

Introducing new information and communication technologies in two rural schools of central Chile: An ethnographic approximation

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As the development of the information society is increasing the opportunities for access to data and facts, education should enable everyone to gather information and to select, arrange, manage and use it. (Delors 1996: 23)

Introduction

In today's globalized and wired society² certain ideas about "development" have become so socially ingrained that they appear to have moved beyond debate. In countries like ours, where on a daily basis broad segments of the population face poverty and lack of opportunity for improving their lives, we can discern formulas that have taken root in the social imagination of our region as ways for resolving these problems. One of these solutions is to seize upon education as an engine of social mobility, providing the only possibility for the bulk of the population to improve its living standards. "Education in the so-called postindustrial society – which is so complex and ambivalent – seems to be the preferred means for achieving tomorrow what we lack today: a productive dynamism with social equity and a democracy based on citizenship without exclusions. Inherent in this expectation is the risk of future disappointment since such objectives can only be achieved through a broad, systemic effort in which the education system can play an important role but can in no case offer the 'keys of the kingdom'" (Hopenhayn and Ottone 2000: 34).

To this we may add the conviction that one of the historical and structural conditioning factors that have perpetuated the backwardness of our region is the low level of technological development of its productive apparatus, which instead of fostering innovation and creating added value is in fact merely a secondary receptor that simply serves to maintain this underdeveloped economic status.³

Thus, we are faced with two utopias, the educational and the technological, both of which hold out the promise of overcoming poverty, if only we will make a sufficient and determined wager on them. The first utopia nourishes the belief that if people at the bottom of the socioeconomic ladder are given a better education they will have greater social mobility and access to more tools for coping within a society in constant change. The technological utopia, for its part, sees underdevelopment as something that can be overcome through greater use of technology, both in production and in information.⁴

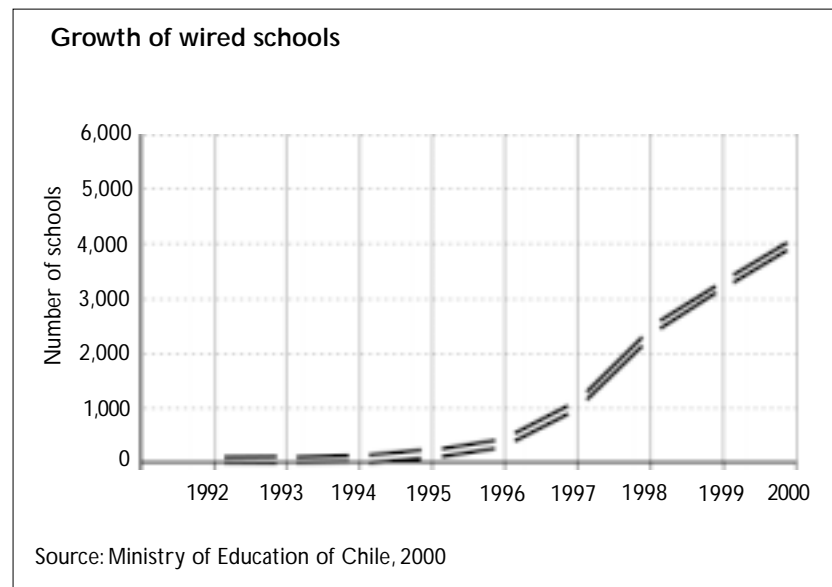
We face a problem when these “wagers” or decisions, which have a social and historical character (and are reflected in public policies), are given the seal of absolute and unquestionable truth. At the very least, we need to adopt a more critical stance towards them. Our research, which examined some of the contradictions and mistaken assumptions involved in introducing information and communication technologies (ICTs)⁵ in schools, is intended as a contribution in this direction.

The Red Enlaces project: objectives and basis assumptions

As a first step in explaining the concepts underlying the Red Enlaces, we shall provide a brief chronological review of the steps that have been involved in this process. The beginnings of the initiative can be traced back to 1992, when the Chilean Ministry of Education declared the need to build “a National Educational Network linking all government-supported public and high schools in the country”. This first stage included a pilot plan involving a dozen schools in the capital city, Santiago, which was later extended to the Ninth Region (the political and administrative division with the largest proportion of indigenous peoples), where a total of 100 schools were enlisted in this initial development stage. The testing phase ran until 1995, when a real growth plan of national scope began to take shape. By that year it was considered feasible to make ICT resources (equipment, software and Internet connections) available in all Chilean schools within the next five years. Consistent with this plan, an exponential increase in coverage can be seen from 1996 on as the programme became truly national in scope. By 1998, computers were already considered an integral part of the secondary school curriculum, with the status of a “horizontal objective”, i.e. it was recognized that the implications of working with ICTs extended to all aspects of the training imparted to students. The following graph charts the progress made with the Red Enlaces:⁶

According to Education Ministry officials, these figures speak of outstanding success in transforming the education system through this initiative for mass access to ICTs.

Given these results, it can be argued that the effort to equip Chilean schools with computers, software, Internet access and peripherals has been broadly successful.⁷ Although there is still a noticeable imbalance in the availability



of these new technologies between schools located in major urban centres and those in more remote rural areas, it is equally clear that rural schools are gradually being incorporated into the plan and that these discrepancies should be overcome in the medium term. Generally speaking, we can say that in one way or another ICTs are becoming a normal part of the school landscape. This is confirmed in the wide media coverage that has been given to the entire issue of introducing ICTs into society and in the consequent expectations of teachers and students alike.

Clearly, this modernization of education is based on a concept that relates technical work, such as establishing a computer network, to the goals, needs and challenges currently facing education. Such a large-scale investment would be inoperable without an ideology that defines exactly what are the basic parameters guiding the entire Red Enlaces project as a government programme.⁸

These guidelines address some of the main questions that have emerged with the introduction of technology into education: for example, deciding the pedagogical orientation to be given to ICTs once they are in place in the classroom, what kinds of new knowledge and skills students can obtain through ICTs, how school management can be improved through the use of computers, and the idea that the teacher can use resources available over the Internet as a supplement to classroom instruction. Moreover, one of the conceptual underpinnings of the Red Enlaces project “considers information and communication technologies (ICTs) as a tool in the service of individuals, the main players in the process of teaching and learning: students, teachers,

principals, supporters and officials of educational establishments. . . . The goal is not only to equip the K-12 schools with computers, but to integrate them into an educational network through which they can communicate with each other and with the world, exchange ideas and experiences, regardless of the region or town in which they are located. This is consistent with one of the key objectives of the education reform: to achieve greater equality of opportunity for children and youths to gain a better education" (Ministry of Education of Chile 2000a: 11).

From the above description, we can detect an assumption that, while not explicit, sets the direction that this process of technological change is intended to take: we are referring to the tremendous degree of confidence that information technologies have for a self-activating potential for change.

This presumed quality of ICTs, when transferred to the education sphere, should enhance its quality and make it equitable as soon as all students have the same "window of access" to the world that the Internet offers, and it should turn students into "world citizens" with the capacity to understand and participate in the process of globalization. As the planning unit for the Red Enlaces project sees it, ICTs are not only a tremendously important teaching tool but are also related to the lifestyle that the boys and girls now learning this technology will experience. "This educational revolution has to do with lifelong learning, distance education and ICT-based education. Countries that fail to make this change will be widening the knowledge and technology gap that separates them from the more dynamic parts of the globalized world and will find themselves cut off from the knowledge-based economy and the information society (Brunner 2000: 214). According to these arguments, the introduction of information technologies in the education system is an answer to the urgent need for Chile's education system to adapt to the requirements of globalization.⁹

Consequently, this research was driven by questions such as these: Is this technology really being incorporated as a new teaching tool in schools? What cultural impact does the introduction of this new, globalizing technology have on the rural environment? What happens to the teacher-student relationship in a rural school when information technologies and their related teaching innovations are introduced? How do students react to this new educational resource?

