

homm

ICT for hands-on laboratories in museums

www.homm-museums.org

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Abstract

Homm_ICT for hands-on multi-media laboratories in museums is an initiative to support lifelong learning and the regeneration of competence networks by using museums as agents of development. The present promoters are the Crafts Museum (National Handicrafts & Handlooms Museum), New Delhi, India, and Officina Emilia (Museolaboratorio of the University of Modena and Reggio Emilia), Modena, Italy. To develop this initiative, a multidisciplinary team is required to support, test and evaluate its development, and to build the specific multimedia contents for the application in the museum hands on laboratories; building a network of museums to experiment with homm's uses. Officina Emilia and Craft Museum are seeking partners to develop the initiative: both public organizations involved in projects fostering development and private investors interested in a new field of social investment for enhancing communities' opportunities would be an essential part for supporting the project.

Keywords

Interactions with visitors before, during and after the visit to the museum; communication through IT/communication through interaction; different types/levels of visitors; lifelong learning; communities of practice; network of museums; museums of science, technology, of the industrial heritage, eco-museums; e-learning and teachers' training; documentation and communication; evaluation; India, Italy; mechanical technology; textile handcraft technology.

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A poster presenting HOMM has been exhibited at [fet11](#), Budapest 2011, and at [MM4CH](#), Modena, 2011.

1. From Modena to New Delhi: ICT for hands-on activities in museums as an instrument to promote lifelong learning strategies

1.1 A new laboratory and an old museum

HOMM is a project promoted by the Officina Emilia Museolaboratorio (OE) of the University of Modena and Reggio Emilia, Italy, and by the Crafts Museum (National Handicrafts & Handlooms Museum) of New Delhi, India.

OE has developed, since 2000, hands-on laboratories on technology, history and society with the objective of improving the students' (and their teachers' and families') understanding of the social context in which they live. OE's goal is to support the local education system in enhancing innovation processes in technology and society.

With a long history, the Crafts Museum has recently undertaken a deep restructuring aimed at enhancing the opportunities offered by a large collection of handcrafted products and by a vast endowment of traditional Indian crafts skills held by craftspersons.

With the project HOMM, Officina Emilia and Crafts Museum intend to explore the use of ICT in enhancing the opportunities created by hands-on laboratories.

1.2 Hands on workshops and ICT

Hands-on laboratories – involving both individual visitors and small groups of visitors or school classes - are largely used in science and technology museums, and increasingly in all other types of museums. to support informal learning and teaching experiences (now considered a constituent part of museum activities).

Generally, ICT-based tools are used in museum contexts for interactive games (edutainment is now popular in museums) and increasingly to support sharing of resources. Recently they have been also used to build “communities of users” (eg Louvre).

1.3 Unexplored benefits of ICT in museums

The benefits of the ICT-based tools are well known: they can be used repeatedly and in different and personalized ways. Nevertheless, so far, their use in museums has not been fully exploited in integrating ICT with hands-on practices: ICT-based tools can support hands-on labs in order to improve knowledge acquisition through interaction and to extend the experience before, during and after the visit; they allow a focus of attention on the process and not only on the final result; they offer the opportunity to connect, share and create networks with other visitors having the same interests (create communities).

Moreover, other unexplored dimensions of ICT in museums are of utmost importance in supporting design and testing of new learning approaches. In this direction HOMM aims at linking activities generally kept separate: sharing resources, evaluating efficacy of individual activities and of the hands-on program; interactive track of visits (before, during and after), multidimensional involvement of communities within the hands-on labs and outside the museum.

1.4 ICT supporting multidisciplinary lifelong learning approaches

The need to contribute to the development of multidisciplinary lifelong learning (LLL) approaches for different levels of learning (pre-school, primary, secondary, tertiary, adult, continuing) requires the availability of communication tools suitable to the needs of the widest group of population – “from cradle to maturity” – without neglecting scientific rigor and accuracy.

Therefore, by combining LLL principles with the opportunities offered by ICT in museums, the project intends to provide an innovative model for lifelong learning, through the direct involvement of a network of museums which take advantage of technological progress in order to experiment in new ways of providing informal education.

