Museum of Natural Heritage: an Interactive Hypermedia Presentation

Mario Bochicchio [*], *Roberto Paiano* [*],
E. Andreassi [*], *Tiziana Montanaro* [*]

[*] SETLAB-Software Engineering and Telemedia Laboratory, Department of Engineering, Lecce, Italy
E-mail: {bomal,rpaiano}@ingle01.unile.it

ABSTRACT
A Museum of Natural Heritage is quite different from a traditional Cultural Heritage museum. In fact, most part of the contents of such kind of Museum are in a natural environment unlike the traditional museum that exhibits the contents present in their building. This kind of museum, managed by Universities, is also devoted to a larger non-expert public and to University students and researchers, therefore it requires different ways of communication. This requirement associated to the need to present the museum goals and activity, when it is still under construction, has driven us to develop an intermediate application (waiting for developing the final hypermedia application when the museum building will be finished) using a tool, named LEZI, usually adopted to develop interactive lectures, that requires minimal computer expertise in order to develop, quickly, educational multimedia applications based on interactive videos and e-documents.

KEYWORDS: Lezi, HDM, natural heritage, educational hypermedia application.

INTRODUCTION
The Department of Natural Sciences of the University of Lecce is devoted to research and to spreading the natural heritage of the Salento Region, in the South East of Italy.

Their researches concern both the sea and the earth environment and they manage the Sea Park of Porto Cesareo (a sea resort in the Salento Region). Their goals are both to understand the natural life and its evolution during time and to contribute to the preservation of the natural habitat.

They also reached an important result, among others, with an international visibility about the reproduction cycle of a particular jellyfish, *Turritopsis nutricula* that can reverse this cycle becoming an octopus.

The Department is realizing also a Botanical Garden to preserve and to spread the more typical species often unknown to non-expert people.

In this scenario, the University of Lecce has decided to build a Museum of Natural Heritage in order to enhance the effort to disseminate the natural environment knowledge among the new generations joined together with actions to preserve it supplying a new high education instrument to students.

This project is partially founded by EU

and is currently in progress and it will be finished at the end of this year.

In the Museum will be several kinds of fossil, photos and videos to be used directly or by means of special information kiosks.

In the meantime the Department asked us to develop a multimedia application, which could be used both on the Web and on CD-Roms, conceived as a way to present the contents of the future Museum and to allow in depth study of some arguments. The real hypermedia applications that will present the Museum on the Web and will run also on the information kiosks are to be developed later when the museum is finished.

In the University of Lecce, at the Department of Innovation Engineering, the Telemedia[1] Laboratory is devoted to the development of Multimedia applications, some of them concerning educational subjects. "Messapia"[2], for example, is a recent application illustrating the history and the culture of the "Messapi", a pre-Roman population living in the southeast corner of Italy.

Within this activity several professors, especially from the Humanities, have been "exposed to the activity of the laboratory". Many of them asked for developing their own "cultural" application: it was clear that they did not realize how much effort was needed, and that they may not have the budget or the human resources[3] to carry out the job. On the other hand, the staff of the Lab realized that there were a few solid assets, to start with:

- the teachers knew very well their subjects, and could deliver wonderful lectures on them;
- they had good bibliographies at hand, from where students could get detailed information;
- some of the references were already in a digital format;
- an "interactive lecture", rather than a full size hypertext,was the basic need;
- low costs and little time span for the development were absolute requirements.

To satisfy these requirements Telemedia Laboratory developed a tool named LEZI (from the Italian "Lezione" or lecture) mainly based on video and text, reaching the goal to build lectures in a short time. We used this tool, described in the next section, to develop a very special "lecture" concerning the Museum of Natural Heritage.

THE LEZI TOOL

Let us briefly recall the main requirements for the tool:

- the tool should allow the development of an interactive lecture;
- It must be possible to introduce video fragments of the lecture;
- It must be possible to use the tool to access specific topics (very focused) within the lecture, or broad topics, involving most of the lecture, if not all of it;
- It must be possible to get short explanations and also deep

[1] Now the Telemedia Lab has become part of SET, Software Engineering and Telemedia Laboratory.

[2] Project partially funded by the European Commission in collaboration with the local Museum

[3] The Telemedia Lab could provide the technical support; it could not provide expertise on content development.

details, at level suitable for University students;
- The cost for development should be very contained;
- The resulting application should be delivered as an off-line CD-ROM or an on-line website.

With the above requirements in mind, a prototype was developed at HOC, the Hypermedia Laboratory of the Politecnico di Milano; after an initial trial and experimentation, a new version was developed by the University of Lecce, in the context of a large effort[4] to develop innovative, culture oriented, applications.

The tool, named LEZI [1], is a development environment that does not require a strong computer expertise in order to develop in a quick manner educational multimedia application.

