

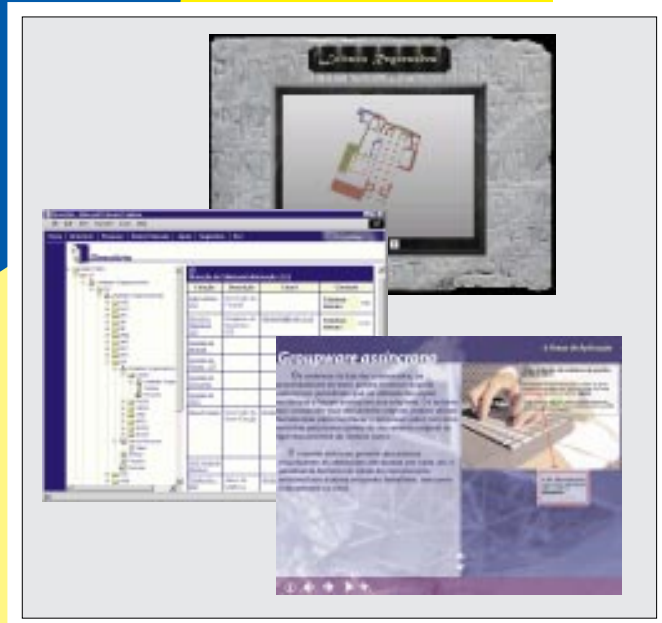
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SOFTCIÊNCIAS –
Technologies for teaching



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»SOFTCIÊNCIAS« – Technologies for teaching

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Framework

The Ministry for Science and Technology built up a support program, which has led to the situation where, today, every secondary school in Portugal has a multimedia PC connected to Internet. It is not enough however to provide the tools and expect that things start working by themselves. So there were some other projects, namely Sub-Program 1 (»Application and Development of Information and Communication Technologies in Education«), of program »NÓNIO – Século XXI«, set up by the Ministry for Education, which aims at supporting the development of projects in those schools as well as promoting the introduction and generalization of information and communication technologies in daily school activities.

Following this philosophy, CCG together with the Portuguese Physical Society, the Portuguese Chemical Society, the Portuguese Mathematical Society, Physics Department of IST, Lisbon, and Exploratory Infante D. Henrique, Coimbra, formed the SOFTCIÊNCIAS

consortium. The Ministry of Education has recognized this consortium as a Competence Centre for basic sciences (Physics, Chemistry and Mathematics).

Competencies for teaching

The Competence Centre (<http://softciencias.ccg.uc.pt>) intends to introduce information and communication technologies in science education, in order to improve learning and training processes.

In particular, our goals are:

- To progressively integrate the new computer based tools taking into account the most recent technical developments;
- To sensitize and educate teachers to the great advantages of using computer based systems.

CCG role in the consortium is to apply its technical expertise and to act as consultant as well as provide services and technology for the implementation of a set of activities in order to reach the forementioned objectives. Namely:

- Creating a Local Training Centre for teachers in the area of

German Abstract

Das CCG hat in Zusammenarbeit mit dem Portugiesischen Verein der Physiker, dem Portugiesischen Verein der Chemiker, dem Portugiesischen Verein der Mathematiker, der Abteilung für Physik des IST und dem Exploratorium Infante D. Henrique den Konzern SOFTCIÊNCIAS errichtet. In diesem Zusammenhang wurde ein Zentrum für Grundwissenschaft (Physik, Chemie und Mathematik), das die Entwicklung der Projekte in den Grund- und Hochschulen unterstützt und die Einführung und Generalisation der Informations- und Kommunikationstechnologien im täglichen Verlauf fördert, errichtet, welches vom Erziehungs- und Forschungsministerium anerkannt wird. Manche der Aktivitäten des SOFTCIÊNCIAS wurden als eine spezielle Aktion in der NetD@ys'98 Woche eingeführt.



