

Chilean Network for Primary Schools

Ernesto Laval <elaval@enlaces.ufro.cl>

Pedro Hepp <phepp@enlaces.ufro.cl>

Enrique Hinostrroza <ehinost@enlaces.ufro.cl>

Abstract

The Enlaces Project is a national governmental initiative that is developing a network for Chilean primary schools.

Teachers and students communicate by sharing electronic multimedia messages. This communication is accomplished using TCP/IP and UUCP protocols for on-line and dialup connections.

The user-interface is a metaphor of an electronic Plaza (Central Square) where teachers and students can carry on their communication activities.

I. PROJECT ENLACES

The Chilean government began in 1993 the installation of an educational network that will gradually connect more than 100 primary schools and 10 education-related institutions within 4 years - Project Enlaces -- [7]. The purpose of the network is to help decrease school isolation, to facilitate the exchange of educational experiences among teachers, to build collaborative projects between schools, to provide educational software and to offer an open forum for different topics of interest.

The Network began as a prototype in 1991 and up to date there are 45 networked schools distributed in the cities of Temuco, Santiago, Angol and Villarrica. The Network is connected to the Internet so there is access to foreign schools. The users: students, teachers, school directors and researchers, use a software called La Plaza, which offers a simple and intuitive interface to use electronic mail, news, interest lists and educational software

The Network is supported by two interdisciplinary educational technology centers located in Temuco and Santiago. These centers have the responsibility of giving educational and technical supervision, take decisions about network and software design, and continuously monitor the network activities, in order to detect and solve any technical anomalies and to evaluate the experiences.

II. NETWORK DESIGN

The Project Enlaces requires a robust and extensible communication platform to connect primary schools during the pilot stage and possibly to expand to the whole country by the end of the century (not so far from now).

II.A. Chilean Primary School System

Chile has almost 10.000 primary schools with more than 3 million students and 120 thousand teachers. These schools are geographically distributed through the 13 Administrative Regions that compose the country. Within each Region, the schools are distributed in local "comunas" (counties).

Most of the students attend urban schools, but there is a big number of rural schools (973 out of 1350) that are located in isolated areas and have 1 or 2 teachers. [15].

The project will initially work with more than 100 schools located mainly in the 9th Region of the country. This region has the lowest educational evaluation results, one of the biggest ratio of rural schools (72%) and the greatest proportion of native population [15]. All these characteristics make this region a very interesting place to develop a pilot project that, if successful, could be replicated in the rest of the country.

The project will also work with a number of schools located in the Metropolitan Region, where Santiago is located. This region has almost one third of the Chilean population.

It is not new that most of our public schools suffer important budgetary constraints. This means that teachers are underpaid, overworked and that the schools cannot afford high variable costs, particularly those related to telecommunication and networking.

II.B. Communication Requirements

Enlaces Project has two main computational focuses: telecommunications and multimedia. The project wants to take advantage of the possibilities offered by today's technology in these areas.

Together with these two main focuses there is an overall criterion that deals with the usefulness of technology. The computers and software must be easy to use. This "must" means that computers in the schools have to be a facilitator and not a barrier to the communication process. Teachers and kids at schools should be able to work in their educational projects without having to deal with difficulties related to operating or networking systems (nor with bauds or data bits).

II.C. Network Topology

Because of geographic and administrative issues the network topology has been designed as regional hierarchies. Each administrative region will be a subnetwork that is composed by counties' subnetworks.

Each region has a regional site with a regional server connected to the county servers.

Due to cost restrictions the schools are connected to their county through dialup telephone calls.

