From the specialist user to the public. Reflections on the efforts made to open a database of illuminated images to new user categories

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From the specialist user to the public.
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Currently one of the most significant challenges for curators and providers of digital cultural heritage is to increase and enhance the engagement of users and communities with digital humanities collections, in an attempt to bring important cultural treasures within everybody's reach. To accomplish this difficult task, an original reflection on new types of users and their main features and on how to involve them is required. The considerations and efforts made to open up the IPSA database to new categories of users is an ongoing process able to offer useful inputs and suggestions to this field of investigation. In particular, this paper reports on the elaboration and execution of trials specifically designed to involve members of the student community.

1. IPSA

IPSA (*Imaginum Patavinae Scientiae Archivum*) is a digital archive of illuminated manuscripts which includes both astrological and botanical codices produced mainly in the Veneto region during the XIV and XV centuries.[1] The collection holds 56 illuminated codices and more than 3400 images. These precious documents testify the shaping of a new scientific mentality in the University of Padua during the XIV century.[2]

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[1] http://www.ipsa-project.org/
[2] For a wider examination on the issue see also the contribution by Professor Giordana Mariani Canova in these Proceedings.

One of the protagonists of this flourishing period of the European culture was Pietro d'Abano, great scholar of the University of Padua (approximately 1302-1316) who had studied sciences and philosophy in Paris and Constantinople. His scientific doctrines, according to the Aristotelian rationalism, first proposed to analyse the influence of the stars from a physical point of view rather than from a magical one.[3] The same quest of scientific objectivity also characterised the Paduan production of botanical codices. Since the beginning of the Middle Ages illuminated botanical manuscripts presented images of plants that were usually copied from previous painted model, without checking the actual correspondence with the real plant. Thus, through the centuries the real aspect of the plant got lost, and herbals held illuminations showing pretty fictitious flowers and herbs. In the second half of the XIV century in Padua, for the first time, illuminators took nature as model once again, trying to realize a realistic representation of herbs, flowers and trees.[4] This was a revolutionary moment in the history of Italian illumination, and probably it would have been impossible that such a great change happened without the cultural background of the University of Padua.

The collection of illuminated manuscripts held in IPSA has the great merit of pointing out the importance that Padua and its University have played since the end of the Middle Ages in the development and spread of science and culture. But IPSA importance is not limited to this aspect: most of the illuminations held in the database are of an outstanding quality, so they have not just a documentary value, but a high formal level that makes them true works of art, worthy to be studied from an art-historical point of view.

The research project which led to the creation of IPSA was presented in 2001 by the University of Padua. Its aim was to create a database that could offer a rich documentation, both visual and written, of manuscripts and incunabola linked to the University of Padua and its associated cultural circles both in Italy and Europe. Then IPSA was

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(3) Mariani Canova G., Pietro d'Abano e l'immagine astrologica e scientifica a Padova nel Trecento: da Giotto ai Carraresi. In: *Atti del convegno internazionale per il 750° anniversario della nascita di Pietro d'Abano*, (Abano Terme, Sala Kursaal, venerdì 30 novembre-sabato 1 dicembre 2007), «Giornale di Storia della Medicina», 2, 2008, pp. 465-507.

(4) Mariani Canova G., Il *Codex Bellunensis* nella storia del manoscritto botanico e della sua illustrazione. In: *Codex Bellunensis. Erbario bellunese del XV secolo. Londra, British Library, Add. 41623*, commentario al facsimile, Parco delle Dolomiti Bellunesi, Feltre, Italy, 2006, pp. 1-34.

completed in 2004 within a research programme that involved the *Seconda Università degli Studi* of Naples and the University of Naples Federico II, as well as the University of Padua.