In other words, the project HOMM aims to disseminate the idea that museums, with the support of ICT, can provide an alternative site to promote lifelong learning strategies. The knowledge society stresses the

need for radical change in the traditional educational and training paradigms and the importance of non-formal and informal learning strategies. New “learners” are increasingly experiencing these new needs, and, from this point of view, the museums will play a crucial role. Furthermore, this project enhances the visitors’ participation in cultural activities of education and training and this can represent an important tool for the valorization of social cohesion and active citizenship. For example, among others, the project helps to overcome some of the problems of marginalization of more disadvantaged groups. These goals aim to promote civil, cultural and economic development, through the valorization of culture, and the quality enhancement of the education and training system.

2. HOMM: an ICT prototype for learning practices within and outside museum labs

With HOMM we intend to produce an integrated ICT-based tool to address some needs specific to learning practices in museums.

2.1 First two applications: main features

We start by developing HOMM with regard to two complementary cases: the Officina Emilia laboratories in Modena, Italy, and the Crafts Museum (National Handicrafts and Handlooms Museum) in New Delhi, India.

The following issues are extremely relevant to both cases: (a) mechanical and textiles, respectively, have very strong tradition in the regions where the museums are based; (b) the regeneration of competence networks is a crucial issue for enhancing the development of the industry and the local economy; (c) education, building communities of practices, supporting technological culture and the special knowledge of handicrafts (as in the Indian textile tradition and in some branches of mechanical production) play an important role in this process; (d) culture and society are key factors in the reduction of the gender gap and the promotion of lifelong learning.

2.2 HOMM prototype: a set of applications for a network of users

The HOMM prototype we intend to develop consists in several multimedia applications addressed to the different groups of users in all the phases of interaction with the “laboratory-museum” activities (before, during or after the visit).

Officina Emilia and Crafts Museums have started the “call for partnership stage” to find a pathway to design and spread the use of the HOMM ICT-prototype to other of their laboratories, and to one or two laboratories of museums which are interested in developing and adopting it.

2.3 From development to testing of HOMM

Development, implementation and testing of the HOMM ICT-prototype will require:

- Defining the appropriate format for the performance of different laboratory activities with classes of students and adult groups. The format will be developed starting from two of the workshops now offered in Modena and New Delhi.
- Realization of a prototype for effective demonstration of multimedia applications targeted, in both cases, at different users at different stages of interaction with activities (before, during and after the visit).
- Building a significant network of designers and software developers, manufacturers and retailers of hardware, graphic designers, video makers and researchers in different disciplines involved (mechanical engineers, textile and dyeing experts, economists, sociologists, educators, evaluators of the results of informal learning, museum experts etc...)

2.4 Multimedia content to test HOMM

Short multimedia products will be specifically produced for the HOMM applications with regard to the testing cases, by realizing video clips, 3D modelling, graphic design slideshows (providing appropriate

storyboard/screenplay, shooting, editing). The multimedia production, modular and scalable, will be developed around the workshops selected for testing, and will cover historical, social, technical, economic, organizational topics related to the two educational workshops.

2.5 Creating a network of developers and users

- Building a partnership with a network of museums (such as museums of industrial heritage and eco-museums). The goal is to create a network of museum experiences that promote learning through informal workshops on technology, culture and society.
- Why create a network of museums? Expanding the end users of the products that will be realized (methodology, appropriate tools, etc.) will make the investment required to support the project more attractive (thanks to economies of scale). This will allow to offer HOMM ICT to all the small museums that either wise could not afford the investment required to develop and implement ICT tools supporting hands-on activities in their museums. A network of users will also allow the testing, development and sharing of effective practices for a range of museum experiences. This will benefit also those museums that were not yet offering those museum services, or hands-on activities that might be ICT-supported (economies of variety). Finally , a network of museums will help to satisfy a more general demand from the education system for support through museum-based practices (informal education).

2.6 Monitoring and evaluation of HOMM

- Along the development of the HOMM ICTI-prototype, it will be developed a complementary design of the evaluation plan and monitoring of the implementation of the HOMM prototype in the OE museum laboratory and in the Crafts Museum in Delhi, and then in the network of museums testing it.

2.7 The project team

The multidisciplinary research team will be composed by computer engineers, mechanical engineers, textile and dyeing experts, designers, manufacturers of hands-on experiences for museums, multimedia communication experts, experts in complex systems, education planning experts, professionals in the design and implementation of multimedia documents, researchers (history, technology, economics) for the production of multimedia content.