These questions apply to both the theoretical and the practical aspects of the assumptions underlying the Red Enlaces. We believe there is a need to look beyond the claims, based on figures showing coverage and number of teachers with ICT training, that significant progress is being made in improving the quality of education and that ICTs are tools that really make it possible to overcome poverty. In fact, if ICTs are to have a true impact in reducing the equity gap, they must be given a more cultural dimension as well, and we must understand thoroughly the real social and practical uses that are made of ICTs in schools.

The context: the commune of Maule and its socioeconomic characteristics

Our research was conducted among low-income groups in rural areas, where we attempted to identify social practices linked to the use of ICTs. We selected the commune of Maule for this purpose because it met the requirement of having elementary schools integrated into the Red Enlaces project. In our ethnographic work, we were therefore able to approximate the daily use made of ICTs in two local schools.

To understand the context of this research, it is useful to review some aspects of the commune of Maule. It is located in the Seventh Region of Maule, along the south bank of the river of the same name, some 288 kilometres to the south of Santiago. The regional capital, the city of Talca, is about 20 kilometres to the north and only 15 minutes by highway from the main village of the commune. The commune has 13,769 inhabitants, of whom 11,007 are in rural settlements; the one “urban” settlement accounts for the remaining 2,762 people. Because it is so close, Talca, as the economic, population and political centre, exerts great influence on the development of the commune of Maule. It is fairly safe to say that the future of Maule, as an administrative entity and a human settlement, is closely linked to movements to and from Talca.

The municipal government has its headquarters in Maule, which functions as the political centre of the commune. This locality has the greatest number of public services (a polyclinic, the largest communal school, the civil registry, the post office, the fire department and a police station) as well as the beginnings of a commercial centre. Human settlement in the commune can be described as dispersed among small centres. This means that, within the broader territory representing the Municipality of Maule, there is a long list of small localities with intermittent public services (health posts, schools and sometimes police) and a great number of shantytowns or *ranchos* scattered haphazardly along the roads that run through the commune. Among these poor villages we may mention Duao, Colín, Linares de Perales, Callejones and Numpay as examples. The interesting point here is that the area covered by the communal administration is very large considering its relatively small population, which is scattered among several very small centres. These features make it difficult to provide adequate coverage of public services, particularly in the winter when heavy rains can severely disrupt intra-communal travel.

As noted earlier, the local economy is heavily dependent on activity in Talca. Most of the commune’s farming output (which represents the primary source of income and work) is sent to markets in the regional capital. This means that the constant fluctuations in Talca’s demand for agricultural products translate structurally into higher or lower incomes for people in Maule and its surrounding areas. Moreover, as an urban centre, Talca represents a much bigger commercial and labour market than does Maule,

which means that the local economy remains very weak if we evaluate it in terms of its potential for generating incomes and benefits for its inhabitants.

Maule, then, is marked by high levels of poverty: 42.4 percent, with an indigence rate of 13.6 percent.¹⁰ It is sufficient to say that, according to figures in the latest UNDP *Human development report*, the Maule region has the worst performance. Moreover, in the 1998 human development index ranking (UNDP 2000: 25), communes of this region fall in the lowest quintile.

The extreme poverty in which most of the people of Maule live can be laid to a number of factors: the high adult illiteracy rate, at 13.7 percent (although this trend is being reversed among children, thanks to expanded educational coverage); poor health conditions reflecting inadequate sewage facilities; the low value placed on manual labour, which keeps family incomes low; and the high degree of local dependence on social assistance from the municipality. Such a situation can exist only when the local population has very low incomes and, far from being able to pay municipal contributions, requires whatever direct assistance the local authorities can deliver.

Despite the foregoing, living conditions are nowhere near as bad as those frequently encountered in the marginal zones of major cities such as Santiago. In this respect, the rural poor have in their hands a number of mechanisms that, to some extent, mitigate the disadvantages of living below the poverty line. One of these, and the most obvious one, is the immediate availability of food on the farm. Despite the concentration of land ownership and the use of practices such as sharecropping, farm work still provides a stable source of family income and prevents poverty in these localities from being even worse. In addition, proximity relationships and cooperative networks are much stronger in small rural communities (in contrast to the cities, where they are extremely limited) and these qualities of sociability in the rural world offer an additional channel for obtaining resources. Local people are able to stabilize their living standards by resorting to small favours and exchanging work for food, among other strategies.

The daily school routine. An ethnographic approximation

"Any ideas you want to express?" We want more computer time! The teacher keeps promising. We want to work more with computers. These were some of the most frequently heard comments from the children we spoke with. Their eagerness to get into this room, so distinct from the other schoolrooms, is evident in the pushing and pulling in the waiting line and the speed with which the children cover their feet with plastic bags so as not to dirty the computer room (this is a requirement for entering the room). Several times we watched this ritual, which takes place before the computer class begins. At some point it becomes impossible to hold back the crowd of boys and girls clustered around the narrow door, which reads "Computer Room", with the "Schedule" posted below. The teacher in charge of the group tries to

maintain some semblance of order among the students. Finally he gives the word that they can now enter the room, with the warning that they must do so “calmly”. The students immediately scatter to the equipment: this previously quiet room, especially outfitted to house the Red Enlaces project, is suddenly converted into one with a swarm of children moving chairs about to form groups with their friends, some complaining of the selfishness of a student who refuses to share “his” computer, fiddling with the keyboards to start up the computers; while others, with a sense of frustration, are left to sit at the tables arranged in the middle of the room. Thus begins yet another computer class in one of the schools of the commune of Maule, part of the Red Enlaces sponsored by the Ministry of Education of Chile.

The social space that provided the setting for the issues on which our research focused is the classroom that functions as the “computer laboratory” in the rural schools in question. In addition to passing on knowledge and serving as a socializing institution (activities that are common to urban and rural schools alike), rural schools perform certain “complementary functions” that are not present to the same extent in the cities. We know that, as an institution, the rural school is expected not only to impart formal knowledge but also to transmit values associated with national identity. The rural school, then, can be understood as an extension of the national state, and the teacher has a greater degree of social authority in his relationship with the community in which he is serving. Representation of the state as a political entity is clear in the teaching of national history, in the celebration of national anniversaries (for the most part commemorating military events) and in national holidays, for example. Thus, compulsory school attendance (which was recently extended to full days) is superimposed on the community’s own dynamics, where children’s work in the fields illustrates the extent to which the school fulfils its function. Now, since the introduction of ICTs in the classroom, we may ask ourselves: how are the schools adapting to this new scenario marked by technological change?

With these concepts, we focused our ethnographic research primarily on observing the various dynamics that manifest themselves within the room housing the Red Enlaces project. This is not to say that we treated this room in analytical terms as an “airtight compartment” without any relationship to the surrounding administrative, social and cultural contexts. But, in our view, this was the best locus for defining and investigating the uses, expectations, practices and representations associated with the introduction of ICT.