The digital archive was designed after an in-depth user requirements elicitation carried out with a user-centred approach, in order to offer art historians tools that precisely address their research needs and procedures.[5] A major requirement that was taken into account was to provide professional users with the possibility of studying and comparing complete illuminations and details, since image analysis and comparison is of vital importance for art historians. IPSA allows this particular kind of research at different levels, since it holds both the image of the complete page of the manuscript and images of specific details. Thus professional researchers of History of Art and History of Illumination are enabled to carry out different types of research: for example, in IPSA it is easily possible to follow the development of the illustration system of a specific text, or to follow the evolution of a single image through the centuries. As a matter of fact, disclosing new relationships between images is the heart of the art historical research, because it brings about new information, for example on the manuscripts studied, or on the illuminator that painted the images, or allows to increase knowledge on a specific artistic period.

The need of highlighting relationships between illuminations and of adding information about these relationships pointed out another essential user requirement: professional user should be able to create links that connect one illumination to another and to annotate the images.[6] This goal can be reached through the use of an annotation system built over an existing image digital archive.[7]

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(5) Agosti M., Benfante L., Orio N., IPSA: A Digital Archive of Herbals to Support Scientific Research. In: Sembock T.M.T., Zaman H.B., Chen H., Urs S.R., Mya-eng S.M., editors, *Proc. 6th International Conference on Asian Digital Libraries – Digital Libraries: Technology and Management of Indigenous Knowledge (ICADL 2003)*, Lectures Notes in Computer Science (LNCS) 2911, Springer, Heidelberg, Germany, 2003, pp. 253-264.

(6) Agosti M., Ferro N., Orio N., Annotating Illuminated Manuscripts: an Effective Tool for Research and Education. In: Marlino M., Summer T., Shipman F., editors, *Proc. 5th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2005)*, ACM Press, New York, USA, 2005, pp. 121-130.

(7) Agosti M., Ferro N., Orio N., Graph-based Automatic Suggestion of Relationships among Images of Illuminated Manuscripts. In: Haddad H., editor, *Proc. 21st ACM Symposium on Applied Computing (SAC 2006) – Track of Information Access and Retrieval (IAR)*. ACM Press, New York, USA, 2006, pp. 1063-1067.

The use of annotations also constitutes a viable way to cooperate in a collaborative environment. As a matter of fact, sharing knowledge is another significant user requirement, because the IPSA database is of undoubted interest not only for art historians, but also for different domain researchers. For example, thanks to the well-detailed catalogue files of every codex held in the collection, IPSA can offer researchers in codicology and paleography precious material for their investigations. Also the content of the manuscripts offers various research possibilities: the texts held in the herbal codices, for example, are of great interest for the Botanical discipline. This shows how a digital archive of manuscripts can involve people with different expertise, who through the use of annotations are enabled to share their specific knowledge in a fruitful cooperation.

2. New user categories characterization and user requirements elicitation

Due to the involvement in the CULTURA project,[8] which aims to enable new types of user to investigate, comprehend and contribute to digital cultural collections, it was decided to make the IPSA database accessible to a wider user community.[9] Five categories of users were identified: professional researcher, such as scholars and academics; non-domain professional researcher; student community, including post-doctoral, postgraduate and undergraduate students; non-professional researcher; and interested members of the general public. The first step to accomplish the challenging task was to capture the characteristics of these users and to establish what features are of value to members of each group. It was necessary to identify the needs, wishes and preferences of the new user groups in order to define the changes and improvements to IPSA required.

User requirements were elicited in two ways. Firstly, thorough interviews with professional researchers were held, both with the domain professional researchers involved in the creation of IPSA from the very beginning, and with non-domain researchers expert in the

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(8) http://www.cultura-strep.eu/

(9) Agosti M., Mariani Canova G., Orio N., Ponchia C., Methods of personalising a collection of images using linking annotations. In: *Proceedings of the First Workshop on Personalised Multilingual Hypertext Retrieval (PMHR 2011),* ACM, New York, NY, USA, 2011, pp. 10-17.

field of History of Medieval Art but not acquainted with the IPSA collection and the History of Illumination in general. All the interviews were held on an individual basis. Professional researchers were shown the database and then asked relevant questions to stimulate an in-depth discussion. The aim was to make the interviewes aware of their usual research process and procedures, in order to make them reflect on how IPSA can help them in their research and what improvements they would like to be made to the database.

