

Nobel Symposium (NS 120)
“Virtual Museums and Public Understanding of Science and Culture”
May 26-29, 2002, Stockholm, Sweden

Electronic Environments and Museums

by Andrea Bandelli
Independent museum consultant
Max Euweplein 17, 1017MA Amsterdam
andrea@bandelli.com

This paper describes two recent research projects currently being developed in Europe by various science centres in the framework of the European Commission’s Research programme – Fifth Framework Program.

The two projects – *BIONET*, a digital programme on Life Sciences (1) and *LAB-VR*, digital access to research labs (2), focus respectively on two strategic activities of contemporary science centres: promoting informed debates on controversial issues and providing direct access to scientific content.

Although different in scope and size, the two projects have a common aspect, because both use the Internet to build an infrastructure that can be used by museums and their visitors and partners to increase the awareness for scientific research, and to provide knowledge tools for the public that cannot be given using the traditional museological methods.

At the time of writing, *LAB-VR* has been completed as a research project and is still being evaluated. *BIONET* will be launched for the public in November 2002 and a “work in progress” version has been available to museum professionals since March 2002.

After giving a description of the two projects, I will look at the methodology and some of the issues that museums are facing when they become producers of these kinds of projects:

¹ Web address: <http://bionet.at-bristol.org.uk> (temporary “work in progress” website on which further information about the final address will be given). The project will be officially launched on 14 November 2002.

² Web address: <http://www.torinoscienza.it/lab-vr>

- Leveraging on the museums' role
- Understanding the “internet experience”
- The importance of internationalisation
- Building a sustainable economic model

LAB-VR

LAB-VR was developed by the Science Centre Torino, and is an experiment to test a visual access to scientific research documents.

At the basis of this project is the expressed need by the citizens for a better and more open access to the places where scientific research is done.

In several European countries research institutions organise “open days” where, once a year, they open their doors to citizens. These events register thousands of visitors in a single day, which is a clear indication of the need and desire of citizens to see what these laboratories look like, and where the research takes place. However, these events are very costly for the organizations themselves in terms of time and resources, without considering the fact that they have to stop the research activities while the events take place. In some cases, the laboratories cannot be visited at all because of controlled environments (like clean rooms or climate requirements), or because they perform a temporary activity for a limited time only.

In fact, scientific information and public understanding of science through media and science museums play a fundamental role in making science accessible to the public. Still, a large majority of the population is interested not so much in the applications or results of research, but in knowing “what” research is, where it is done, in seeing who are the scientists who work on these issues and where they work.

This need, if satisfied, may very well lead to a bigger involvement in scientific interest, especially for young people and students, in an increased interest for scientific and technological disciplines and education, and better orientations for studies and careers.

LAB-VR presents 10 research institutes established in the province of Turin, Italy. For each institution a number of laboratories are displayed using the QuickTime VR (QTVR) technology (3), together with a general

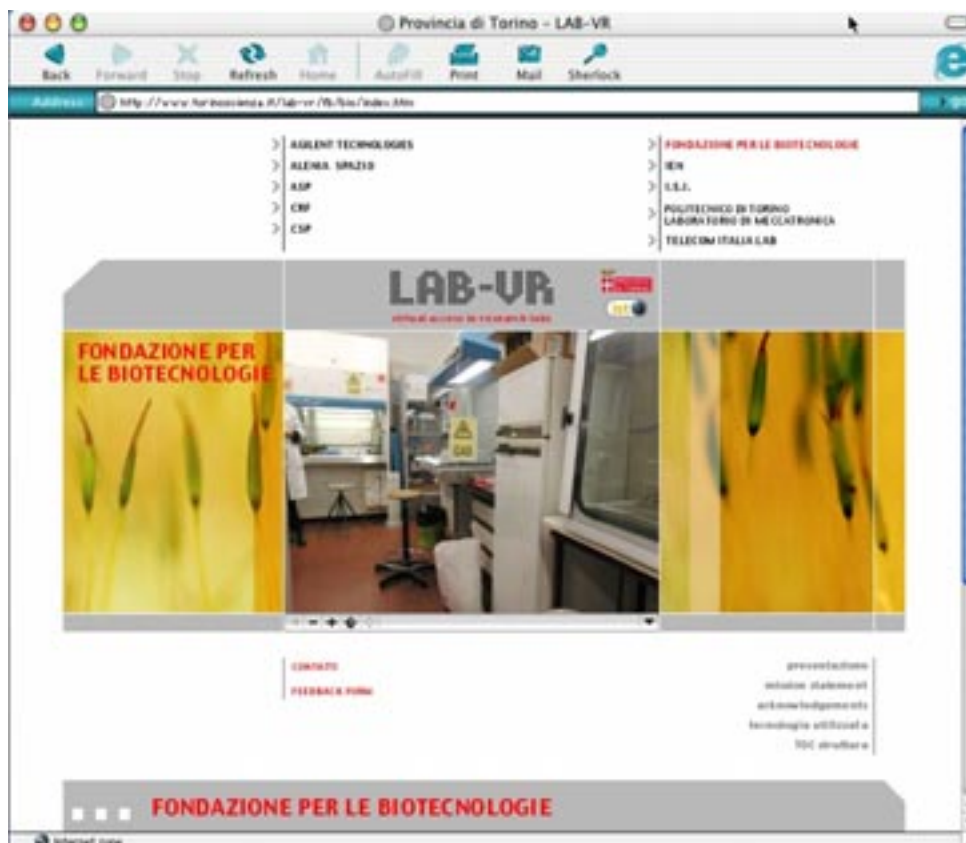
³ More information on this technology can be found on <http://www.apple.com/quicktime>