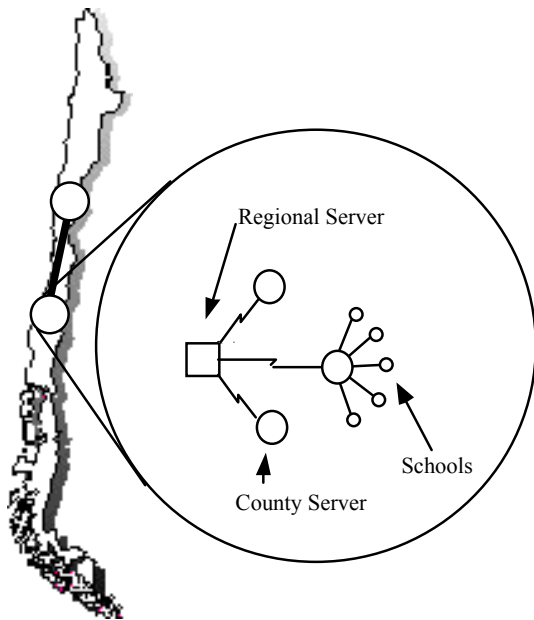


Figure 1. Regional Topology

II.D. Communication Protocols and Standards

One of the most critical decisions in the design of the communications system has been the choice of the communications platform to be used in the network.

The network should support an easy growth, connecting future subnetworks. Also a communication platform was needed, such that could function with a minimum of technical support.

These requirements lead us to choose a suite of "open" protocols that are designed to build multiplatform dynamic "internets", and that is already tested in other parts of the world. The initial proposal is to use the protocols currently used in the Internet community.

The obvious advantage of these protocols is the international compatibility, and that most Chilean public Universities are already connected to the Internet [13]. On the other hand, one problem (at least in 1991) was the lack of a standard for multimedia messages.

Fortunately, in 1992 the standard for Multimedia Messages -- MIME -- was published [2]. MIME allows the codification of multimedia information using the standard RFC822 [4] for electronic mail formats and standard transport mechanisms.

Now the network is on a message transport system that uses standard Internet messages (RFC822), with MIME extensions for transmitting pictures, sound, eventually video and any binary file.

The messages are transported using TCP/IP protocols [9] (SMTP) for on-line connections and UUCP for dial-up links.

The Regional nodes are connected on-line using TCP/IP, taking advantage of the installed National Network of Universities along the Country [13]. However, the schools will be mainly connected using dialup links since it is very cheap to make night local calls.

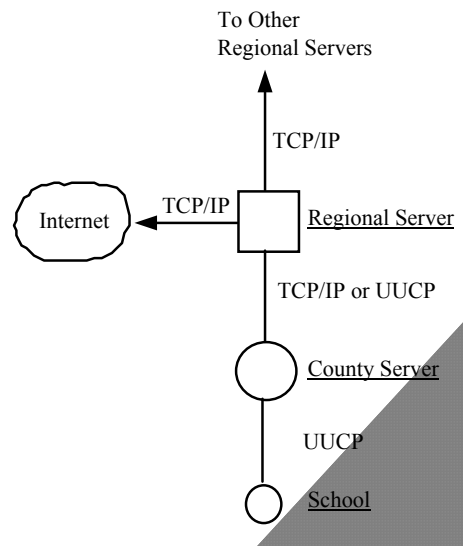


Figure 2. Communication Protocols

II.E. Integration to the Internet

Chilean schools have the possibility to exchange messages with foreign schools and Institutions trough the Internet. This is accomplished by standard message formats, standard transport agents and standard addresses based on the Domain Name System.

Each school has the possibility of sending an electronic message to any valid Internet address, and

vice versa. Also foreign schools have the possibility to participate in our local interest lists or forums.

All the schools in the network are located under the domain "plaza.cl", which is divided in sub domains for each county.

For example, the school Millaray, located in the county of Temuco (tco) would have the address:

millaray.tco.plaza.cl.

Each school has a few generic users, currently the user "profesor" for the teachers and "alumno" for the students. Also there are some virtual users to receive mail in certain bulletin boards (mathematics, science, etc.)