The coordinators are Dr Ruchira Ghose, Chairman of the Crafts Museum (National Handicrafts and Handlooms Museum), New Delhi, India) and Prof. Margherita Russo (University of Modena and Reggio Emilia, UNIMORE) Italy the scientific director of Officina Emilia.

2.8 Stakeholders

The project is intended to involve also the participation of relevant stakeholders, especially policymakers at national, regional and local levels. Indeed, the final aim of the project is to develop a renewed identity for the museums, which will be recognized as effective education and training centers, promoting the complementarity of their innovative activities with the training activities offered by the more formal education and training sectors. Therefore, the active involvement of decision-making bodies will be crucial in expanding this concept to the public, and in attracting a wider public compared to the past and, above all, addressing those citizens who are not traditional users of the museums.

3. Seeking partners for HOMM

Officina Emilia and Craft Museum are seeking partners to develop and implement the prototype. Private investors interested in a new field of social investment for enhancing communities' opportunities would be an essential part for supporting the project.

4. REFERENCES

[1] Officina Emilia www.officinaemilia.it

[2] National Handicrafts & Handlooms Museum <http://nationalcraftsmuseum.nic.in/>

Annex. OEMM: an application of HOMM_ICT-prototype to one of OE's hands-on laboratories

We propose below an illustration of the activities that can be incorporated in the ICT prototype to develop **homm**. These are some of the ideas around which the project team is working.

We have identified storytelling as the most effective form that can be used to promote dialogue and synthetical description of the many specialized disciplines involved in the project. In particular, through storytelling, the working group constructs the meaning of the features that we wish to incorporate into the prototype. Each one of the designers will develop and integrate, according to her/his skills and in continuous interaction with other members of the working group, the realization of a prototype that meets those features.

The narrative form is a design tool that promotes sharing within the project team not only during the preparation of project design and the specific presentation of the idea to potential partners, but also in the next phase of prototype development. At that stage, the narrative will be examined formally, checking the requirements of the software platform against what emerges from the testing and the critical analysis of the project. This method will allow us to check that no parts are told in the stories which are "off topic" or "off budget" or which are very expensive and do not produce innovation. (This discussion will be deferred until the launch of the actual project, in the expectation that "**homm**" proposal will generate the same enthusiasm that motivates the project team).

The example presented in this paper is "Story of a lathe: from the war to Formula 1". It concerns a specific ICT application (here after named OEMM) to the Monarch lathe that is now part of the heritage of Officina Emilia Workshop. The application OEMM is described as accessible from the **homm**'s website. Through five short stories, three types of users and the actions that are possible in the stages before, during and after the visit, are introduced. The protagonists of the stories are students, teachers and other visitors. *A complementary set of stories with regard to the Crafts Museum is in progress: it draws from Ruchira Ghose's paper (2004) on Sanjhi, the ancient art of paper stencilling, and on pottery.*

Francesca and Riccardo are students who use various features of OEMM during and after the visit made by the class. Ramella and Binora are their teachers of literature and robot programming: they have completed one of their planned activities and use some OEMM applications for their evaluation of students, for other activities with their classes, to gain information, etc. Omar is Francesca's father. He has been a lathe operator for most of his working life. Through the **homm**'s website he finds a group of former students who are designing the maintenance of the Monarch lathe, but also discovers other stories. Other people also come into contact with OE.

Suggestions for development of the prototype section of contents and applications "OEMM_torniomonarch":

- One way in which the Monarch lathe, on display at the headquarters of Officina Emilia, could be used is to show an overview of the "history of machining in Modena during the post-war period"

- During the visit, the lathe will be in operation: a skilled worker will show how the machine is equipped and set up to achieve a particular job, as well as the details of the machine, of the processing operation and of the piece being worked on (at different stages of the process) (see storyboard)
- The Monarch lathe will be compared with the NC lathe. The machine in operation is a narrative device to draw attention to the importance of mechanical technologies in Modena, the characteristics of manual technologies that are different from NC, the different man-machine interactions entailed by the two technologies, people's stories, their relations and human-machine interactions (since the postwar period)
- A historical analysis that documents the technical features of the Monarch lathe and the events that led it to arrive to Modena is already available: from a tool to serve the American army to a tool for learning how to shape metals. It will be necessary to produce various kinds of multimedia materials (photographs, movies, sound clips, text, animations) that describe episodes linked to the Monarch lathe located in the Museolaboratorio of OE. For example, interviews with former workers who recount how it was left by the Allies after the liberation, photo of the institution where it was taken, interview to the person who modified the lathe so it could be used with metric system, stories and testimonies about the machines and other pieces produced using this kind of lathe.
- More generic materials can be acquired about the period in question, relating to the history and territory, either purely "historical" in nature, or more specifically related to factories and the mechanical engineering industry from the post-war period to today.