In this connection, it is very useful to look briefly at how ICTs have been integrated into the practice of teaching. The facts described below are intended to establish a continuum, the purpose of which is to provide a frame of reference as the basis for the discussion at the end of this article. This is very important for the critique that we intend to level against most of the commonplace arguments in favour of initiatives for introducing ICTs into society: our research is based primarily on direct observations. Through our

ethnographic work, we have tried to identify firsthand the social representations concerning ICTs that make themselves felt in the classroom, thereby inverting the traditional order of things, which in Latin America always ends by imposing public policies “from above”. In our view, this tendency has pushed the assumptions surrounding the introduction of ICTs to their limits, to the point of adapting reality to the requirements of those policies.

The school routine and the use of ICTs

We may begin our story by looking at the preparations that are made before the actual instruction session begins. Generally speaking, initial instructions are given in a normal classroom. There is a practical reason for this: the class has to be divided into two working groups before the session begins. Since the number of computers available is inadequate, the only way to keep the number of students working at each computer to a reasonable number is to resort to this approach. What this means is that the time allocated to use of the computer room is in reality cut in half. While the first group goes to work on the computers, the second group is confined to watching from the middle of the room or is kept in its regular classroom working on some activity that the teacher has assigned. Once the teacher has explained the tasks that the children are to perform, the first group goes to a room that has been specially equipped for the Red Enlaces project. There they are made to line up in front of the door. As described earlier, the children become very anxious as they await the chance to go in and start using the computers. Here, in front of the computer room door, we can observe the practice that produces the greatest perplexity, betraying an attitude that treats the equipment as something sacrosanct. We are referring to the custom of forcing the children to cover their shoes with plastic bags before they enter the computer room: in fact, the session will not begin until all the boys and girls have followed this order. What is the sense of all this? From the teacher's perspective, this room has to be kept especially clean, and the students must be prevented from tracking mud onto the carpet installed in the room.

As we see it, this scene is not just a simple anecdote but reflects much of the apprehension that most of the teachers feel when they are faced with having to master the tools of information technology. It is natural enough to expect that children will track mud into the room, especially in a rural setting, but the interesting thing is to see how this simple order by the teacher reflects the special status accorded to the computer room. We must not forget that the computer room is a special place where normal standards do not apply, starting with the broad U-shape arrangement of furniture, which already suggests an attempt to modernize the traditional classroom layout. Traditional classroom control is ignored (at least for the moment) and disciplinary standards are relaxed (the children talk loudly, move all over the room, show

off their achievements to their fellow students, trade their latest findings, play jokes on each other, and so on) – one might almost think it was recess time. Moreover, we must remember that in most cases the other half of the class is kept waiting, either in the laboratory or in the classroom, for its turn to use the computers. Under these circumstances the teacher's ability to enforce normal classroom discipline is seriously undermined. The children are very aware of this, and they take maximum advantage of the opportunity to "push the limits" beyond the rigid rules that govern behaviour in a normal classroom.

Returning to our description of a typical class, when the teacher gives the go-ahead there is a stampede of boys and girls racing to grab the best spot in front of the computer screen. And when we say "the best spot", we must recognize that the limited number of computers means that these spots are limited, despite the division of the class in two. When the class begins, then, we may see three or four students sharing the mouse, the keyboard and the screen. At this point, the teacher has already given the final general instructions linking the subject of study (science, mathematics, history) with the use of ICT. We must remember that the official curriculum treats ICT as a tool that must be inserted into each of the subjects that the children are studying. This leads us to wonder what level of utilization, knowledge and integration of ICTs is possible under the working conditions that we have described.

Our class continues with the use of the available educational software. Of the programs used as teaching resources, the most popular one with teachers (and, to a lesser extent, with the students) is certainly La Plaza.¹¹ As the teachers see it, the environment that La Plaza delivers makes it possible to switch from one subject to another without great difficulty. In other words, it can be used for a mathematics class or for a science class. It works in this way because the program itself is designed to combine the main content to be covered for each course in a "common space", and it also allows for communication by e-mail through special applications. We may say, then, that La Plaza is the starting point for much of the routine coursework observed. This does not mean, however, that work in the computer room is limited solely to using this software since there is quite a wide variety of programs available.

The key role assigned to La Plaza reflects the fact that it delivers a wide variety of content within a single set, where much of the content is already processed and virtually ready for application in the classroom. This feature is greatly appreciated by the teachers since not much of the available computer time needs to be spent on detailed programming. The instruction "Go to La Plaza" is repeated constantly in most of the courses we observed, and it is clear that the work that the children do with this program is not very differentiated. In fact, there is a curious uniformity in the way they work with this program, and most of the children spend their time moving from one section of the program (museum, library, hospital) to another without any clear order or direction. At this point, it would seem that the principal

criterion for using La Plaza, and in the end ICTs, relates primarily to the children's own preferences. We frequently found children visiting the various features that La Plaza offers with no apparent motivation other than to amuse themselves with the pictures and sounds offered by the multimedia format of the program. This is another finding that needs to be examined further – the disconnected, random and essentially recreational use the children make of computers – in light of the requirements of each specific subject.

In fact, La Plaza (as a homogeneous set of applications) offers a wide variety of content that can be used for any subject matter in basic education. All of this is contained in a very attractive multimedia architecture that readily captures children's attention, to the point where it becomes their favourite and most-used program (a point that takes on greater weight when we realize that the children are completely free to select the application with which they are going to work during the class). With all these features in its favour, why aren't all the possibilities that it actually offers exploited? There are several reasons that may help us understand this shortcoming in the use of this educational software. In the first place, we found on repeated occasions that the teachers were rather lax in their supervision of students' work with ICTs. This was reflected in the lack of clear and precise directions for classroom work. Far from assimilating the content that this software offers, the children quickly began to surf the different sections available in La Plaza, mainly for their own amusement. The video images, sounds, puzzles and drawing boards fill up the time that each student has for working with the computer (remembering that there are three or four children for each computer and that the other half of the class must patiently await its turn – this is another weakness that we shall discuss further later). The problem lies in the way the students use La Plaza¹² – the program is essentially a series of sounds and images that grab the children's attention but do little to transfer knowledge.

A good example is the "anatomy centre", a window in La Plaza that offers very good graphics representing the different systems of the human body. At first glance, no one could dispute the quality of this material, the versatility and variety of which should be a great help in teaching natural sciences. The contradictions become evident, however, when we note that the available multimedia resources do not represent a school assignment in the conventional sense. The images and the memory puzzles, the purpose of which is to explain through play the organs and functions of each of the systems of the body, end up being used simply for entertainment, and the students are incapable of going beyond the immediate excitement of the game to see that there is some knowledge that the "anatomy centre" is trying to pass on to them through play. That, of course, is positive in itself, but this admission is far from saying that learning and the transfer of knowledge should be not merely relegated to the background but completely banished. Our assertions may seem fairly radical, but they are based on our classroom observations, where

we frequently found that memory games, which are supposed to provide graphic support to the teaching of natural sciences, are reduced in their scope to the status of simple games, which in the end are stripped of their educational content. This criticism is intended to strengthen the use of ICTs in ways that will reinforce learning. The words of Nicholas Negroponte (1995) are highly illustrative of this point: "An important part of learning, no doubt, is achieved through structured teaching – but it must be sound teaching imparted by good teachers. An even greater portion is achieved through exploration, 'reinventing the wheel' and discovering things for oneself. . . . Since now virtually anything can be simulated by computers, there is no need to dissect a frog in order to learn its anatomy. Instead, we can ask the children to draw a frog, to construct an animal that behaves like a frog, to change that behaviour, to simulate the muscles, to play with the frog."