description of the institution and links to relevant websites. In each QTVR view the user can “click” on instruments, equipment, or other details in the scene and get detailed information about the research activity relative to that equipment. This can be in the form of research articles, texts, images or any other media.

LAB-VR features now more than 30 laboratories. Each view of a laboratory, if “opened”, looks like this:



For the Internet user, this is the interface to each laboratory:



With this project, users have the possibility to see for the first time for example the clean rooms at Agilent Technologies, and learn about the production process for optoelectronics components, or to look inside the International Space Station at Alenia Spazio, where some of its

components are being built – these are experiences that cannot be performed during a real visit.

One of the main outcomes of the project is its possibility to be used also in a social context – in a classroom for example. Focusing on academic and high school students, this project gives them the possibility to see, during a lesson or a lecture, how the laboratory is set up, what are the instruments used there, and have immediate access to the research documents. If used as a follow-up to a real visit, it can reinforce memories and be a tool to get the information, which was missing at the time of the visit, preserving the context of the experience.

BIONET

BIONET is developed by a consortium of 8 European science centres and museums (4) under the auspices of ECSITE, the European Collaborative for Science, Industry and Technology Exhibitions. BIONET is not only a website rich with information about life sciences, but a programme which will take place in each partner where the public will be invited to join debates and lectures, supported and prolonged by the electronic infrastructure.

The current design for each scenario is like this:

⁴ The partners are: *At-Bristol*, Bristol, *Science Museum*, London, *La Cité des Sciences et de l'Industrie*, Paris, *Heureka*, the *Finnish Science Center*, Vantaa, *Experimentarium*, Copenhagen, *Deutsches Museum*, Munich, *Museu de la Ciència de la Fundació "la Caixa"*, Barcelona, *Museu de Ciència da Universidade de Lisboa*, Lisbon.



The goals of BIONET are:

- to create an electronic forum to inform European citizens about life sciences, including genetic research and biotechnologies, and to discuss the issues, benefits and implications of contemporary research in this field with the goal of increasing the level of understanding of these subjects;
- to gather, present and collect competencies and factual information from many European countries and from different sources (such as universities, industry and NGOs), by means of interactive exhibits and presentations.

The website is organized around 6 “scenarios”, compelling and controversial stories that introduce the topics of BIONET: “Designer babies”, Stem Cells, Ageing, New Medical Treatments, Future Foods and Genes and Human Rights. For each of these topics, the user can find a description of the main issues at stake, a dictionary, a quiz to test the user’s factual knowledge on the topic, a discussion of the ethical problems, an overview of the legal situation in the European countries, several interactive tools to explain the main techniques used by scientists in this field, a database with further resources and stakeholders, and the main news and recent discoveries. Common to all areas is a debate area where citizens can log in and raise questions and issues. The debate is not only an electronic one: during the year 2003 each partner will host at regular intervals a public event where the visitors can discuss with scientists, opinion leaders and other stakeholders the controversial issues

of life sciences. These events will “feed” the on-line discussion, which will be translated in several languages.

Leveraging on the museums’ role

Projects like LAB-VR and BIONET are developed by science centres, a fact that makes them unique for several reasons.