ONE_Before and during the visit. Use of touchscreen in the Museolaboratorio, identification using proximity devices, authentication, interaction, memorizing activities

STUDENT

While others in my class are still listening to the guide explaining what you can do with that big machine, I leave the group and go to a screen that is on display next door next to the lathe and on it I see some moving images. As soon as I approach a sentence appears: "Hello Francesca". At first I am surprised, but then I realize that it was the "card" that they gave us at the entrance that revealed who I am to the computer. Shortly after the screen flashes "Francesca's workspace", at least this is what the title says. The space is empty for now, but there are some selections with "activities" that I can do. Some are active and others are switched off, I understand this because if I touch those that are switched off (which are also different in the form of presentation) I get a message saying: "this activity can take place only on the after-visit website: return to your workspace from home by browsing the website that is printed on your card".

Looking closer I see that there are only a couple of proposed activities and that they are in a "slice" of the index called "Monarch lathe". The entire index would also let you do activities related to all the "experiences" in the museum, for example, there is one called "How many things are in it?". However, only the part related to the lathe opens in this screen.

When I touch each of the selections, a small thumbnail appears, a kind of animation close to my finger which recalls a step or an element of the activity and makes me remember or guess how it is performed. The selections, all, both active and "off", I can drag them with my finger in my workspace and leave them there. I begin to expect that I

will find them as I left them, both here and, why not, when when I'll try to get back to the website from home.

But now a couple of my friends arrive and they tell me they want to play too, so I must hurry and so I choose one thing that is called "the network of stories". The screen is now divided in two parts. One of them shows a video. A guy who looks a bit like my grandfather Cesare begins to tell a story about the lathe and when he saw it, when it had been left in a warehouse half bombed.

On the other side of the screen there are small symbols that are interconnected with lines. At the center there is one that is "lit up" with a small picture of the "grandfather" who is talking, then from this symbol some lines begin that connect it to other symbols, all with pictures or icons. For example, there is a picture of a soldier's helmet, then a facade of a school and even a vintage car. I can touch any symbol and, when I do that, the symbol follows my finger and it is as if I stretched the lines with all the other objects hung to them, like rubber bands, and the whole network moves accordingly, as if suspended. When I let go, the symbol that I have touched bounces back to the center and lights up. Also when I touch a symbol other parts of the network appear. In fact, the symbols furthest from the center become more transparent depending on the distance.

The symbol in the center however does not immediately launch the film on the other part of the screen, between the two sides there is a button (or at least something with an arrow that I understand can be pushed). It is enough to press that one to start the film. Or better, whatever is "inside" the symbol starts, in fact if I choose the vintage car I can launch a slide show of photos of cars and racing pictures and captions that speak of Ferrari and Maserati cars over time.

Or, going forwards following the links that leave from the school I found a very serious guy. He was the principal of some school, I don't remember which one, who showed that now, instead of that lathe back there, they use a machine from "Star Wars" like a robot.

A few symbols away, then I found other pictures of the robots that made me curious but unfortunately the screen stopped and told me: *"Ok, Francesca, here at the museum each person can only play for 5 minutes, But come back to your workspace from home, you will be able to continue and you will see other activities. See you soon"*.

TWO_After the visit. Online use, web authentication, memorizing activities, interaction

STUDENT

At the Officina Emilia exhibition I could not play any of the "video games" because that stupid Francesca had glued herself to the screen and stole my card so that she could continue playing on my behalf. The lady at the exhibition said we could try it at home, so tonight, since nothing interesting is happening on Facebook, I'm trying to browse.

I enter the address that's on the card, I open the site and I am asked for my username and password. Wait. We had to come up with them at school, when the teacher got us to pre-register on the website using the classroom computer. My username is my usual "Zargon", and the password is also the usual. But I do not write it here. I do not even tell Ely, who is to my girlfriend.

