

Internet in Schools: the Portuguese Approach

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1. Abstract

It is widely recognised that the rapid deployment of the Information Society can take advantage of the adherence of the youngest citizens to this new paradigm of society organisation. Indeed young people is usually highly motivated by new technologies and they normally have a significant paper in social changes due to their role inside families. In addition it is crucial to create a framework to increase the awareness of schools to the new possibilities provided by multimedia contents and by the Internet. It was with these aspects in mind that in Portugal it has been decided to connect to the Internet all Portuguese schools from levels 5 to 12.

2. Main Objectives

The decision to connect Portuguese schools to the Internet has been taken in early 1997 as one of the main tasks envisaged in the Green Paper for the Information Society in Portugal (<http://www.missao-si.mct.pt/english>).

The task of connecting all schools to the Internet is quite large since it represents a significant technical challenge and also a major organisational effort. It also implies significant investments that must be carefully planned. In addition the pedagogical aspects are a key factor in the whole process since many teachers lack specific training in the areas of new technologies and in most schools there is not relevant expertise in networking technologies.

Taking into consideration these aspects, namely the different development levels of schools and the need to control the technical and financial aspects of the overall project, it has been decided to adopt the following guidelines:

- i. In schools where there is already some activity in the area (around 15% of schools already had local area networks) this project should provide a good connectivity component
- ii. In schools where nothing existed (or existed limited activity) a special strategy had to be devised in order to try to maximise the rate of success of the project providing them with a good platform to motivate the school to the benefits of information technologies
- iii. The opportunity to connect schools to the Internet should also be used to open the schools to the new realities, namely the new media and the source of knowledge that they can bring

To achieve these objectives it has been decided to implement the project according the following general guideline:

Install in the school library a multimedia computer with two network connections

These two network connections have specific and important roles that must be emphasised:

- One ISDN controller provides a connection to a scholar PoP (Point of Presence) using an ISDN line installed in the school library
- One Ethernet controller provides a connection to the school local area network (in existence or to be created in the future)

Thus the multimedia computer has multiple functions: a) can be used as a multimedia Internet workstation opening the school library to the new frontiers of multimedia either on CD-ROM or via the world-wide Internet; b) act as a router between the local area network of the school and the Internet.

With this strategy we have a solution that can be tuned to the specific needs of the school communities along the country and, at the same time, provides a path for future migration.

3. Connecting the Schools

Another fundamental aspect of the project comes from the scholar PoP mentioned in the previous section. Indeed schools receive their connectivity to the Internet through a PoP located in a university or a research centre. The objective of this approach, instead of using a commercial provider, results from the need of giving to schools specific technical and pedagogical support from network and education experts in the universities. Indeed a quite strong cooperation between the school and the staff in the PoP has proved very useful in increasing the success of the project.

The role of the PoP is very important in the philosophy of the project of this school network. Thus we now present the main functions of the PoP.

The PoP is located in a university or research centre where a router with several ISDN primary accesses collects the calls coming from the schools. The number of primary ISDN accesses depends on the number of schools served by the PoP (on average a PoP serves 100 schools and has 3 primary ISDN accesses). In the PoP we also installed 4 servers that have specific task in the support to schools, namely: DNS server, mail server, news server, WWW server and proxy, remote file server, etc. The servers are permanently available to the global Internet. As a consequence pages placed by schools in the disk space that is allocated to them in the PoP server are always available despite the fact that the school may be disconnected from the PoP (e.g., during the night or weekends).

Finally in the design of the network it has been considered crucial the existence of very good quality content addressed to the target audience of the network: students from levels 5 to 12 and teachers. A highly skilled team with significant experience in educational telematics is responsible for all those contacts with schools not related to connectivity aspects (these are dealt by the PoP). A WWW server with educational content has been designed and set up (<http://www.uarte.mct.pt>). Its development and improvement proceeds with significant feedback from the schools.

The project has been designed during the early months of 1997. Starting in April 1997 Portugal Telecom has installed the required 1600 basic ISDN accesses in the schools and all the required primary rate ISDN accesses in all the PoPs. During June and July 1997 the PoP equipment has been installed and all the services were setup. During the same period of time the computers have been installed in the schools and a basic training about the use of the computer has been organised.

In the beginning of the school year, in September 1997, the school network has initiated its operational phase. During the 5 months of real operation of the network we have been dealing with the day to day support of the schools. Several seminars have been organised along the country, at each PoP, were 2-3 representatives from each school served by the PoP come to hear presentations concerning several aspects relevant for the PoP/schools smooth relation. During these seminars we also try to launch collaborative initiatives involving several schools.

The connectivity of the school network to the global Internet uses the Portuguese academic network RCCN as its backbone. Due to this design option, and to control the fair use of the backbone by either universities or schools, at each PoP a scheme of traffic balancing has been designed using a network load sharing router. Up to now this scheme has proved very efficient in enabling a fair use of the network by both communities.

4. Additional Developments

This success of the project lead to the decision of extending it to additional schools and also to libraries in municipalities. Since December 1997 the installation of additional multimedia computers has proceed in around 100 schools for levels 1 to 4. Due to the nature of these schools a more careful approach has been taken. Instead of connection all schools these are carefully selected according to the existence of trained teachers.

Due to the important role of libraries in the knowledge diffusion process it has been decided to implement a similar solution to the public libraries located in municipalities. Up to now 120 public libraries are already connected and more shall be connected in the first semester of 1998.

Full version of this paper can be found at: <http://www.di.fc.ul.pt/~pmv>