Beyond the doubtful plausibility of such an assertion in rural schools in a country like Chile, it is still interesting to see how such intensive use of ICTs in education can undermine the status of the teacher as an authority in knowledge intermediation. In rural areas, a teacher's performance is frequently judged not so much by the formal knowledge that he can transmit and teach, but rather by his ability to control and win the respect of a group of students under his responsibility. To help appreciate this statement, we need to take account of the fact that the dominant social representations in a rural setting like Maule tend to stress the concepts of paternalism and authority, the demonstration of which requires practices consistent with these ideas. In other words, we could say that there is an "authoritarian personality" that, as a cognitive system, stamps the construction of the social system and therefore establishes the basic coordinates that govern the relationship between teachers and students (from the community viewpoint, of course). These concepts are deeply rooted in daily thought and action, and no social researcher can afford to overlook them if his purpose is to formulate public policies consistent with the social spaces in which they are to be applied. Under these conditions, to speak as Negroponte does, "constructing a frog instead of dissecting one" will not happen automatically but only after a lengthy process of acceptance.

In light of the above, one of the great obstacles that is slowing the introduction of ICTs in the schools lies in the plethora of rules and regulations that many teachers impose on their classes when the time comes to visit the computer room. Carried to an extreme, these regulations transform ICTs into a disciplinary tool. In this respect, we may note, for example, that in some cases children are punished for bad behaviour by forbidding them access to the computer room, which means that the computer is basically perceived as something for children to play with for their amusement, rather than as a learning tool. This is a good example of the way teachers view the role that the computer assigns them in the educational process. On this point, we may cite a passing comment made to us by one teacher, which helped us to appreciate directly the relationship that is established between the teacher

and the student through the presence of computers in the classroom. We were discussing children's complaints about how strict some teachers tended to be when it came to the computer class. The children complained about the excessive rules and the steps that had to be followed in booting up the equipment and settling themselves in front of the screen. This was the message that we were trying to convey to the principal, in terms of a very real complaint by students who wanted more freedom of action in using the computer. Interestingly enough, the principal immediately and spontaneously admitted to us that some of his colleagues were excessively strict when it came to the computer class. The principal's comment was this: "I already know whom you're talking about. What happens is this teacher gets very uptight. She insists that the cover has to be folded in just a certain way. I tell the kids not to worry about it and to pull off the cover any old way. I do it myself lots of times. I'm not going to worry about silly things like that in using the computer."

One very important element in this comment is that there are at least two ways of approaching and conducting classes in the Red Enlaces room. On one hand, the use of ICTs is taught and transmitted from a strictly formal viewpoint related to basic operations (booting up, using the mouse, opening the program, closing it, shutting down and covering the computer) without much possibility for experiment and learning through the conventional (and very useful) "trial and error". The other approach, the success of which remains to be seen, would be to allow children more flexibility and more room for experimenting in using the computer – assigning tasks and giving a few general instructions on the topic for the class so that the children themselves can decide how to find the actual information required by the teacher.

During the course of this fieldwork, we observed sharp differences in the structure (and the attitude) of the class, depending on the teacher. As we became more familiar with the internal dynamics of each school, these differences stood out more clearly. In fact, each teacher's approach is different, depending on his accumulated knowledge of ICT use, his skill in transmitting it to his students, his willingness to incorporate ICTs as a classroom resource, the type of relationship that he has with the class, his ability to organize a group of children in an atmosphere that differs from the traditional classroom layout, etc.

These factors taken together reveal enormous differences in the structure of each class conducted in the Red Enlaces room, ranging from extremely rigid teachers who will not allow any use to be made of the computer if it deviates from the instructions initially given, to the opposite case where, as it seemed to us, the teacher took no interest at all in what was going on between the students and the computers. In the face of these findings, it might be argued that these differences are nothing surprising and that they are to be expected when we consider that each teacher has a different way of running a class, based on such factors as personality, professional background, formal training, etc. Yet we were struck by the clear discontinuities in something

that was defined as a “horizontal objective” of education, where the teaching and transmission of skills and knowledge in working with ICTs were supposed to be subject to minimum standards and should not deviate significantly.

Discussion of the results

With this brief description of the introduction of ICTs in the schools, we may now turn to some considerations that emerged from our field observations. To illustrate the elements discussed in this section, we thought it useful to focus the discussion on a system of opposite pairs, to take into account the various practices, valuations, representations and expectations that surround the introduction of ICTs in these rural schools. By establishing these opposing themes of analysis, we can give some order to the major considerations that arose from our research and thereby provide a basis for a critical discussion of the impact of ICTs.

Theme 1. Familiarization vs. specialization: the computer as a technical device vs. a technological tool

Another viewpoint from which we may consider the data collected relates to the way in which computers are used in the schools. This duality (familiarization vs. specialization) seeks to explain how the schools can exhibit two approaches for dimensioning the relationship that teachers and children establish with the computer and also how the computer has been introduced in the schools – whether it is integrated into the daily dynamics of the school or, on the contrary, constitutes something entirely strange and foreign.

The first point to consider here refers to the opportunity that the children have to make use of the computers in their school. From the outset, we noted that access to the computers was restricted: they were located in a special room (the computer room) well away from the children, thereby producing an isolation that was both spatial and symbolic. The computer room in fact is separated from the other rooms and, very symbolically, it is located close to the principal's office,¹³ quite apart from the places normally frequented by the children. It is not, then, a “children's room”,¹⁴ someplace where they go every day, but rather a “special” room, for which special behaviour is required (such as covering their shoes with plastic bags so as to keep the room clean). It is also the only room with carpeting and with all its windows intact, and the arrangement of the chairs and desks is different from that of the normal classroom: they are set up in a U-shape, instead of in rows facing the teacher. The computer, then, is located in a place with special features that set it apart as something different and remote from everyday life.¹⁵

The very idea of setting up a computer room implies restricting the computer's presence in the school milieu and controlling access to it. In fact, the computer room is not always open and the possibility of using it outside

regular school hours depends on the willingness of another person (the computer custodian, who is generally a teacher). This means that each student has only minimal access to computer use, a fact made even worse by the very little time that each student gets during computer class to work with the machine. Clearly, from this viewpoint, the computer represents a special element in the school milieu, and this makes it difficult for a child to identify with it.

For their part, the teachers also have to cope with the novelty of the computer's presence and its impact on teaching dynamics, and the way they do this has direct implications for how the computer will be accepted in the school. Broadly speaking, we can identify two approaches that relate directly to how the teachers accept the presence of computers in the school. On one hand, some teachers see the computer as a device that has to be handled very carefully, and so they restrict the use that children make of the computer for fear that they may break something. This is a fear based on a lack of confidence both in the computer (which is seen as something extremely delicate and fragile) and in the children, and it frustrates any attempt to establish a bond of familiarity between the student and the computer. This approach stands in contrast to another one that takes a less respectful view of the computer and is more comfortable in interacting with it, as reflected in the case described above, where the principal of one of the schools, in response to students' complaint about a teacher insisting that the cover be folded in a certain way, told the students to pull off the cover any old way. This case provides clear evidence of the contrast between the repressed (and repressing) approach to computer use and the approach that accepts the computer as just one more element of daily life.

As noted earlier, the way the teacher accepts the computer (and of ICTs in general) as a tool that will help him in his work will have an impact on the dynamics of the computer class.¹⁶ On this point, we found, broadly speaking, two forms of class structuring. On one hand, some teachers apply a *dirigiste* approach where the atmosphere in the class is extremely strict, with the teacher dictating and controlling each step to be followed by the students (from when to boot up the computer and how to move the mouse to an almost pathological concern with how to fold the cover): the teacher's presence here is a permanent cloud over the children's use of the computer because his attention is focused on maintaining control rather than on guiding their work with the computer. In contrast to this approach, we find a more flexible one where the teacher does not try to control computer use (without suggesting that he is not concerned with proper care of the equipment) but leaves the students to work with the computers on their own, to the point where the teacher may seem to have little interest in what is happening in the class.