Figure1: Softciências Web Site

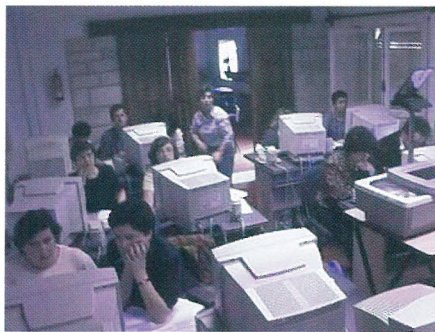
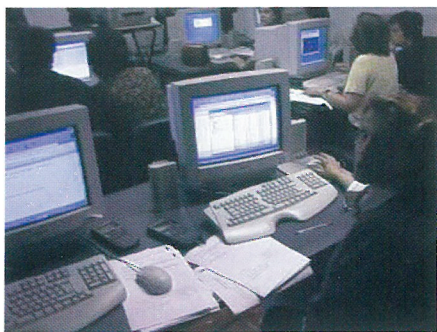


Figure 2: Training activities at CCG

- basic sciences;
- Creating a Local Resource Centre with telematic access;
- Producing educational software;
- Creating of WWW servers;
- Promoting communication between national and foreign schools;
- Coordinating curricula guidelines for exploring educational software;
- Providing technical and didactic support for schools connected to the Competence Centre.

Training is essential

When it comes to the Internet and new technologies, teachers face nowadays one of their biggest challenges: they are learning at the same time as their students. The students often have some advantages (e.g., more time to browse at home). The training

of teachers is vital to provide them with tools and necessary skills that are required to attempt such a venture.

Topics going from broad ones like the »Introduction to Internet« to more specific ones like »Dynamic sites using Advanced HTML, JavaScript and Active Server Pages« are some of the examples of courses being held at CCG facilities. During the last year, more than 70 teachers attended these courses in a total of 92 hours of training.

»O MOCHO« – A collection of links for teachers of the Basic Sciences.

When one thinks about looking for information on the Web, one first refers to Search Engines, and Computer Based Algorithms, which provide a list on every subject. Each day, more and more

information is available on Internet, in affect producing a counter effect: People, flooded with results, may give up searching for information. In spite of the fact that this problem could be solved using more complex and refined searches, those mechanisms are not yet efficient or easy to use, especially for persons with little computer literacy.

Baring this in mind, it is ideal to create a Web Server, which consists of a collection of links, specially designed for teachers of the Basic Sciences: Mathematics, Physics and Chemistry.

»O Mocho« (The Owl), is a Web Server (<http://softciencias.ccg.uc.pt/mocho>) made by a list of WWW archives related too Basic Sciences. In order to facilitate the search in »O Mocho«, specific topics and general help classify the resources. Those specific topics are, in general, chosen from the syllabus of the secondary schools in each discipline. This is done, not by a Search Engine, but by a qualified teacher of the area, which makes a pedagogical and scientific evaluation of each listed entry.

The human intervention in this project is seen to be of the uttermost importance, since it allows teachers from secondary schools that are not yet at ease with the Internet and its resources, to find topics of interest. Adding a short description about the site will give them some guidance, enhancing the educational use of the Internet in Portuguese schools.

Besides »O Mocho«, other Internet resources are available, like »Multimedia Periodic Table« (which earned a national award for the best multimedia application done by students), »Science 3D« (a gallery of VRML images of molecules), etc.

Learning by Playing

During the NetD@ys'98 week, Softciências proposed a complete project that included Internet Dissemination Sessions, Talks / Debates with Scientists (via video-conference), Dissemination of a Scientific Inter-Active Bulletin and