Ok, I entered. The website says: "Hello Riccardo!". The workspace is already populated with some activities that have been carried out, these are those that I have seen Francesca do during the visit, in my name. I browse and reopen the activity called "Network of stories" and I find the situation that Francy left, with a movie about robots that paint cars. I also click around a bit. By the way here you should use the mouse and not the touchscreen, but it's the same thing. However I am not going to describe it for you, as you know already.

The novelty is that when I return to the workspace I also find some activities that were closed when we were at the exhibition, but that now you can do. I choose one that is called "From the war to formula 1". When I enter in the activity I see some symbols arranged on two levels: those closest are similar to those of the "Network of stories", there are still photos and writings that talk about Emilia-Romagna and its workshops, but behind them there are photos of Italian events and the page is marked with the numbers of years starting from 1945 and looking to the right I see that they continue, but I can read only until 1950. Looking closer I see that all the symbols have dates and that they are arranged in chronological order, ie, their horizontal position depends on their date: the "oldest" are to the left of the more "modern" ones.

In practice the screen is organized on three "bars": one with the list of the years, one with the events of Modena and one with the history of all of Italy. If I click on any of these bars I see that I can make it slide. When I move one of the bars, after a while everything else is moving too: the other bars follow with a little delay, as if they were tied to it with a spring. When I let go of the bar or if I pause while it is sliding, after a while the other bars line up and "fit" into place. Some of the symbols can be clicked and enlarged, opening a window that covers the remainder of the screen. In the window there are movies or texts or pictures with an audio commentary, for example in the history strip there are a few songs next to different years or photos of historical facts and trends: there is a girl dressed just like my mother in a picture that my dad keeps on his desk. In the same way, the symbols in the Modena strip link to events related to Officina Emilia issues: the development of machining and local industry in our territory.

While looking at symbols I notice another thing: in some there is a small drawing that looks like the usual "user group" icon. I move the cursor over one of these special symbols: it appears to be an interview, judging by the image that opens and by the title "Immigrants tell their stories - a graduate in the foundry". In addition to standard preview information, it also says "Immigration Project 2009 - ITIS Corni / prof. Ramella".

I must confess that it makes me breathe a sigh of relief. Because I begin to understand what Ramella had in mind when the other day she said: "Fifth graders in section F will soon make a very interesting piece of research work" and all of us, distinguished members of that class, shuddered to think of another one of those exercises that ended up with an avalanche of E grades.

THREE_Activities and online projects for groups: project management, sharing tools, repository material, restricted access, Web contacts to the project

TEACHER, STUDENTS AND OTHER USERS

Also this year I took the herd of fifth graders, section F, to Officina Emilia, as we did last year with the old class. With Professor Binora I was glad to make the effort of

taking the class out, including the coach trip and the football-type chanting. I did it because I know that during a visit to Museolaboratorio the kids are involved in the activities. Some even enjoy themselves. Moreover, also with this class we want to do a research project that will occupy them and that will keep them involved for a few afternoons. The project worked well last year, we put together a document and some students produced a piece with pictures and movies. At their final exams, they used the work that was done then, and were able to connect it to some key parts of the curricula of several subjects.

In collaboration with the staff of Officina Emilia, who has involved us in the preparation of the visits, we chose the theme: immigration and the integration of foreign workers in the mechanical workshops of Modena. With the kids we then we designed a rough outline of how we would do the work: interviews, collection of statistical data, reading materials, movies to watch, and even some lessons in geography and economics with the involvement of employees of Officina Emilia who came to the school.

Then, using the webpages reserved for teachers, we set up a "project". This is an area that the **homm**'s website reserves for every group that wants to launch new ideas and activities. Having a "project" means that you have web tools for collaboration and communication, such as a wiki for collaborative management in the form of collaborative hypertext of the project ideas and information, a blog where the group that manages the project publishes news relating to the work, an area for sharing texts and multi-media materials (videos, images, audio).

Those of us teachers who open a project are responsible for the content that is published. The authors, the individual students, are each responsible for their activities on the website, and this trains them to use wisely the information that they make available on line, respecting others and valuing the contributions of individuals and of the whole group that developed them. Among the students, a group of 4 or 5 immediately wrote the outline of our workplan on the wiki: a wiki allows you to easily write a network of web pages and the kids learned how to use it in an instant. With the others, we divided the tasks and we started working.