The basic functions of the tool are the following:

- The "core" of the application consists of digitized video. Starting from a video VHS taken from a lecture, in half a day a digitized version can be obtained. The tool can support several formats; in particular it supports Real-Video[5], an efficient format that can be played also over Internet.
- The digitized video can be cut into small pieces, which can be assembled in larger pieces, hierarchically. The smallest fragments should last no less than 2 minutes and non more than 5 minutes: this is not a technical requirement, but it is suggested by empirical evidence and Human Computer Interaction researches.
- The process above described can take (starting from a lecture on a 2 hours videotape) between 1 and 3 days, according with the complexity of the subject. The result is a tree-shaped index of topics, each one consisting in a number of subtopics. It should be noted that starting from a lecture of 2 hours, it is difficult to obtain more than 45-50 minutes of good digitized video. The rest can be discarded, having "little content" associated to it.
- The next step is to provide a few lines of comment for each topic: between 5 and 15 lines is the proper measure. Depending upon the complexity of the application, it may take again from 1 to 3 days of work.
- The next step is to add, for each topic, the proper bibliographic references; if the electronic format of some material (e.g. papers) is available, they can be inserted in the application. A competent teacher can complete this task half day or 1 day.
- A relational Data Base, invisible to the teacher, who uses simple commands to insert, modify or delete content, manages all the material of the application.
- As a last step a "generation" (taking 1 hour of work) can produce the wished application, i.e. an offline application or a WWW site.

Therefore, overall, in about 10 days, and with little cost, an interactive multimedia lecture (assuming that good traditional content is already there) can be delivered, to the students.

These are the actions allowed to the

[4] The project, partially sponsored by the European Commission, involved the University of Lecce and Catania.

[5] Real-Video is trademark of RealNetworks, Inc.

user (a student, in general):

- To interactively play the video (with the usual commands for interactive video), choosing the topics from the tree: s/he can choose a very narrow topic or the full lecture;
- To look at the short comments to decide whether a topic is interesting or not;
- To get bibliographic references;
- To get possibly additional contribution in digital format.

Our experience shows that students (and also teachers) of humanities can easily learn how to use similar applications, with very little effort. The applications themselves can be very satisfactory or not, dependently upon the quality of the content (as always it is the case).

THE MUSEUM

The application is conceived to satisfy two different aspects of education: it allows to present the future Museum and its contents and to supply relevant scientific arguments devoted to specialists.

While the tool was conceived to digitalize videos from a lecture or an interview with the attached text and for an in-depth study of the concepts associated with documents in PDF format, the contents of this application has various different formats. There are underwater video, several photos, and also video of lectures and interviews.

To satisfy both the structure of LEZI and the needs of usability, we transformed all contributions in "digitalized videos" adding audio comments to the underwater videos and editing the photos in a slide show with audio comments.

The structure of the application, shown in the left frame of Fig. 1, associates the presentation of the Museum and its goal - realized by interviews with the professors involved in the specific areas and by a collection of video about the most important contributions - with an area explaining the researches on specific arguments. In Fig.1 we can see the video related to the Policheti in the sea habitat while in Fig. 2 there is an important research contribution about the desertification of the coasts due to the illegal poaching of seafood. The user can see the associated videos or the pdf documents by using the buttons in the bottom area of the right frame after selecting the argument in the left frame.