Therefore, anyone in the Internet can communicate with Chilean teachers at school Millaray in Temuco, sending email to "profesor@millaray.tco.plaza.cl"

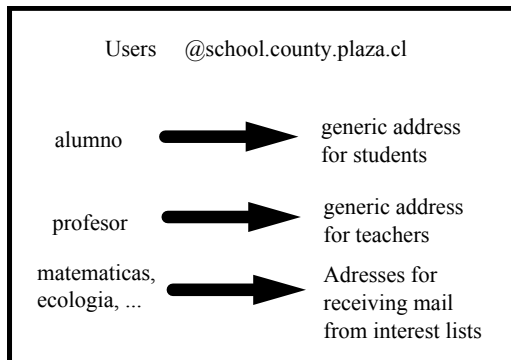


Figure 3. School email addresses

II.F. Future Services

Since many schools have only dialup store & forward communication, most of the network services are based on email.

Each school can maintain personal communication with other schools, and there are also some BBS that are shared among the schools.

The schools can also participate in some "electronic" multimedia newspapers sharing articles within the network.

In 1994 there are plans to offer software delivering services, library queries, and specific collaborative projects.

II.G. Monitoring

Two critical issues in the management of the network are traffic monitoring and alert systems.

All the schools have some information gathering processes to register traffic information (senders, destinations, subjects, information, time, etc.) and information about the use of the computers within each school. This information is periodically transmitted to a central office where it is processed,

providing invaluable tools for evaluating the evolution of the network and its uses.

Also there are some alert mechanisms that provide a dynamic picture of the state of the network and the sites that may have some trouble.

III. USER ENVIRONMENT: La Plaza

The network activities can be very limited if the users don't have an easy and intuitive software environment. Most teachers and students are facing a computer for the first time and they don't want to deal with technical difficulties.

The project has designed a software environment that represents and simulates different elements of a town. At this stage of the project, we provide a Post-Office, to interchange e-mail, a Museum where different educational software can be found, a Kiosk, with pertinent news and short stories and a Cultural Center where collaborative projects are initiated and coordinated.

The first metaphor the user finds on the computer screen is a Plaza. Plazas are well-known places in Spain and Latin-American towns and cities. A Plaza is an attractive place for children, used for getting together and to start interesting adventures.

There are no command languages involved in using the Plaza, nor is it necessary any particular training, only pointing and clicking with the mouse. Its main purposes are to be inviting and to offer a simple window to the available functionality. Teachers and students are exposed to a short demonstration and then they are left on their own.



Figure 4. La Plaza

III.A. The Kiosk

The Kiosk offers a window to an information space comprising newsletters and stories. There are several newsletters organized in subjects which have been interesting for teachers and students (Ecology, National Issues, Curiosities, etc.)



Figure 5. The Kiosk

Students and teachers have an easy way to read existing articles and publish new ones.

The Kiosk also includes short stories and comics as a stimulus for reading. Every time while reading the newsletters, comics or stories, students are encouraged to send their own illustrated comments or stories that, after some central editing, can be found in the Kiosk.

III.B. The Museum

The museum is a friendly interface for a simple educational software database. Users can browse through the museum and select a piece of software. If the selected material is on place, it is run for the user; generally a multimedia educational application.

Presently, only a few applications are available at the museum but one of the project's goal is to gradually build a comprehensive library of tested software. Most of the software is being built in collaboration with teachers. Only proven, robust and well-designed applications are allowed into the Museum's collection. Each application has a "curriculum", stating its ownership, users, experience, recommendations and whom to write to share or ask information about it.

A section on general purpose articles will be available to the teachers containing educational articles in electronic format. It should also gradually evolve into an electronic library, to be used in the same way as the applications.

III.C. The Cultural Center

Teachers and students will be encouraged to work on collaborative projects (i.e., story writing, scientific experiments), to engage in discussion lists and to build their own multimedia applications using general purpose authoring tools. These activities are organized and conducted in the "Cultural Center", which is a known place, normally next to a Plaza in small towns. Our Center contains an information space for every area of interest, as in some electronic bulletin boards. Users design their

projects and use the e-mail system from inside this place.



