General Public

For the first interaction session with people belonging to the general public, we chose to involve people with no specific knowledge in History of Art, but with an interest towards Cultural Heritage and historical monuments. With these criteria in mind, we contacted the *Salvalarte* association[6], which is a voluntary association of individuals who share a great interest in History of Art and Cultural Heritage in general. The goal of the association is to protect and preserve Italian historical monuments, and to foster better knowledge on Italian cultural heritage among the general public. There are many chapters of the association in different cities of Italy. The Paduan section was founded 15 years ago, and currently has approximately 80 volunteers. They work for free to allow visitors to access many Paduan monuments that otherwise would be closed to the public. They also organise courses and seminars on History of Art topics. Recently, some volunteers collaborated in a research project on the study and the preservation of the ancient archive documents regarding two important Paduan monuments, the *Ospedale di San Francesco* and the *Scuola Grande della Carità*.

For this evaluation, we decided not to have a task-oriented experience, because we wanted to recreate the realistic situation of a member of the general public who finds the webpage of CULTURA by chance, either while doing other research or just browsing the internet without any specific goal in mind. So we just showed IPSA@CULTURA and its tools to Salvalarte members, and then we asked them to explore the collection and try to use all the tools, and then tell us their impressions, especially what they liked more and what they would have changed.

Because many of Salvalarte members have a limited knowledge of English, one of the main requests was an Italian version of the interface of the web application. They also showed a lack of confidence with IT tools, so they need a simplified interface with clear explanations on how to use the system. In this regard, a tutorial of the most

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[6] http://www.legambiente.it/contenuti/campagne/salvalarte (in Italian).

important CULTURA environment functionalities would probably be the best solution, as this would also address students' requirements.

Concerning content issues, Salvalarte members already had a basic knowledge of History of Art, but still they needed an introduction to the collection. Nonetheless, once they were taught to use the CULTURA environment tools and they were given all the preliminary information about the collection, they were able to browse it and to appreciate its content.

It must be noted that they seemed to particularly enjoy the manuscripts strictly related to the history of Padua, as all the interviewees were born in Padua or have been living in Padua for many years. This is similar to what happened with those students that were especially attracted by Renaissance illuminations: users that are not browsing the collection for academic research purposes are more interested in something they are already acquainted with, even if they do not have a deep knowledge of the topic. They are more gratified because they feel they already have a little competence about the collection, and are more motivated to look for new information to integrate their knowledge of it. This is why Salvalarte members appreciated the links to external websites: because they were often looking for more information resources on the illuminations they were observing. Through the links to external websites, they could easily and quickly obtain all the data they needed to further understand the collection, and to better place the manuscripts or the illuminations they liked in their correct historical and art-historical period.

5   Discussion

As previously reported, the two evaluation exercises of IPSA@CULTURA present a number of common outcomes that help us to understand how non-specialised users consider the IPSA digital archive, and to figure out possible solutions to make it more accessible to the general public.

First of all, both students and Salvalarte members showed greater interest towards the collection when they realised they could connect elements of the collection to their own experience: e.g. the history of their native city or their high school studies in History of Art. So it is very likely that an introduction to IPSA that highlights the collection connections with Paduan and Italian history can attract user attention. This holds good for every Humanities collection: end-users get more involved if they know the purposes of the original project and if they can relate some elements of the collection to their own personal experience and cultural background.

Another outcome concerns users' requests to provide more preliminary information on the digital content. Since it was developed for domain professional users, who are chiefly interested in images, IPSA provides only a basic set of descriptive metadata. This information, although relevant and congruent with library standards, was considered insufficient. Users asked for more involvement with the digital content by being provided with access to additional information, such as the research results produced by specialists.

These outcomes are completely in line with the trends in dissemination of cultural heritage. The application of 3D technology to interact with digital artefacts and navigate inside virtual spaces, the development of serious games for dissemination

purposes, the increasing exploitation of portable and interactive devices – including users' portable devices – all suggest that the cultural content itself is not sufficient to raise interest among the general public.

To this end, we believe that an effective way to improve the involvement of members of the general public is to exploit the experience and the knowledge of professional users who are interacting with the same digital archive. Scholars have always played the role of "mediators" between artistic content and the public. Experts select the artefacts that are to be disseminated to the general public, study them in detail, and provide in-depth description of their artistic and historical relevance. Direct access to online collections may prevent the general public from taking advantage of the results of scientific research, thus without the benefit of mediated access. The request from students to have an introduction to the IPSA collection and to the research methods on illuminated manuscripts supports this point of view.