Upon advice of the staff of Museolaboratorio we identified and contacted some companies to conduct interviews with workers and entrepreneurs, and we also collected data on these companies, taking advantage of the grid prepared by the staff of OE. Interviews with workers were held in the afternoon, after their shifts, and the students prepared for them by consulting the interview outlines that staff at Museolaboratorio use when interviewing their informers. Some students did the interviews while others took notes and recorded the speech. The student were really good at editing movies and putting them in the project site. The transcripts of the interviews were then corrected by us teachers, and discussed along with other materials about the companies that hired the immigrant employees.

We were about halfway through the work that we had proposed to do, when we were contacted through the blog by the "OneWorld-OneWork" association, who had read about our project on the **homm** website. These very competent people are dedicated to the mission of their organization which is to promote sustainable development, social justice and human rights. They form a network of around 1,500 organizations worldwide and they asked to cooperate in our project which they had found through the blog and the project area of the **homm** website. Here we have indexed our activities also in English (and Spanish) so we can enter into other search engines

while leaving most of our text in Italian, but keywords and abstracts of the projects are available in other languages.

In addition to providing excerpts from their audiovisual works, which they loaded directly into the project repository (but only after we had approved them as participants), we were then allowed to have a series of meetings organized in the form of video conferences via Skype with two colleges: one in Cairo and one in Budapest. With the kids and with the help of the English teacher, we developed a questionnaire for a comparative survey on the three training models: their two, and ours. Naturally also this item has ended up among the materials of the project in the **homm** website.

Finally we used the “pages for authors” of the **homm** website to connect our materials to the other “open” interactive activities, in fact some of the interactive activities available from the exhibition or from home, are made so as to allow the insertion of material from the projects. For example: in the repository we had a video on the interviews, we decided to designate it as a shared object: it is now possible to choose this option from the page describing the video. We then had to fill in some data cataloging the item. These were additional data, since for each media object loaded, even in the repository, you must already provide the basic information. In fact, also these project materials, if the declared “public”, already appear in the “Gallery” section of the site and users can browse them. Returning to the example: after completing the additional information, the system showed us a list of all “open activities”, we selected the “web of stories” because that was where we wanted to put our interview. At this point we had to select from the list of nodes in the network a group of “related nodes” and then the interview appeared in the “network of stories” available both at the exhibition and on the website.

With prof. Binora we are preparing an evaluation of educational activities: we will put it in the reserved area of our work tools. We plan to modify last year’s evaluation outline, which we recovered from our online documents, adding information about this year’s class. This year’s class is more diverse and we expect pleasant surprises from teamwork. The assessment is made both on the quality of materials that students produce and on the effectiveness of their teamwork and individual work. For the evaluation of group work we had some tips from the staff of OE and we have slightly changed our observation grid.

Our collected data and the assessment that we made is placed (though without reference to the names of students) in a database that collects all the experiences related to Museolaboratorio. We also completed an evaluation grid measuring our involvement as teachers: in fact we have also learned something about how you can work on cross-cutting themes without losing too much time and obtaining some success. Above all, we can use year after year the materials for students of previous years and also those of other class groups. This is a good way to better exploit the work of all the people involved.

FOUR_Assessment: Registering users and groups, gathering statistics, tests and indicators, teachers’area, comparing the collected data

TEACHERS AND STUDENTS

Mrs. Ramella has struck again. That woman has an energy that could be used to run trains. And as usual I am thrilled about this project. It was enough for her to tell me during the faculty meeting: “Come on, Binora, let’s do an online project, one of those

of Officina Emilia, with the Fifth F class! You will see that these too will participate as they did last year”. And lo and behold. Also this year I fell for it. In fact the results last year were truly amazing and we managed to integrate the work done with our class planning and also with the regular testing of the students’ learning. This year I’ll try to see how we can best use this experience to connect it with the history curriculum.

How does the assessment work? In the first place, there is an evaluation of the knowledge that students acquire during the laboratory activities and the visits. This is knowledge of technological, scientific, economic and historical nature. The assessment is measured on the basis of "before" and "after": through a sophisticated system of questions with closed answers, students respond by logging online at our activity’s web page. In order to do this (us teachers must ask to do this, otherwise the Museolaboratorio proceeds in a simpler way) individual students must be “registered” before starting the activity.