For the student community, a different user requirement elicitation was evidently needed. As reported in the following section, the organization of different trials on a group basis with the IPSA database was thought to be the best solution for obtaining useful input and information.

3. Preliminary considerations

The starting point for developing the trials[10] were the outcomes reached in the first eight months of work of the CULTURA project. Most of this period was dedicated to drawing up a profile and identifying the needs and wishes of the new categories of IPSA users. From these evaluation experiences, especially from the interviews with the non-domain professional researchers, it was noted that users should not only be presented with the system and its functionality, but they should also be provided with a task-oriented hands-on experience. In fact, it was found that a lack of motivation may reduce the effort put into learning how to work with the system, whereas making users interact with the system for a reasonable amount of time and with a specific purpose helps to provide richer feedback.

This preliminary consideration prompted the need to work out at least two tasks that would require the students to interact with the system in different ways.

In addition, another important condition was that the tasks needed to be specifically tailored to the students chosen and their cultural background, so that the students could easily understand what they were asked to do and accomplish all the tasks proposed.

Two groups of students of the University of Padua were involved in the trials. Group 1 was made up of 24 first year Bachelor students

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[10] The trials were developed and defined after in-depth discussions with Professor Maristella Agosti, Professor Giordana Mariani Canova and Dr. Nicola Orio.

in History of Artistic and Musical Heritage, Group 2 was made up of 51 Master degree students in Communication Strategies.[11] Considering that the students belonging to Group 1 had just begun their University career and that the students belonging to Group 2 are not attending a degree in History of Art, the development of some simple tasks that would not require a thorough knowledge of History of Art and History of Illumination was preferred.

In order to allow the students experience the richness of the IPSA database, it was decided to work out a task related to the botanical codices collection, and another related to the astrological codices collection, so that they could get an idea of both the kinds of manuscripts held in IPSA. Lastly, the tasks had to be the same for all the students involved in the trials, in order to obtain easily comparable data.

In line with these requirements, two tasks were developed. Because only one interaction with the students was thought to be insufficient to obtain significant data, both the tasks were subdivided in two parts to be executed on two different trials, according to this scheme:

- First trial: task 1.a; task 2.a
- Second trial: task 1.b; task 2.b

To obtain further feedback, after each trial the students had to answer an evaluation questionnaire developed purposely by a team of psychologists of the University of Graz. The questionnaire aimed mainly at evaluating the interaction with the system and the acceptance of the users.

4. First trial

The first trial took place on November 10, 2011 for Group 1, and on December 7, 2011 for Group 2.

Because Group 2 was constituted by Master degree students in Communication Strategies without a proper background in history of art, a short introduction to the History of Illumination was made, giving particular attention to the presentation of the art-historical research method. Furthermore, the students were briefly shown how to undertake research in IPSA using different strategies.

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(11) Group 1 was attending the first semester course on Foundations of Computer Science lectured by Nicola Orio, which ran from October 2011 to December 2011. Group 2 was attending the first semester course on Design of Websites lectured by Maristella Agosti, which ran from October 2011 to December 2011 as well.

4.1 *First trial - task 1.a*

This task was related to the botanical codices collection and proposed a guided comparison between the *Liber Agregà de Serapiom* (London, British Library, ms. Egerton 2020) and the *Erbario Roccabonella* (Venice, Biblioteca Marciana, ms. Lat.VI.59).