The problem is that both of these approaches to structuring the computer class fail to take real advantage of the computers in the school. On one hand, excessive control prevents the children from becoming really familiar with

the computer, and the teacher passes on to the children all the fear and mistrust that he feels about computers in the school. Yet, on the other hand, the totally hands-off approach, while it allows the children to familiarize themselves with the computer, does little to encourage educational use of the device or to involve the students in the learning process, suggesting that the teacher himself does not see it as a working tool that will help him in his teaching efforts (observing these teachers, we had the impression that they were simply putting in the required time). It is not enough to introduce the computer: what is needed is to allow children to become familiar with it as a tool, to make use of all its possibilities, to be able to think of new uses for it and, at the same time, new possibilities that they can open for themselves through the use of this technology.

Despite the foregoing, we were surprised at how the children grasped the computer and at the great interest they showed in using it every time they had the chance to enter the computer room: indeed, they preferred this to any other “conventional” school activity. Computer class became a highlight of the school week, allowing the children to take a break from the everyday routine and do something that, if not new, was certainly rare. This was clear in the pushing and shoving and the joking that went on while waiting outside the computer room, where the children had to cover their shoes with plastic bags before they could go in – a ritual that reinforced the almost sacred image that the computer has gained in the school, and yet the veritable stampede once the children were inside the room meant that for them the computer was far from sacrosanct. Once they were inside, we saw that the children suffered no complexes in the presence of the computer but, on the contrary, were attracted and excited by it. The computer room and computer work is for them a recreational activity that allows them to work as a group and play with the computer. Here we have the key to children’s interaction with the computer: it is very much a plaything, and this speaks for their capacity to appropriate the computer as something relevant to their interests, as a thing that they can control in order to achieve something that interests them, providing clear evidence that, in contrast to their teachers, they have no fear of computers and they recognize clearly that computers provide them a great service.

It is interesting that the teachers seem to be quite aware (perhaps intuitively) that the children enjoy playing games with the computers, and in fact they promote the view of the computer as a plaything rather than a serious educational tool. Evidence of this is the widespread practice of punishing student misbehaviour by barring offenders from the computer room.¹⁷ As well, students are warned not to visit multimedia sites or the Ministry of Education will descend upon them. “I went there once, but the teacher said we shouldn’t because the ministry would come and want to know what we were learning,” said one student. This shows clearly how these teachers see the role of the computer in children’s education.

It is precisely this amusement aspect, this playing with the computer on the part of the children and the ambiguous reaction of their teachers, that illustrates one of the main contradictions surrounding the introduction of ICTs in the schools and that poses the question of what is the basic objective of the initiative – seeking to familiarize children with computer technology is, after all, quite a different thing from trying to strengthen conventional teaching through the use of computers, which means highlighting the computer as a teaching support, as a kind of Technicolor blackboard. The two are contradictory. To familiarize students with ICTs, the important thing is that they should lose their fear of the computer; and this will only happen if children are allowed to experiment, to play with it and to share it. On the other hand, if we want to make practical use of the computer as an efficient transmitter of knowledge (as in the conventional classroom), then there must be some control in place. The attempt to combine these two objectives in a single process in these schools has produced ambiguity when it comes to integrating the computer, and this is why some teachers are so strict in controlling the child's every step with the computer, while others simply look the other way from what is going on.

This confusion over the real meaning of introducing ICTs into the schools leads in the end to a collision between two distinct approaches to the computer – on one hand, the children “instinctively” seek to familiarize themselves with the computer and appropriate it for their purpose (which is play), and on the other hand the teachers try to turn it into a tool for teaching their subject. This conflict is not easy on anyone – the children chafe in frustration at the control imposed, while the teachers are left feeling powerless.

Theme 2. Achievers and non-achievers: schools and the perpetuation of the digital divide

The introduction of computers in school, together with all the technical, economic and political paraphernalia that accompany these projects (such as the Red Enlaces), has been done with one great objective in mind: to go as far as possible towards closing the infamous digital or technological divide that separates developing (or, frankly, underdeveloped) countries from the developed countries (or what we may now call the postindustrial countries). All of this is taking place within the context of globalization and the ever-greater technological demands that it imposes.

From the perspective of this digital divide, we may ask: With all their computers and Red Enlaces paraphernalia, how are the schools trying to close this divide? In other words, how are the schools going about making students “digitally literate” for this new world?

With respect to this question, we may look first at the work plan adopted for helping students learn and understand what the computer means. As described earlier, the computer room functions on the basis of group

dynamics, given the scarcity of computers (which means that one group is always waiting), but this group system seldom implies group work (being together is not always the same thing as working together). The creation of groups reflects an economic scarcity and not a deliberate methodological approach, which means that the group system is not pedagogically inspired; in fact, the groups are formed solely on the basis of friendships: it is the children themselves who decide their composition (with the teacher intervening only when this leads to disruptions). Beyond the methodological issue of what is the best way for a child to learn how to work with the computer, we may identify a very interesting feature of the working dynamics that arises from this group system. We noted that there was a kind of competition among the children as to who would control the keyboard and the mouse – one or two children always seemed to monopolize them. These, then, are the children who will actually take advantage of the computer's interactivity, while the others are merely observers. Since there is no group-work methodology,¹⁸ the teacher does not interfere with this "competition" (intervening only when the group makes too much noise) and so does nothing to ensure that all students have access to the computer controls.

A second finding, which flows from our observation of work with the computers, is that it is the child's own wishes that take precedence in many cases, since most of the time the teachers limit themselves to giving the order, "go to La Plaza", but are unable to make effective use of the program. This means that most of the children simply spend their time hopping from one section to another (museum, library, hospital and so on) without any order or direction, retracing their steps many times. It would seem, then, that it is the children's own preferences that determine the use they make of La Plaza and of ICTs in general: this is not always a bad thing, yet in light of the foregoing it is clear that the children who really make the decisions are those who have control over the computer.

From this, we may conclude that the children who really grasp the computer are those who win in the competition (either because their interest is stronger than that of their fellow students or because they have power or influence over the others). From what we observed, then, we may say that the group-work system that operates in these schools ends up favouring those who are the "achievers", to the detriment of their fellow students. It is these achievers who have the greatest chance to familiarize themselves with the computer and to learn how to handle it, compared with those who are merely onlookers. This is not to stigmatize one group of students as oppressive or abusive with respect to another, helpless group, but simply to recognize that the use of the computer in these schools is complicated by the individual characteristics of each student (as in many other activities) and that for some students it is more "natural" to work with the computer, either because they are more interested and feel more comfortable with it, or simply because they find it more entertaining.¹⁹ This strikes us as a factor that should be

taken into account in examining the problem of introducing ICTs into the schools, since it raises the question of whether we are not reproducing the digital divide that we are seeking to close, but on another scale.

An interesting example that highlights the case of “achievers” is that some former students from the schools (now enrolled in the high schools of Talca) continue to return there in the evening to do their homework on the computers. They have acquired computer knowledge and skills superior to the teachers, and it is in fact they who have “appropriated” the computer to the point where it is for them an effective work tool and one that can open new horizons for them. They have achieved this ability through their own efforts, because they like computers and they find them useful. From this, we may conclude that the real development of this knowledge takes place outside the classroom and relies, above all, on the possibility of permanent access to a computer, which is indeed the way to transform the computer into an educational tool.

