

## 12 DOCUMENT 12

### Chile's Learning Network

This document describes how a program in Chile, the Learning Network, allows teachers in remote schools to participate online in an electronic environment focused on professional development.

#### Telecommunications Infrastructure and Internet Network

Chile's telecommunication infrastructure is one of the more advanced in Latin America. Heavy public and private investment in the sector in the past two decades has given the country a backbone of copper and fiber-optic cables. Since 1991, Chile has had Internet connections that cover a large portion of the country; today it has five separate international connections provided by five companies. Two companies, Reuna and RDC, the oldest Internet service providers, are providing national Internet links. Reuna is different from the other companies in that it is a consortium of state universities, which have joined together to establish an extensive digital backbone that offers speeds of 64 Kilobits; Reuna's international connection is 1.5 Megabytes.

The Enlaces network links primary and secondary schools and other educational institutions through Chile's national computer network. The linkages are made through seven centers located in five zones throughout the country. Each center has the required equipment to service the schools in their zones and use TCP/IP Internet protocols for communications. The majority of communications among schools and institutions is carried out using conventional telephone lines and UUCP (Unix to Unix copy protocols). Node schools that are part of the Enlaces network are able to communicate with each other using e-mail and bulletin boards with standard Internet addresses. Electronic mail messages can be sent to and received from abroad without additional costs by using Chile's university networks as gateways to the Internet.

At present all schools in the Enlaces network have the equipment to be linked to the Internet, but do not have direct lines or service providers, and their connection permits them to receive only text, not graphics or sound. However, this situation is changing rapidly. Enlaces has launched an experiment with the Compania de Telefonos de Chile to connect schools directly to the Internet via fiber-optic cables. Twelve schools in the Temuco

area have already been connected, and others will follow soon. The cost of connections and service will be borne by the company for a year, during which time it will determine a rate structure.<sup>1</sup>

Most schools use telephone lines for network communications. However, some 3,000 or 36 percent of Chile's 8,250 public and subsidized primary schools are in remote areas and do not have telephone service. To provide network access to these schools, Enlaces has begun experimenting with the use of radio. Using packet radios, Ultra High Frequency channels, and the TCP/IP protocol, Enlaces linked up four schools within a 20-kilometer radius, in areas without major geographic obstructions, on the Internet node at the Universidad de la Frontera in Temuco. Enlaces plans to continue experimenting with other communications technologies while increasing the current number of nodes served by packet radios to 20. Meanwhile, Enlaces' engineering team has learned some important lessons: teachers in these remote schools can be taught to use the equipment and to help monitor its use, packet radios are reliable for transmitting electronic mail, and finally, this technology can only be used effectively where there are no geographic obstructions.

**Strategy.** Enlaces has a gradualist demand-oriented strategy for expanding the network at the primary level. Enlaces' staff has actively promoted the network by visiting schools and meeting with principals and teachers to brief them on the network's educational benefits. However, if schools wished to become part of the network, they had to demonstrate their commitment by applying officially, presenting a proposal as to how the computer network would enhance their educational programs, and agreeing to provide facilities and security for the computer equipment and to cover all recurrent operating and maintenance costs.

The strategy for expanding the network in secondary schools is different from that for primary. Instead of following a gradualist demand-oriented strategy, Enlaces plans to incorporate all 1,700 public and government-assisted private secondary schools into the network by the year 2000. To reach this target, EMCEE will annually allocate funds to each regional Secretary of Education to enable a certain number of secondary schools to join the network. Based on selection criteria provided by Enlaces, the regional secretaries would annually select schools on the submission of project proposals. The criteria would be similar to those already used by the program. Enlaces began its secondary school-network program by incorporating 62 schools in 1995. While that in itself was a significant achievement, Enlaces will now have to increase its annual installations by

six times the current rate, if it is to incorporate all secondary schools by 2000.<sup>2</sup> This is well within reach, as the government's contracts with Apple and IBM include not only the purchase of computers and other hardware but also their installation.

**Provision and Access to Computer Equipment.** Primary schools accepted into the network have been provided computer equipment, software, furniture, and teacher training by Enlaces. The number of computers allocated to each school is determined by enrollments. The Enlaces' standard formula is as follows: a small school (100 students or fewer) would receive three computers, a modem, a CD-ROM player, a dot-matrix printer, and software packages; a medium-size school (100 to 300 students) would be entitled to six computers and the same quantity of peripherals as the small school; and a large school (more than 300 students) nine computers and two CD-ROM players and the same quantity of peripherals allocated to small- and medium-size schools. The computers in each school are linked to a local network by a telephone line connected to a modem. One computer functions as the server to send and receive mail from the center in its zone. School computers are Apple Macintosh and PC compatible with 10BaseT Ethernet cards. For internal communication, schools use Macintosh System 7 or Workgroup for Windows 95, depending upon the platform.

Secondary schools, in contrast, are provided equipment for a multimedia room consisting of 11 computers, a network server, three printers, multimedia accessories such as CD-ROMs, and a wide range of educational software and productivity tools. Planning assumptions are that multimedia rooms would accommodate about 20 students. Those computers already in the schools would also be incorporated into the network, whenever possible.

What do these ratios say about student access to computers? **Table 1** provides some insights by showing what the average maximum weekly computer access would be for each student in different size schools, based on certain assumptions. **Table 1** was constructed according to Enlaces' norms for the provision of computers to different size schools, and it assumes that the equipment would be used throughout the school day.