The *Liber Agregà de Serapiom* is a remarkably important manuscript drafted in Padua at the end of the XIV century and commissioned by the prince of Padua, Francesco II da Carrara, who was particularly attracted by science and medicine.[12] The beautiful book contains a translation of the botanical medicine treatise written by Serapion, a XII century Arabian doctor, and shows the realistic representations of many different Mediterranean plants with a short text explaining their therapeutic virtues.[13]

The *Erbario Roccabonella* is a Renaissance illuminated botanical codex written by doctor Nicolò Roccabonella, who graduated in Padua in 1410 and then moved to Venice in 1415. Roccabonella wrote the manuscript between 1445 and 1450 to save all his botanical knowledge, and to pass it on to his son and the following generations.[14] The manuscript displays more than 400 painted representations of plants, all full page images, some of which are also described in the *Liber Agregà*. Art historians understood that Roccabonella must have studied the *Liber Agregà* because many images in his book are copied directly from the Paduan manuscript.

The students were required to verify this relation as well as find out which plants in the *Roccabonella* manuscript are copied from the *Liber Agregà* and which are not copied from this model but from other sources. So every student was assigned a page number belonging to the *Liber Agregà*. They had to check which plant was painted in the assig-

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(¹²) Bettini S., Le miniature del *Libro Agregà de Serapiom* nella cultura artistica del tardo Trecento. In: Grossato L., editor, *Da Giotto a Mantegna*, exhibition catalogue, (Padua, Palazzo della Ragione, 9 June-4 November 1974), Electa, Milan, Italy, 1974, pp. 55-60.

(¹³) Mariani Canova G., Serapiom il Giovane, *Liber Agregà*. In: Baldissin Molli G., Canova Mariani G., Toniolo F., editors, *La miniatura a Padova dal Medioevo al Settecento*, exhibition catalogue, (Padua, Palazzo della Ragione-Palazzo del Monte; Rovigo, Accademia dei Concordi, 21 March-27 June 1999), Panini, Modena, Italy, 1999, pp. 154-157, n. 54.

(¹⁴) Marcon S., Nicolò Roccabonella. *Liber de semplicibus.* In: Fogliati S., Dutto D., editors, *Il giardino di Polifilo. Ricostruzione virtuale dalla Hypnerotomachia Poliphili di Francesco Colonna stampata a Venezia nel 1499 da Aldo Manuzio*, Ricci, Milan, Italy, 2002, pp. 113-115.

ned page, and search whether the *Erbario Roccabonella* had an image of the same plant. Once they had found the second image, they had to analyse the two illuminations and decide whether the plant looked the same in both images, and if this was the case, set a link between the two illuminations, specifying the kind of link between them. They could choose between the following options:

1. Copied in: the subject of the oldest image is quite faithfully re-proposed in the newer image;

2. Not related to: the two illuminations show subjects belonging to different iconographic traditions;

3. 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 in time and for images closer in time;

4. Siblings: the two illuminations were copied from the same model;

5. Similar to: the two illuminations show some analogies, but it is not possible to further specify the kind of relation existing between them.

Clearly this is an "art historian task", since it requires the comparison and analysis of two different images to discover the kind of link existing between them, so it was a good exercise for the Bachelor students in History of Artistic and Musical Heritage to become acquainted with the History of Art methodology.

Furthermore, this task points out one of the most valuable aspects of IPSA: the art historian is able to compare two different images and understand the relation between them simply by sitting at a computer. In the specific case of the *Liber Agregà* and the *Erbario Roccabonella*, the art historian need not travel to Venice and London to study these manuscripts. This is a great help for scholars, and perhaps not so immediately evident for young students who have no research experience: the task aims to show them the enormous potential of IPSA.

4.2 *First trial - task 2.a*

Task 2 is related to astrological manuscripts. The objective of this task was to have the students read the catalogue files and mine information from the database. Every student was given an astrological subject, namely:

- representations of constellations, i.e. *Ursa major* (Large bear);
- astrological signs, i.e. *Sagittarius*.

They were required to do a search by the subject assigned and analyse the first or the last five images in the results list. Then they were required to put them in chronological order. In this way, not only did they have to compare images, but they also had to read the catalogue files of five different manuscripts. Once the chronological order was set, they had the possibility of following the iconographic development of the subject.