One of these is the role that science centres have for the public opinion: they are quite often regarded as neutral places, where science is presented in an independent and objective way. They have gained a reputation that is becoming an increasingly difficult responsibility to hold, especially when dealing with controversial subjects where the public opinion is constantly confronted in the social, political and legal arena. “Museums which deal with science are not simply putting science on display; they are also creating particular kinds of science for the public, and are lending to the science that is displayed their own legitimising imprimatur” (5). BIONET has chosen an almost journalistic approach, rather than a museological one, where the main difference with a conventional exhibition is the possibility for citizens to join and “shape” the exhibition with their participation to the debate. Such a platform re-establishes the neutral role of museums in dealing with subjects that, because of their complexity and their role in our society, might be easily tackled only from “convenient” sides.

The other aspect worth mentioning is that in projects like LAB-VR, the science centre establishes itself as a potential key player for regional development. So far several recent science centres have been financed as capital projects to boost local development (for example, the new science centres in the UK financed by the Millennium Commission). These enterprises, extremely costly as investments, are showing little signs of playing that role: some are already facing severe sustainability problems. Their role in the local economy can be questioned.

Using electronic resources such as LAB-VR, the science centre can create a “system” of research institutions which are available in a coherent and organized way, where synergies can be highlighted and the whole area can be presented as a technology-rich region, able to attract human resources, investments and partnerships. This function cannot be performed by a single player; it needs a “super partes” institution, which

⁵MacDonald, S. Exhibitions of power and powers of exhibition: an introduction to the politics of display. In: S. MacDonald (ed.) *The politics of display. Museums, Science, Culture*, pp. 1-24. Routledge, London (1998).

is independent from all the partners, and still benefits from achieving the results on a large scale.

Science centres and museums can benefit from building electronic platforms when they manage to make available the “invisible” research which goes constantly on in their institutions and which is at the basis of their work. By “invisible” research I mean the knowledge which museums acquire during the development of their programs and exhibitions, of which only a small part “sees the light” in the final realization of the exhibition. Digital archives and databases can be used to hold the data, resources and contacts and to make this available to the users. BIONET has a database which, is used by museum researchers to store the sources of information they use; the same database is available to the users of the digital exhibition when they want to explore the subject further. This is of course only a small implementation, limited to the factual information that can be stored in a database. A well-structured information architecture for museum research will open a new field of interaction between citizens and museums.

Understanding the “internet experience”

On-line media are reaching a very wide number of citizens, especially younger audiences. For many museums, the number of on-line visitors is much higher than the number of physical visitors. Still, the two experiences of visiting a museum in a physical space or through the computer screen cannot be compared. Building an electronic environment cannot be confined to simply translating content from one medium to another. The engagement of users follows different channels, which have to be carefully evaluated in order to provide a satisfying experience for the visitor. Museums are social spaces, where people go not to be alone, but to witness other people sharing the same experience, and in most cases, to enjoy a pleasant activity with friends, loved ones, partners and colleagues. Until the technology will allow several people sharing the same digital domains in a true interactive way (using embedded technologies or ambient intelligence, for instance), most of the electronic exhibitions are enjoyed as a solitary experience, or as a passive viewer.

This situation however should not be taken as a limitation: on the contrary, the limit of most exhibitions in science centres is that because they are shared by many users, their level of depth in terms of scientific information is often very low. The museum environment becomes suddenly unfriendly if somebody wants to spend some time on a particular exhibit: no place to sit, noise, other people getting in the way,

etc. Most of the time the visitors find only references to resources outside the museum, which are easily forgotten once they leave the museum.

There is for most visitors a borderline where the social experience of visiting a museum should become the personal activity of getting more into the subject. Instead of providing the two options on the same premises, as for instance many museums do with the “study rooms” where several computers and books are available for consultation to the visitors, both BIONET and LAB-VR try to create a model of use which integrates the electronic environment into a social experience, being it the visit to a museum, a lesson in a classroom or a public debate. In both project the experience is not “complete” if it is not approached from both sides. It remains enjoyable, but the added value of the integration of these electronic projects into a social setting is very high.

The large availability of electronic media raises the issue if museums are the only places where the social interaction can take place. The answer is obviously no. Several initiatives can give citizens the same qualities of a museum environment in terms of services, attention to dialogue and richness of content. LAB-VR is not “based” at a science centre, but relies on its partners to meet the demand for a social component, which is found in universities, visits to the premises and lectures. For example, temporary and travelling exhibitions and their electronic counterparts can reach different communities in a relatively short period of time and explore even further the diversities of people across countries, and link them together.

An opportunity made possible by electronic project is to address audiences which usually do not visit science centres, and especially teenagers and university students. The possibility to provide rich documents and complex information, together with the familiarity of young people with the electronic media, makes possible for science centres to provide tools for these users which do not find place in their on-site offer. The mission of many science centres is to stimulate curiosity and engagement with sciences, usually through interactive exhibits or games, and simple demonstrations. But all those audiences for which this step has already happened find most science centres almost irrelevant to their own needs.