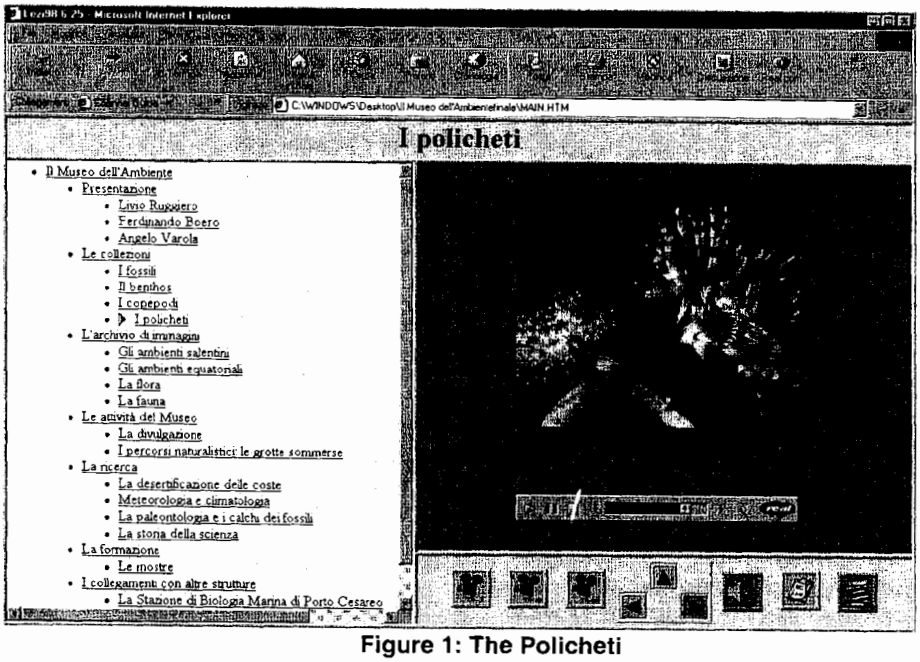

Figure 1: The Policheti

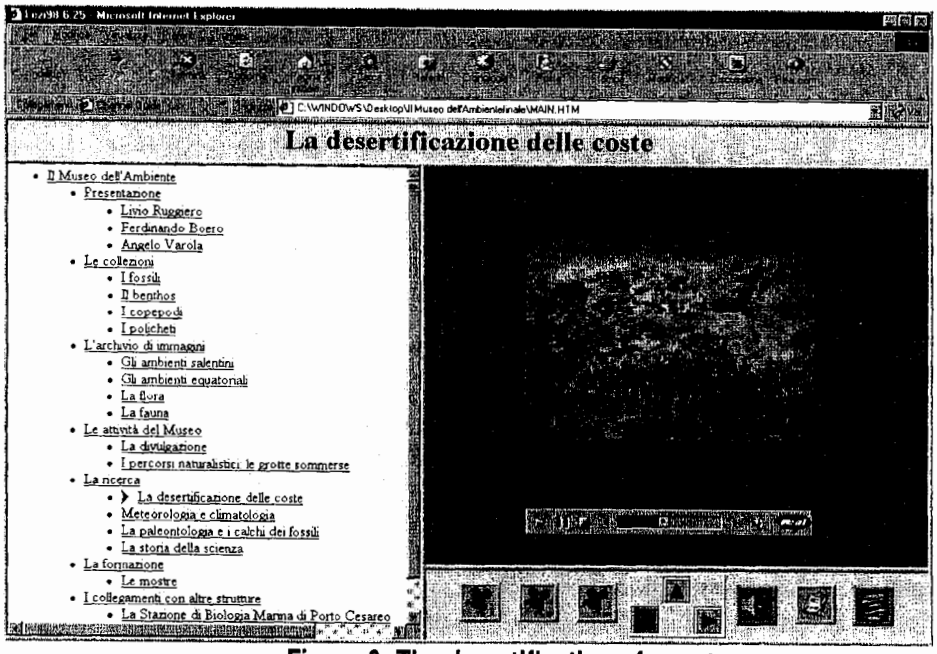

Figure 2: The desertification of coasts

CONCLUSIONS AND FUTURE WORKS

The idea presented in this paper is quite simple: there is a need for good multimedia educational titles, that teachers
can develop by themselves, with little time, little effort and little budget.
The University of Lecce has developed 3 applications on cultural and educational subjects. After all these developments and with data about the students' reaction, a final version of the tool, LEZI, is planned by the end of year 2001.
We are convinced that several excellent teachers, mostly in non-technical fields, by using LEZI (or similar tools), could develop, with little effort, a large body of high quality multimedia educational materials that could greatly enhance the education process, and also improve the cultural exchange among different institutions.
The tool will be enhanced to support complete courses oriented to different kind of students reusing the contents and to allow the authors to choice the Web layout easily.
Although this tool was conceived to develop interactive lecture, it's demonstrating its flexibility to be used in other applicative context like museum.
The traditional museum hypermedia application is strictly related to both the contents and its disposition into the museum structure. This kind of application are conceived to realize the paradigm of the visit to museum.
The Lezi tool could be used to realize an overview of the museum, such as a brochure, driven by the interviews of experts people in order to give an intelligent summary to the user.

ACKNOWLEDGEMENTS

The authors wish to thank Prof.Boero, Prof. Ruggiero and Prof. Varola for their lectures.

REFERENCES

1. M. A. Bochicchio,R. Paiano, P. Paolini, E. Andreassi, T. Montanaro " LEZI: a tool for easy development of interactive video for education" Proceedings on CD International Conference Telecommunication and Electronic TELEC 2000 - Cuba - Luglio 2000 *ACM*, 38 (8), August 1995, 8-15

ABOUT THE AUTHORS

Roberto Paiano received the DrEng degree in electronic engineering from the University of Bologna, Italy. He worked in IBM Italy until the 1996. Since the 1997 he has been at the Department of Engineering, University of Lecce, where he's assistant professor. His research interests include the methodology of Web application design and distance learning tools. He is member of the IEEE and the IEEE Computer Society.
E-mail: *roberto.paiano@unile.it*

Mario A. Bochicchio is a researcher working at the Software Engineering & Telemedia Lab of the Engineering School at University of Lecce, in Italy.
His research interests include conceptual modeling and implementation of hypermedia applications for e-commerce and cultural applications.
He is member of the SIMOS (Supporting Interactive Multimedia On-line Services - ESPRIT Program) European working group.
E-mail: *bomal@ingle01.unile.it*