This is where another, extracurricular factor comes into play, one that has to do precisely with this possibility of achieving greater access to the school’s computers so as to become thoroughly familiar with the technology. Since very little time²⁰ is available for computer use within the school curriculum, the decisive factor is the extracurricular environment, beyond the institutionalized sphere. At this point, personal relationships come to play a central role, since the decision to grant special access to the computers lies with the teacher responsible for the computer room or with the school principal. Thus, when we asked whether some students knew more than others, a girl in the eighth grade at the Colín school said: “We have a better chance to get into the computer room if we clean up the office – the teacher said if we would clean the office we can use the computers.” This suggests that the real possibility of closing the digital divide has to do not only with technical issues and resources but with an entire social dimension, which is the empathy that a student may have with one or other of the authorities, who will then give him special privileges.

On the basis of the above considerations, we may conclude that, in practice, the attempt to close the digital divide, which is the goal of the Red Enlaces project, depends on a great many unanticipated extracurricular factors²¹ that imply the risk of reproducing that divide at a smaller but no less worrying scale. This means that the issue of technology in the school cannot be addressed from a purely reductionist perspective that holds that simply introducing computers in the school will provide the desired results, as if by magic, without recognizing that technology, like any human activity, carries with it complexities that cannot be overlooked.

As we have noted throughout this section, there is here a clear relationship with what we said about the duality of “familiarization vs. specification”, in the sense that only those who are able to establish a relationship of familiarity with the computer will be able to appropriate it and make use of its potential, not only as a work tool but, above all, as an instrument for development that

will open new possibilities. On the other hand, those who succumb to the institutional rationale of the school will lag behind the others. We are faced, then, with a complex paradox whereby the school rationale can reproduce the digital divide and only those who break with this institutional rationale, or who manage to work in parallel to and outside the curriculum, will be able to close the technological divide.

Theme 3. Expectations and daily reality

One of the most interesting issues that arose during our research relates to the underlying tension that we found between the expectations that children have for the use of ICT, both as an information and communication medium and as a tool for their future work and standard of living, and on the other hand the everyday reality they experience within their locality and their family.

Children's expectations began with the imminent act of using the computer, and they showed great excitement in simply going into the computer room, which made them feel in some way that they were making contact with a new reality. Perhaps for this reason, the children were very enthusiastic about being able to use this technology in the school, and that in turn generated much competition within the computer room.

Their positive attitude survived despite the obvious discontinuities between working sessions with the computers and the fact that their visits to the computer room were random or irregular.

Another issue related to children's expectations of ICTs is the fact that the children had lived nearly all their life in rural localities and that virtually none of them were familiar with any city other than the capital of the region, Talca. For most of them, Santiago was a place they knew of only through the media, such as radio and television. There is clearly, then, a degree of isolation, either because their experience is limited to their own community or because rural areas are to some extent considered marginal in comparison to the cities. This produces an obvious interest in learning about other places and in being "open to the world".

"The Internet gives us greater possibilities" (girl, grade 7).

"We can talk with other people" (boy, grade 7).

"We got to know someone over the Internet and we even sent her a photo, she was Chilean but she lived in the United States" (girl, grade 7, Callejones school).

Here we can see clearly that there is a great congruence between what the children want and one of the most repeated postulates of the Red Enlaces programme: bringing the world closer to students in remote places. This link between the global and the local no doubt deserves to be kept in mind when looking at the more complex expectations that youngsters build for themselves on the basis of this utopia, which relates to the relevance, or not, of learning

to work with ICTs with a view, above, all to their future employment.

“Although we are now in grade 8 we have to learn more, but I like it better here” (girl, grade 8).

“We also have to take full advantage” (girl, grade 8).

“Why?”

“Because my sister graduated from intermediate school and she never took computers, maybe once a year” (girl, grade 8).

“The girls are really eager to learn computers because some of us in the class are hoping to go to secretarial school” (girl, grade 8, Colin school).

Girls have a clearer idea of the relationship between computers and work, since they discover in one way or another that computer skills are needed in the vocations in which they expect to work – whether as secretaries, teachers or policewomen (as some girls suggested to us) – all of which call for handling files and networking with data. They think of these occupations in entirely practical terms, recognizing that their parents cannot afford to send them to university, or that it will take many years to get there.

“As for the boys, they will need to use computers because they will be studying mechanics or furniture-making” (girl, grade 8).

“I would like to be a mechanic, and computers will help me” (boy, grade 8).

“I would like to study automotive mechanics, and I think computers will be helpful” (boy, grade 8).

“And I want to be a mechanic too. You can use the computer to make parts” (boy, grade 8).

“I will work with my parents in their tomato business, and afterwards maybe do something for the family” (boy, grade 8, Colín school).

The perceptions of these children provide a good illustration of the linkages between learning to use computers and their future work, but we can also see how thoroughly rooted they are in their daily reality, as with the boy who says that he will help his parents with the tomato farm and then see what happens. There seem to be two outlooks that coexist with each other: excitement over the possibilities that these technologies offer and, at the same time, a frank admission that farm work does not require computer skills, at least for the time being.

“I would say no, farming is one thing and computers are something else” (boy, grade 8).

“There are some manual machines that you can attach a computer to” (boy, grade 8, Colín school).

“My dad is taking computer classes – he works in a nursery where they have a computerized trickle irrigation system” (boy, grade 8, Callejones school).

This boy's case is exceptional for two reasons: First, nobody's father knows computing, much less works with a computer. Secondly, the only ICTs available locally are those in schools. Against this background, we may ask what use it is for the children to learn ICTs. We believe that one of the best ways to learn is through practice, not only at school but also at home. We must consider that this is only a first step in bringing these children together with ICTs (through the school), and it is clearly better to have a few computers in the school than none at all. Yet we need to contextualize the level of use and meaning that the children assign to the possibility of using ICTs, in terms of this complex relationship between desire and reality.

Theme 4. Horizontal use vs. exceptional use: integrating computers into the entire curricular fabric or continuing to treat computers as a separate subject

As indicated earlier, there is a certain contradiction between the Ministry of Education's objective of turning computer technology into a tool that can be used horizontally in the teaching of all subjects and the fact that not all teachers are trained, even at the basic level, to meet the challenge of teaching children these new technologies. While teachers may face problems such as lack of time at school and may not be able to afford a computer at home, there is also a certain fear of technology, which we shall examine in the next section.

In our research, we found that teachers approach this technology in a variety of ways. As we deepened our understanding of the internal dynamics of each school, we came to recognize the differences in this area. As noted earlier, each teacher's work will differ depending on his familiarity with the use of ICTs, his ability to transmit this knowledge to his students, his willingness to integrate ICTs as a real classroom resource, the kind of relationship he has with the class, his ability to organize children into groups in an atmosphere different from the conventional classroom layout, etc. All these factors taken together produce tremendous differences in the structure of each class in the Red Enlaces room. Some teachers are extremely strict, forbidding any use of the computer that strays from the initial instructions given, while at the other extreme there are teachers who give the impression that they have no interest in what goes on between the children and the computers.

In light of this, there is a great deal of irregularity and discontinuity in the integration of ICTs as a further element in the various subjects. Obviously, there are some classes and subjects where no use is made of the computer and its development potential is virtually ignored. Thus, our attention is drawn to the glaring discontinuities of an aspect defined as a "horizontal objective" of education, in which the teaching and transmission of basic skills and abilities in working with ICTs should be subject to minimum standards and should not fluctuate so obviously.