Figure 6. List of letters in an Interest List

For the 1993 experience, the Cultural Center was basically a bulletin board containing discussion lists: Logo, Special Education (for students with special needs) and Sports, etc.

III. D. The Post Office

The Post Office is presently a simple to use e-mail system. The letters are public documents inside each school. The Post is separated in different areas, for teachers, for students, and for the teachers in charge of the network at each school. Users can presently write, and will soon be able to draw pictures and send short sound messages on their letters. The main purpose of the Post Office is to establish initial contacts with people having similar interests to later continue a more structured communication inside the Cultural Center. It is also used for pen-pal initiatives and for informal messages, not particularly connected to any project.

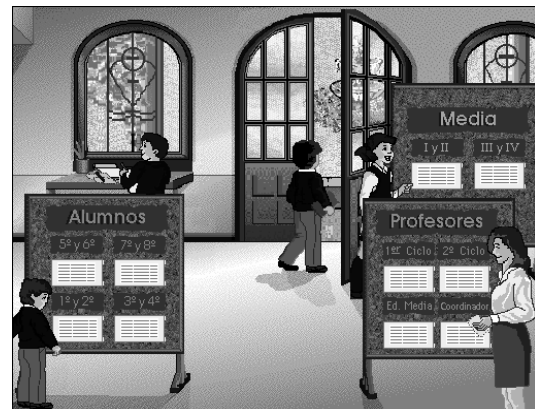


Figure 7. The Post Office

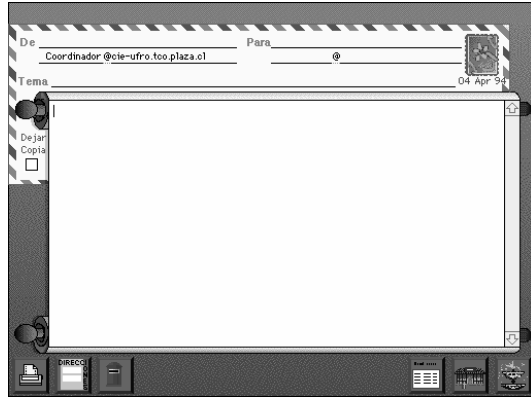


Figure 8. Notebook for Writing Letters

IV. Future Work

This project will continue evolving during the next years, and this evolution has some challenges for the future: increase the number of networked schools, develop new user environments for collaborative work, access new network services, increase the communication with international school networks.

In 1994 there will be around 70 schools connected in 8 communities and 2 regional subnetworks. From there on, the network will be expanded to other Regions, and reach more than 100 schools by 1996.

The challenge is to demonstrate that this initiative is worthwhile by 1996. If this is a project that can have a very positive impact in our educational system, the next step will be the expansion of the network to the whole country.

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Author Information

Ernesto Laval is a research engineer from Project Enlaces at Universidad de La Frontera, in Temuco, Chile. He became Computer Engineer in 1990 at Pontificia Universidad Catolica de Chile and got an M.Sc. degree in 1991 at the same University. Since 1991 he has been involved in the Chilean program for school networking, first as the Chief of Networking and Communication area, and currently as Chief Engineer.

Pedro Hepp, Phd. Is the director of project Enlaces. He obtained his Phd. in 1983 from the University of Edinburgh, Scotland. Before leading project Enlaces at the Universidad de la Frontera, he was adjunct professor at the Pontificia Universidad Catolica de Chile from 1983 to 1992. His main interest areas are Software Engineering and Educational Technology.

Enrique Hinostroza, MSc. Is the projects coordinator at project Enlaces. He obtained the master degree from the Pontificia Universidad Catolica de Chile in 1991 after finishing his studies of Industrial Engineering in 1989. His main research and development interests are Software Engineering and Multimedia applied to educational software.