A possible solution, which we are developing further, is the use of pathways inside the collection that are created using all the available services. These pathways, which are in the form of narratives, can be thought as simple lectures where the users are invited to follow a number of guided tours inside the collection. At each step the system provides a concise description of the actual research goal, highlights the relevant aspects that might be hidden by the large amount of information accessed by the user at each step, and supports the exploration of the digital content through a number of predefined queries. Since narratives are added to the original system, users are still free to follow different directions, make new queries, use different tools or simply navigate the collection according to their particular interests. One of the goals of narratives is to highlight the richness of the available digital content, which may be difficult to retrieve for non-experts.
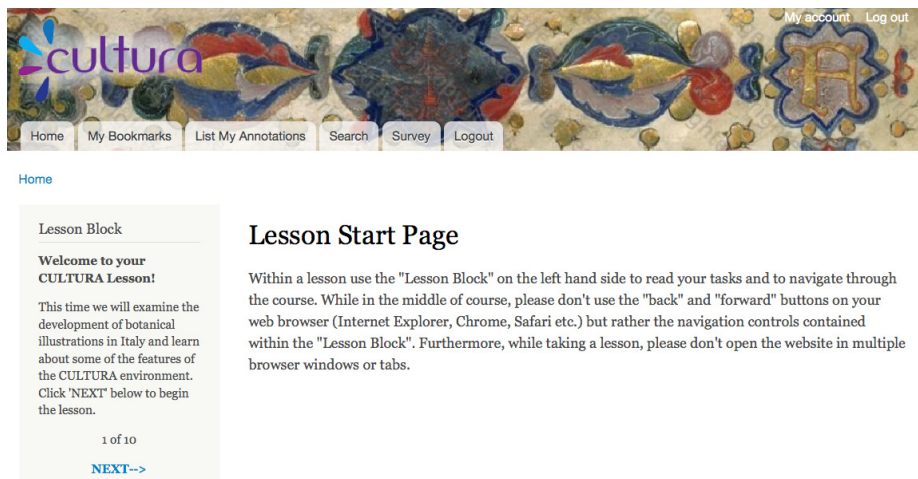

Fig. 4. Screen shot of the initial page of the lesson block of the narrative on the development of botanical illustrations in Italy

The creation of a particular narrative, which can be selected by the user at any moment during the interaction, needs to be designed and prepared by professional users. This was done in our initial experiments of creating some complete thematic paths across the IPSA@CULTURA collection, showing that the approach is feasible. Figure 4 shows the initial page of a lesson block on the development of botanical illustrations in Italian illuminated manuscripts.

The usage of narratives is expected to improve user involvement with the digital content, and its impact will be seen in a few months, because in upcoming months we will have more interaction sessions with different groups of users.

6   Future Work

To continue to collect useful feedbacks from the users, an additional evaluation will take place with users visiting the CoLab centre of the University of Parma, Italy. CoLab is a cross-department research centre for learning and digital publishing support [8]. It organises workshops on e-learning, digital publishing, digital humanities, and in general topics related to information technology applied to teaching and learning. To organise the interaction with CoLab we are currently working with one of the researchers in charge of the centre, who is also responsible for the International Master in Digital Library Learning (DILL) [9]. In fact the evaluation exercise will involve students attending the Master which is a two-year international master's programme that aims to provide elite information professionals with the skills and competencies to navigate the rapidly evolving world of digital libraries. It takes into account both the technical and the organisational issues involved in digital libraries, developing criteria and methods that exploit the strengths of digital libraries in a socio-economic and interdisciplinary manner. DILL is offered in cooperation with Oslo and Akershus University College of Applied Sciences (Norway), Tallinn University (Estonia), and the University of Parma (Italy)[7]. Students are therefore requested to spend at least one semester at each institution. The first semester starts with a summer school, and takes place in Oslo. The second semester students are in Tallinn. The third semester contains a second summer school, and takes place in Parma. In the third semester students are also required to do an international internship. In the final semester, students can choose in which country they would like to write their Master thesis. The evaluation excercise is going to take place in Parma during the third semester.

Involving students coming from different European countries and attending an International Master will surely enrich our user studies. Up to now we have involved Italian users, who, although with different cultural backgrounds, obviously share the same national identity. Especially the Salvalarte group is a local association, strongly linked to the city context. Thanks to the interaction with DILL students, we will move from a local perspective to a European perspective. Particularly, we will be able to verify what parts of the IPSA collection can be interesting for European users, and if the tools are user-friendly enough to help users to browse a collection which they are completely unfamiliar with and which they cannot relate to their personal experience, or to their city or national history.

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[7] http://dill.hioa.no/

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