Similarly, one of the most widely used programs, if not the most widely used, is La Plaza, described earlier, which offers a good variety of content within a homogeneous set of activities that can be applied to any subject in basic education. It also has an extremely attractive multimedia architecture that readily captures the attention of the children, to the point where it has become their favourite program (a fact that becomes even more important when the children are free to choose the application that they will be working with in the class).

Another fact illustrating that the much-vaunted horizontality is only modestly effective is that all the computers in the schools are to be found in one room. This already gives computer use the aura of a special event and makes going to the computer room something out of the ordinary, almost like a sacred rite, for students and teachers alike.

These observations make us wonder if computers and ICTs are not being treated as just another subject, rather than being integrated as a work tool in all courses. In our view, this would seem to be the case. One of the main reasons for this is the fact that teachers have little training in these technologies and even less practical familiarity with them, quite apart from the obvious resistance that some of them may feel.

Another interesting point is the extent to which going to the computer room has become a question of rewards and punishment. As noted earlier, many children told us that teachers often punished them for poor performance or disorderly behaviour by refusing to take them to the computer room.

"We don't come because the teacher keeps promising and nothing happens" (boy, grade 4).

"The other day we had a test and the student who came first got to go to the computer room" (boy, grade 4, Callejones school).

These comments provide ample evidence that teachers must have unwritten agreements about rewarding students' good behaviour by letting them work with the computers. The right to enter the computer room is still seen as a special privilege and not as a necessary and compulsory routine.

Theme 5. Technology as a tool vs. technology as a luxury: perceptions that facilitate or restrict the use of ICTs

Teachers seem to be virtually unanimous in seeing the computer (and its software) as a valuable asset. This in itself is nothing unusual, but most of them show a tendency to be too protective of the equipment, often going to the ridiculous extremes of forcing the children to fold the computer cover in a certain way. Underlying this conceptual approach that the teachers take to ICTs is the feeling that computers are pieces of property that must be very carefully handled.

As we have noted, a teaching methodology based on linear instruction will only induce conservatism in the use of technology, reducing all its potential to a minimum, unless a teacher clearly shows a greater interest in experimentation. Thus, we see the teaching and transmission of ICT use from a very formal approach related to learning basic operations (booting up, using the mouse, opening and closing the program, etc.) without further possibilities of experimentation through the necessary (and very useful) “trial and error” approach.

“Sometimes the teacher doesn’t know what to do” (girl, grade 8).

“Sometimes we use the computer as a typewriter for practice, but we already know how to type as fast as possible” (boy, grade 8).

“I know that I can type fast, I like typing and I am good at it” (boy, grade 8, Colin school).

This view of the computer as something sacred denotes, as we have already said, a certain conservatism in the use of technologies, and so does using it as a word processor. The fear of damaging the machine shows up explicitly in the strict control over what the children are allowed to do in front of the monitor. We must be clear that this fear is due essentially to the fact that teachers view the computer more as a source of problems than as something that can help them in their work. This is because they know so little about using the computer, and even less about how to fix problems (when the system crashes or a program is wiped out), and they see training as something that is difficult and that eats into the few free hours they have. There is also the underlying notion that they are dealing with something entirely different from what they have experienced and learned (the generation gap plays a part here since most of the teachers are over 40 and computer skills were not offered when they took their training).

“At the beginning we didn’t even know how to boot it up or shut it down. I was really nervous” (boy, grade 6).

“The teacher drew a computer on the blackboard and explained it to us. She said we must be very careful in handling it” (girl, grade 6).

“We mustn’t get them dirty, we mustn’t fool around with them” (boy, grade 6).

“We have to look for things that are useful to us” (boy, grade 6, Colin school).

Finally, we must consider that the teacher is faced, perhaps for the first time, with the dilemma of acquiring knowledge that is not only new to him but that often seems to be more readily learned by his students. This realization no doubt makes the teacher feel insecure and even hostile to ICTs, so he will not only exert maximum control over what the children do at the keyboard but will have little interest in experimenting with new methods for using the potential offered by ICTs in teaching his subject. In this way, the teacher

takes a defensive posture in the face of this new “agent” that has entered the school.

Conclusion

After reviewing and considering the different themes that arose from our research, we have reached some tentative conclusions about the problems of introducing ICTs into the schools.

In Latin America today, one of the angles from which the poverty problem is viewed is the so-called digital divide, i.e. a technological backwardness that prevents successful integration into the globalization process. One of the tools for overcoming this disadvantage is therefore education. “Among other reasons reinforcing this image of education as the key, we may highlight the following. First, the growing economic importance of innovation and knowledge makes education not only a high-return investment but a field that will decide the future fate of individuals and of entire societies: they will either be part of the information revolution or be left behind; they will either have access to intelligent jobs or be relegated to low-tech and low-wage services; they will either be integrated into knowledge circulation networks or abandoned to the wilderness of cybernetic illiteracy. Secondly, education appears as the principal field for reducing inequalities in the future and as the best way to overcome the intergenerational reproduction of poverty. The arguments on this point have been around for decades and refer to the virtuous circle between better education, social and occupational mobility and higher incomes.” (Hopenhayn and Ottone 2000: 37).

In this connection, we noted that the perception prevailing in Chile, and reproduced in the Red Enlaces project, sees the solution to overcoming this problem in strictly quantitative terms, whereby this technological backwardness is due to the country’s low technological coverage as reflected, for example, in the inadequate number of computers per capita and the even lower rate of Internet connections.

As we see it, this view addresses the problem only in part, because it assumes that technological change requires nothing more than the introduction of machines, whereas it also requires cultural appropriation on the part of users, who must integrate and understand ICTs in the context of their daily lives and thereby come to appreciate these technologies in all their potential.

The only way to close the digital divide effectively, then, is to create a broad process of “technological literacy”, a process that will help users to develop their own “technological culture” that will go beyond mere mechanical use. This, in our view, is one of the principal weaknesses in the implementation of the Red Enlaces project.

This aspect was clearly evident when we looked at the training given to teachers for the Red Enlaces project. A great many factors conspire to impede success in this process. Because it is given from an exclusively technical

perspective, training becomes a matter of simply passing on procedures to be followed. This prevents the teacher from becoming an active player in his own learning and reduces him to a passive receptor of instructions delivered by engineers or “experts”. That leads to a contradictory situation for the teacher since he then reproduces this very passivity in the classroom. He therefore faces the paradox of being reduced to the same level as his students. It is not surprising, then, that teachers look upon training courses as something imposed on them by the Ministry of Education and not as an opportunity that will empower them in their work.

In light of the foregoing, we think that any attempt to optimize the introduction of ICTs in schools must begin with training of a kind that treats the teacher as an active subject in the process of learning the technology so that he will have a thorough understanding of the nature of ICTs as they apply to education. In other words, it requires teachers who, through practice, can lose their fear of making intensive use of technology and who are able to see the potential of the computer in their work. This is the only way to make the teacher a motivating agent for active appropriation of the culture by students. Otherwise, we will merely be reproducing what we see today – a teacher with resistance and fears, who instead of facilitating learning ends up hindering it and becoming a stumbling block that discourages students from learning.