I am therefore required to lead students to the computer room to prepare for the visit. I organize the kids so they can work on all computers and I get them to connect to the web address that the staff of Officina Emilia let us have for the registrations. Each student must first choose a username and password for their personal account and should also provide the code for the "group" he or she belongs to. The group for us is the class, and we're the teachers in charge, and we have told the kids the code that they need in order to register to the group, which appears on our web pages. Immediately after, they are asked some data for statistical purposes: data are therefore not private, but qualitative. Such as: age, gender, profession of parents, city or state of origin, area of the city or town of residence.

Students tend to relax and laugh together at this early stage. Luckily the registration process is very clear and straightforward and above all the questions are just a few, only about ten. So they all move quickly through this page, also because the part on evaluation tests is experienced by the kids as a kind of contest and they are in a hurry to try it out. The initial tests are simple tests of two or three types: true or false, closed questions and a few simple "games", such as tidying up some objects on the screen or indicating parts within pictures and drawings. The tests are so many that they are practically different for each student and the program still takes into account those already shown in order to avoid repeating the same test to the same person. After the test, the system returns to the student a profile of his or her knowledge as measured on a few indicators, such as: knowledge about work, about some basics of technology, about certain principles and laws of physics, about some economic variables, some historical facts and sometimes about some excerpts from literature.

In order for them to be understood by the kids, the results (as indicators) are shown with bars in a page that contains the header: “What do you know about” And the bars are named as: “... how to work in factories?”, “ ... where it is produced in Modena?” or “... why does that happen?”.

For us teachers, there are some pages, also accessible via the internet, from which we can see the total result for the group and the details for each student. The result is labeled with the date, and is thus comparable to the tests that will be done after carrying out the activities. For example, when the class last year took the test again after the visit and at the end of the project, naturally they obtained better results, but what was interesting for us teachers was to observe the correlations between the results and the categories of students. For example, I recall that we were very

impressed about the different results obtained on the issue of local knowledge by the kids from Modena and by the foreigners.

Also the time devoted by the students to the activities of the Officina Emilia website, both at the exhibition and from home, is recorded, and is an overall indicator of the degree of interest that we were able to stimulate. The OE staff completes, in relation to each class, an assessment of their interest and results. If we want we can ask for it and it often contains useful indications. All students and us teachers are invited to complete a quick online questionnaire, about the extent to which we enjoyed the activities. Also we are asked for suggestions, criticism and advice.

All the data that is collected by Museolaboratorio is published on the website anonymously and used to improve and change activities that are proposed.

FIVE_Before, during and after the visit: registering users, workspace

OTHER VISITORS

Francesca came home from school today with that little packet of bolted coupons. These Officina Emilia types are funny! A bolt and nut to hold that little book, which seems made of large playing cards. Franci said that we can also see these things online, and I know that lathe well, it is the Monarch, and at school I've spent months to understand how set up the tools and afterwards it learned how to work it perfectly. I still remember how excited I was when our teacher told me that my piece was done to perfection.

The web page **homm** is like entering the webpage of my local cycling association, only that there are many more activities. I also found a group of former student of Corni like myself who learned mechanics on that lathe. We opened an online discussion and we agreed to meet. On the calendar page we set one afternoon after work when we could meet at OE and decide if we could re-start the Monarch lathe as when we were using it.

We went on Saturday with the others from blog_Corni (we were seven as agreed), and there it was different from how I imagine a museum, everything on display could be touched, and there were also kids who work as tutors for the schools. They explained to me how the lathe works: and I have been a lathe operator all my life! But they were passionate about it. And some girls made me assemble and program the robots. They made me understand why when Franci came home she said, "is too good!" She usually does not speak well of things at school, and it was Binora who took them there.

With my colleagues from the blog, we organized how to intervene on the lathe, but we needed people to collect the materials and technical drawings, and we also needed an electrician (we are mainly mechanics) and so we found one. Giulia from OE's documentation centre told us they want to film us while we do the maintenance.

Every time I enter the site, after I registered the first time, I identify and find where we stand with our restoration project of the lathe. When I cannot go, I follow what others have done, and going by the last images that have been taken and put online I realize that they are going slowly. Next Saturday we have to stay there until we finish.

The last time I logged in (Walter sent me a text for the next appointment) I also found the news about a class that is doing research on immigration. I talked with Saverio, but also with Chang, about some stories from the South of Italy and from China that the kids have put online: they sound like their stories! And they are stories that this association shows around the world. On Saturday they are also coming to see the completed videos, which are going to be projected in the Museolaboratorio.