**Table 1** shows that the maximum amount of time that each student alone could have on a computer would be an hour in the smaller schools and only a half hour in the larger ones. However, because two to three students usually work on one computer, the average student-per-computer time

could be as high as 90 minutes in the larger schools and almost three hours in the smaller ones. In fact, schools have adopted different strategies for using computers. Some are limiting access to students on the basis of motivation, interest, and other criteria. Others give all children some access to computers, even if it is only about 25 to 30 minutes a week. Still others, particularly secondary schools, might have other computers so that access is greater than suggested by this table.

Table 1

### Average Maximum Weekly Computer Access by School Size (minutes per student)

Computers	50/100 Students	100/300 Students	600 Students	1000 Students
3		108/54 min.		
6			54/36 min.	
9				27 min.
11				33 min.

Assuming that schools are placing two to three students on a computer or limiting access, many students might be getting at least one hour per week and perhaps even more time on computers. If so, what is the most effective use of that time? To its credit, Enlaces has not mandated a response to this question. Enlaces' position is that each school must define its own best use of computers and devise a schedule to make it operational. As a result, there is considerable diversity and experimentation in computer use in network schools as well as interest on the part of teachers to learn new applications.

**Software.** Despite the limited educational software available in Spanish, Enlaces has provided all of its network primary schools a basic collection of such software. This software consists of titles produced in Chile for educational use and other Spanish titles produced in the United States. One of the most exciting pieces of software used in Chile today is La Plaza. It is distributed to schools by Enlaces and is exemplary for its elegance, simplicity, and facility of use. It is also culturally 100 percent Chilean although its features can be readily adapted to all Latin American countries that have plazas.

**La Plaza.** La Plaza (the square) is a software program written in C++, which has an attractive and colorful point-and-click interface that permits students and teachers to have easy access to several applications. Originally designed for the Macintosh, it is now also available for use with Windows 3.11 and PC-compatible platforms.

Clicking the “Correo” or Post Office provides access to e-mail, the kiosk stores electronic newspapers and other documents produced and downloaded by teachers and students; the “Museo” or Museum serves as an information center and interface for easy access to software; finally, the “Centro Cultural,” or Cultural Center serves as a bulletin-board system. Enlaces has also bought site licenses for some 30 different software titles and has distributed different titles to small groups of schools. It is also providing schools an additional ten multimedia educational applications developed in Chile.

**Training and Technical Assistance Strategy.** School administrators and teachers are essential to the effective introduction and use of technology in schools. If administrators and teachers actively support technology, attend training courses, and experiment with technology in their teaching programs, there is a very good chance that the schools will achieve significant educational benefits. In Chile, as in most other countries, primary school teachers have given a mixed reception to the introduction of technology in their schools. Their enthusiasm stems from the sense that computers will bring their school into today’s world of information and communication and enable them to prepare their students for the future. Their trepidation arises from their own unfamiliarity with computers. They are fearful of the technology and have profound doubts that they will learn to use it effectively. While the majority of teachers are generally willing to try to overcome their fears and learn to use technology effectively, there are some who are unwilling or unable to change.

Enlaces’ training strategy is that there is no universal solution for all schools and that training should equip teachers to find their own solutions. It has also attempted to train as many teachers as possible in each school to enable them to incorporate computers into their teaching and avoid repeating the experience of the past ten years when only one “expert” laboratory instructor reigned supreme among the rest of the teachers. Lessons from the experience of Apple Computer Corporation’s Apple Classrooms of Tomorrow (ACOT), such as the value of training two coordinators in each school to work as a team and the benefits of involving

teachers in hands-on computer training in the classroom, are also guiding Enlaces' training strategy.

Enlaces has provided in-service training to school administrators and teachers in every school in the network. During the pilot phase it managed to train several hundred administrators and teachers in schools in the southern districts. Most training was organized and conducted by the Enlaces staff in Temuco with the help of consultants. However, training was carried out by university collaborators in Santiago. Enlaces has provided training in two phases. Initial training is obligatory for all schools joining the network and has been held *in situ* after a school has its computers installed. This training has consisted of six weekly, two-hour sessions to help teachers overcome their fears of technology and develop basic computer skills. It also introduced teachers to the various features of La Plaza, emphasizing communications by e-mail, conducting collaborative projects with other schools, and drawing upon the information tools available through the Museum in La Plaza. The second phase of voluntary training consists of specialized month-long modular courses for about eight hours each, which teach software applications such as word processing, spread sheets, and other productivity tools, and their use in teaching.

Enlaces has also trained two teacher coordinators in each school to be leaders in the incorporation of technology. In training two coordinators, rather than one, Enlaces has enabled each to support the other in carrying out their responsibilities. The coordinators provide technical, administrative, and general support to other teachers and the school director. They work with the school director in scheduling the use of computers, securing the necessary inputs and support for projects, and undertaking other in-school activities involving computers. Another key role of the coordinators is to encourage innovation in teaching with computers and to promote the incorporation of computers into the curriculum. The training sessions for coordinators have often been used to help schools reformulate their original projects more effectively.

### Notes:

1. Enlaces is already using the web to disseminate information about its activities in Chile and throughout the world. Its website: <http://enlaces.unfro.cl> also provides information about networks in other Latin American countries and offers links to some of the well-known data banks and network sites in education.

2. This conclusion is based on the fact that Enlaces has five years to reach 1,700 schools and currently has reached 120. At a minimum, it would need to increase installations to 370 per year during the first two years, compared to the present 60 per year.

Source: Potashnik, Michael. 1996. *Chile's Learning Network*. Washington, D.C.: the World Bank: 4-7.