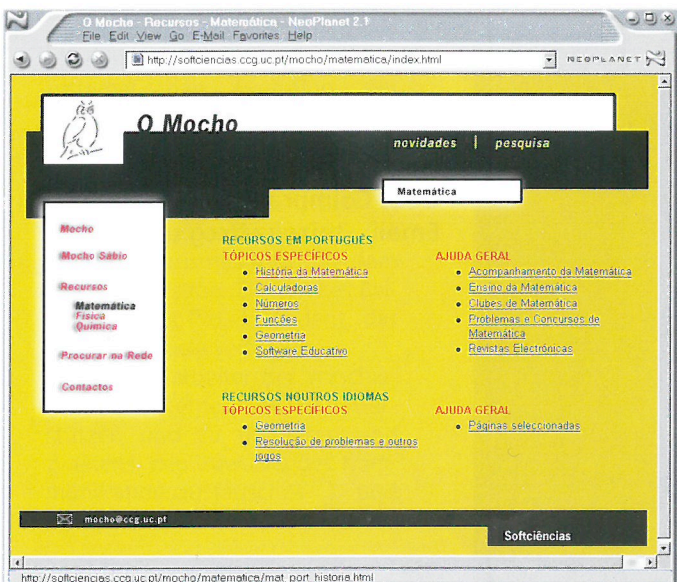


Figure 3: »O Mocho« Web Server

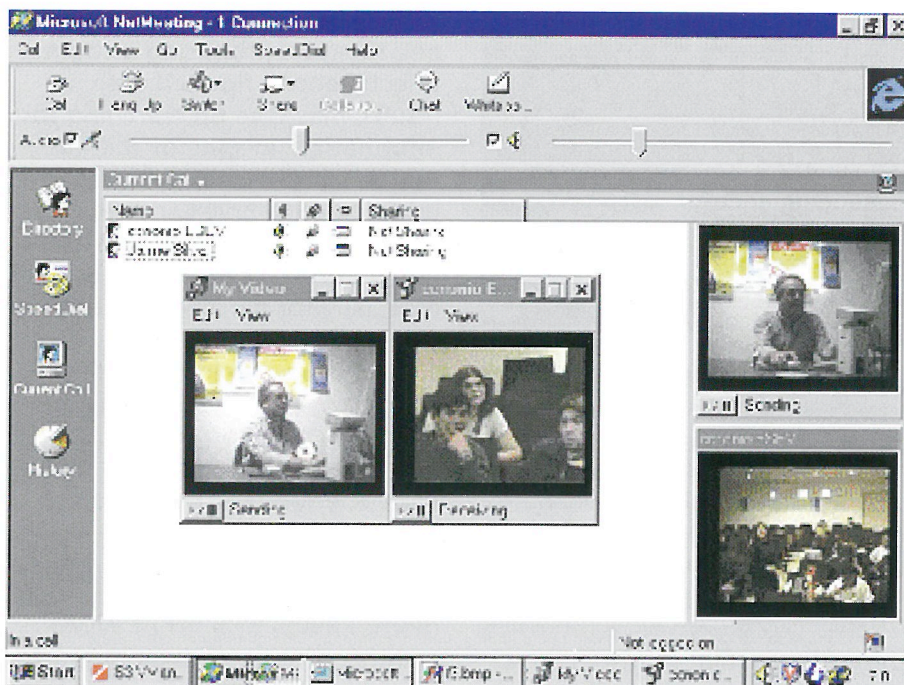


Figure 4: Videoconference session

one Internet Scavenger Hunt. (Complete report at <http://softciencias.ccg.uc.pt/netdays98/indexing.html>)

The students were most receptive to activities that involved something new. The debates with scientists, involving standard tools (i.e. NetMeeting), proved that, despite the small window size and the low bandwidth, it is worthwhile to use such technologies, allowing experts to get in contact with students in remote areas. Students had the opportunity to participate in real-time debates with scientists about

»Internet and Science« (Mathematics, Physics and Chemistry).

However, the star of the project was the Internet Scavenger Hunt, designed to facilitate learning in children of all ages. The students had to search for information on the Internet about science and scientists either individually or as a team, as well as answering a set of questions. To aid and encourage them, they had direct links and reference suggestions within »O Mocho«. Participating in this nation-wide activity were 37 schools and 504 students with the

support of 73 teachers.

In the report presented to the European Commission the NetD@ys Evaluation Group recognised the whole initiative as an »excellent example of projects focused on learning science«.

Future Developments

»O Mocho« already allows searching inside the server and looking for a particular word. It is expected that actual users will increasingly refine their needs and although there is a great effort made in subdividing subjects according to the most appropriate categories, it is expected that, in the near future, the amount of entries will justify more efficient ways of looking information.

Because of this and because it is necessary to create mechanisms that help teachers in maintaining the site, this information is being included inside a database, which will be accessible over the server.

A Local Training Centre is already in construction, where teachers can log in and have access to courses and tutorials that are held at CCG.

Regarding other activities, CCG and Softciências will continue their work in introducing new technologies to secondary schools. There are new proposals for this year NetD@ys' week, with projects focused even more on the use of communication tools within the Internet (e.g. videoconference, IRC and ICQ).



Figure 5: Closing Session and Scavenger Hunt Awards

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