5. Second trial

The second trial took place on November 30, 2011 for Group 1 and December 21, 2011 for Group 2.

On this occasion a short explanation of the IPSA functionality was made to Group 1 before the trial, in order to check whether the results changed and to what degree.

5.1 *Second trial - task 1.b*

Each student was re-assigned the same illuminated page from the first trial. This was the starting point for another kind of search: they were required to find out whether there were other images of the same plant in other botanical codices of the collection. Since plant names were not precisely codified in the Middle Ages, the students had to pay attention not only to the images, but also to the name variables. For example, the plant represented in f. 14v of the *Liber Agregà* is called *Stichados*, but in other botanical manuscripts held in the IPSA database the same plant is spelled *Sticados*, so the student working on this subject needed to search by every name variable, and to verify whether the plant was the same by carefully analysing the illuminations found. Once the student had verified that the represented plant was the same, he had to create a link between the two illuminations as in the previous trial.

5.2 *Second trial - task 2.b*

Each student was re-assigned the astrological subject of the previous trial. They had to make a search by this subject, and create links

between the illuminations they found. So this time not only did they have to establish a chronological order, but they also had to analyse the kind of relation existing between all the images.

It should be noted that task 2.a and task 2.b may seem quite similar, but they actually presented different kinds of difficulty. In fact, in task 1 the students had few manuscripts and a limited number of images, but a large number of etymological variables that made the research quite tricky. On the other hand, in task 2 the illuminations were easier to find, but the students had to work with a larger number of manuscripts and images.

6. First outcomes

The analysis of the outputs of the trials is still ongoing, so it is too early to have an exhaustive and comprehensive overview of the results obtained. Nonetheless, so far the trials seem to be a successful way of creating a useful and dynamic relation with users. In fact, in the first trial with Group 1 it was already possible to identify some necessary improvements that were immediately made to the database, in order to test them in the second trial. The most important improvement needed was to work out a more practical and faster way to present the illuminations. For example, the *Erbario Roccabonella* holds hundreds of illuminations that required some minutes to be loaded. In the second trials the images were shown divided into smaller groups, and the loading was faster. This example clearly shows how the trials are bringing about a useful process of eliciting user requirements, immediately inserting changes into the database and subsequently evaluating the modifications made.

The trials also made it possible to make some preliminary remarks on how such a specialist collection is perceived by a non-specialist user.

First of all, it was found that people not used to working with images as historical documents focus their attention mainly on the text. When asked to find the images of the same plant in the *Liber Agregà* and in the *Erbario Roccabonella*, most of the students preferred to look for the images by searching with their names, rather than comparing the illuminations. This is not the best way to proceed, since in the Middle Ages names had a lot of variables, and a painted representation is normally more trustworthy. For example, the word *citron* means both "lemon" and "cucumber", and some students set a link

between the images of these two plants without noticing that they are far different. This is really important to keep in mind, since it points out the need to develop a way to draw the user's attention to the illuminations, to make them understand the real meaning and value of the IPSA collection and the way art historians work.

In addition, a general tendency in working mainly with Renaissance images was detected, especially in Task 2.b, in which the students could work with a larger group of illuminations. This tendency can be explained by considering that the Renaissance is one of the most well-known artistic periods for people who do not have a specific expertise in History of Art: so the students were probably more attracted by something they could recognize and were able to refer to a known background. This is an output that probably also applies for characterising the general public and should be kept in mind for the elicitation of the requirements of general public.

7. Conclusions

The IPSA database trials have turned out to be a dynamic and fruitful way to have large groups of students interacting with the system. The trials made it possible to see the students reactions for the first time when faced with a digital collection created specifically for professional researchers and the degree to which such a specialist database is accessible to university students. An accurate analysis of the outputs of the trials and of the questionnaires will provide a detailed profile of the student community and help to understand how to make IPSA more engrossing and useful for this user group.