Looking at the Eurobarometer 55.2 on “Europeans, Science and Society” (6), we realize that many of the traditional tools for communication of science are not regarded as reliable or meaningful by the citizens (and on

⁶ <http://europa.eu.int/comm/research/press/2001/pr0612en.html>

top of the list we find journalists and science museums!). There is an expressed willingness to “control” the work of scientists, and a sharp increase by young people to use the Internet. Young people are not generally concerned by a “poor” image of science, but rather by the lack of appeal of science studies at school and the difficulty of subjects. This is largely due to the fact that science is often mediated, transformed and presented out of its context.

Science museums appear to be much less visited than libraries or even art museums. This is irrelevant of the number of such institutions in each country. Richer institutions in terms of context, such as universities, get more than twice recognition by students.

It is evident that we need a more direct access to science, supported by actual access to content and visibility of scientists.

The importance of internationalisation

Today, the impact of science and technology on society goes well beyond a country's frontiers. If this is largely true at world level, it is for sure in Europe. On the one side, European institutions are more and more busy to build a true European Union where the physical frontiers will radically change their role; on the other, increased mobility for European citizens means more opportunities for each country and their people to act at an international level. Recent experiences like BSE and the foot and mouth disease have dramatically confronted Europe with its regulations. In the field of life sciences, this is even more evident looking at the differences in the law systems across Europe. But the European Union means also more opportunities for researchers, for young people looking for a job, and for life long learning and training.

Electronic projects are intrinsically international: the Internet allows a developer to reach a wide public, where the main obstacle to be a cross-country project is represented by translations and cultural values.

BIONET is an example of a true European project, developed by a consortium of 8 museums where at every step a consensus is reached in order to guarantee a representative view of the issues. The result will be a platform where all citizens can recognize their own values and the points of view of many other countries.

BIONET will also be a tool to understand the differences that still exist across Europe. It will help students and teachers to have a broader

knowledge of why life sciences play such a crucial role in today's society and why there is still no general consensus on how research should be regulated in Europe.

Developing a true international electronic project however poses many challenges to museums. Project management must be tuned for different rhythms of work and decision making processes. Translations must be considered, especially if the target user group is the general public. Responsibilities have to be shared among the group preserving a firm leadership. Instead of having a single development group, a collaborative has many "units" responsible both for specific aspects of the project, and for steering the development in accordance to each partner's goals and objectives. Within ECSITE, BIONET represents one of the first opportunities for this kind of collaboration among museums and science centres.

Building a sustainable economic model

Museums and science centres are facing constant financial pressure which in some cases threatens their very existence. Sustainability of institutions is a strategic issue that goes well beyond the subject of this article (7). Electronic projects are sometimes seen as a preferred way to develop programs and activities because of the lower development cost compared to a traditional exhibition. This way of thinking is wrong for two reasons. The first one is conceptual: an electronic project is no substitute for an exhibition or a program. The two experiences differ in methodology and results, and one cannot easily replace the other. The second one is related to costs: at the moment there is no concrete evidence that developing electronic projects is substantially less expensive than any other development activity within a museum. Human resources, external research and management costs still represent about 60% of the project costs, and they do not differ if the end product is electronic or physical. However, electronic projects offer museums the possibility to build a sustainable set of products that can be offered as services to external partners.

LAB-VR was developed in the framework of the IST program as a trial project where the expected end result is a business model for the services tested under the project.

⁷ A critical approach to sustainability of science centres can be found in: Bradburne, J. *Dinosaurs and White Elephants: the science centre in the 21st century. Public Understanding of Science*, 7: 237-253 (1998)

Context-rich access to research information is not only useful for museum visitors; it plays a key role when it comes to recruiting human resources for the industries that want to attract new personnel; it is also important to give a complete overview of the research activities to potential investors and business partners. As noted before, a science centre has a privileged role to develop such projects, for its ability to provide impartial information and gather several partners making the project as complete as possible. Considering the business value of this project for an industry that wants more efficient tools to recruit human resources and attract investors and partners, the science centre can take the leadership in providing such services.

The step from an education project to a business one is certainly not so easy or straightforward. Still, it is essential for any institution to consider the sustainability of the project and therefore explore also the economic models that can be applied.

In the recent years some science centres have undertaken a fierce competition in the leisure market, to compete with potential rivals. This competition brings science centres out of their original mission, reducing them simply to “family destinations” at the same level as theme parks and shopping malls. The development of digital projects represents one of the most challenging activities for science centres, where they can exploit their nature of social places and laboratories for change.