Finally, we believe it timely to raise an issue that needs to be discussed in order to optimize the introduction of ICTs and to begin reducing the digital divide. This involves analyzing the underlying assumptions on which programmes such as Red Enlaces are based and the ambiguity with which their ultimate objectives are proposed. In our view, the user profile that is supposed to be created through teaching in high schools has never been clearly spelled out, either in official statements that rely on vague concepts such as “citizens of the world” or in teaching practices that discourage the real integration of ICTs into the curriculum. Is the Ministry of Education trying to teach children to handle a computer or to assert ownership over information technologies? Questions such as this will remain unanswered if we do not understand them in the context of a complex society where the issue of learning and training is often divorced from the real needs and conditions that society offers these youngsters.

To view this problem as merely a question of teaching computers in the school is to reduce it and strip it of any perspective in terms of progress for society as a whole. It is this notion of the autistic isolation of the school that in the end transforms the computer into a mere technical device, essentially a typewriter with memory. If we are to optimize the teaching of ICTs, we must view these technologies as an integral part in the process of educating active subjects and equipping them with the tools they need to enter fully into the information society.

Notes

1. Interdisciplinary Programme for Research in Education, PHE, Santiago, Chile.
2. There has long been talk of a newly emerging society, and many definitions of it have been proposed: the postindustrial society (Bell and Touraine), the consumer society (Baudrillard), the global village (MacLuhan), the information society (Costell), the computerized society (Nora-Minc) and the digital society (Mercier). In each of these conceptions there is both an implicit and an explicit vision of development.
3. The factors that have caused our region to lag behind have of course given rise to a very broad debate on the issue of development. A discussion of those factors, however, is beyond the scope of this paper.
4. "Thus, 5,300 schools are participating in the Red Enlaces. Although it seemed impossible six or seven years ago, today it is a reality. Under a contract signed with the CTC Company, those schools today are part of the worldwide Internet network, which means that 90 percent of students in the Chilean school system are now connected, free of charge, and the Internet is now much more widely used. In other words, we are educating nearly the entire school population on the basic aspects of life in the society of the future, and we are closing the gap that existed until very recently between school culture and global culture." (Arellano, 2000: 11).
5. While there are many definitions of ICTs, we use the one proposed by Della Crovi Druetta in her book *Satellite technology for teaching*. "These new technologies replace the analog system by the digital system, which makes possible new systems of distance transmission in the communications field. . . . Moreover, the new technologies include both hardware, the machinery itself, and software. . . . They have been defined as reflexive and interactive. Reflexive because they result from the application of human reasoning, which, in relating to them, can adapt the services they offer and adjust the software component as needed. Interactive because in some cases they can respond to the user and because, in contrast to conventional media, they do not represent a simple menu of media, but rather integrated systems in which media combine and interact" (2000: 12–13).
6. "Progress achieved by the end of the decade can be summarized in two statements:
 - 90 percent of Chilean students have a computer room with Internet connections in their school.
 - Computers have been incorporated into new study programmes and are part of the daily work of Chilean students.
 Implementation of the Red Enlaces has meant:
 - Training 20 teachers in each school for two years, i.e. approximately 70,000 teachers trained through a nationwide university-supported technical assistance network.
 - Distributing 38,000 computers to schools, as a function of their student population.

- Equipping the schools with educational software in support of study programmes.
 - Creation of a web site <<http://www.enlacs.cl>> offering a selection of educational content and services for teachers and students (Ministry of Education of Chile, 2000a: 7).
7. "The Red Enlaces was conceived as a 'seed' project to equip each school with sufficient computers so that teachers could evaluate the technology in the context of their school's teaching plans. The equipment was distributed as follows: for schools with up to 100 students, 3 computers, 1 printer; for schools with 100 to 300 students, 6 computers, 2 printers; for schools with more than 300 students, 9 computers, 2 printers" (Hepp, P. 1988: 130).
 8. The Red Enlaces project is financed by the World Bank.
 9. "From the perspective of an educational experience that will be relevant to the world in which Chile's children and youths will be living in their adult lives, computers and computer technology occupy a central place. They offer access to information and knowledge and make it possible to communicate and network with others, and it is this model of linkages that is the basis of how the modern world functions" (Arellano, 2000: 11).
 10. *Education plan for the Commune of Maule 2000.*
 11. The La Plaza (or Town Square) software was created by the Educational Computer Technology Institute of the Universidad de la Frontera. It has four spaces: the "kiosk", where children can post notices for all to read and which also contains stories and comic strips; the "cultural centre", listing various discussion groups; the "post office", which allows children to send and receive e-mail; and the "museum", which contains small databases with various kinds of information, from how to produce a school newspaper to the voice of Pablo Neruda reciting a poem.
 12. This view is confirmed by Victoria Uranga in her study *New technologies: information or communication? The Enlaces Project (Chile)*, in which she poses this question: How do children and teachers use Red Enlaces? "The great majority of network users participate by writing seriously in La Plaza (97 percent), which shows that they place great value on the new technologies and are ready to use them. This was confirmed by what the children said in the focus groups, where they demonstrated a high degree of motivation and interest in using them. A further discovery is that children and adults have opposing interests. What adults like about La Plaza is rejected by the children, and vice versa. This was clear in their preference for different sections. The children's favourite is the "literary corner", while for the adults it is "pedagogical innovation". Another example is the fact that the sections preferred by the teachers attract zero participation by the children. With respect to the topics that users write about, there are also enormous differences: for the children, the favourite topic is friendship (39.6 percent), while for adults the favourite topics are related to technical matters (45.1 percent). The explanation here is that the two age groups make different use of La Plaza. In 79.2 percent of cases, the children use it for fun, while 84.6 percent of adults use it in a utilitarian way. This is reinforced in

the connection between the messages from the network and the school environment. In the case of children, only 16.7 percent make this connection, while the figure for adults is 84.6 percent.”

13. Anyone who has been in school knows that no noise is allowed near the principal's office and that if they go there at all they must behave especially well.
14. Remember that, in general, each class has a specific “homeroom” and that it is the teachers who move from one classroom to another, depending on the subject to be taught.
15. There are of course technical reasons for the room's features (such as protecting the computers from dust and humidity), but this does not diminish the symbolic impact of its isolation.
16. This point of course embraces a series of variables, such as a teacher's real mastery of ICT, the kind of relationship he has with the class, his ability to organize a group of children in an atmosphere different from that of a conventional classroom, his methodological training, etc. But even so, a key element of judgement for understanding the structure of a computer class is the teacher's real willingness to integrate computers (and ICTs in general) as a classroom resource (with all the challenges this entails).
17. It would be unthinkable, for instance, to punish a child by barring him from a mathematics or science class.
18. Even the design of the software is more conducive to individual than to group work.
19. It was fairly common for some students to stay in front of the computer even after the recess bell had rung.
20. As noted earlier.
21. As well as the entire weight that the outside community can bring to bear from this perspective, something that we did not examine.

Bibliography

- Arellano, J. P. (Minister of Education) (2000) *Desafíos de la sociedad de la información en América Latina y Europa. Primer Foro de las Comunicaciones*. Santiago: Unicom and Ediciones LOM.
- Barbero, J. M. (2000) *Retos culturales: de la comunicación a la educación*. Nueva Sociedad, No. 169.
- Brunner, J. J. (2000) Interview in *Informe de Desarrollo Humano Chile 2000*. Chile: UNDP.
- Castells, M. (1997) *La era de la información. Economía, sociedad y cultura*. Vol. 1, *La sociedad red*. Madrid: Alianza.
- Castells, M. (1998) *La era de la información. Economía, sociedad y cultura*. Vol. 2, *El poder de la identidad*. Madrid: Alianza.
- Castells, M. (1998) *La era de la información. Economía, sociedad y cultura*. Vol. 3, *Fin de milenio*. Madrid: Alianza.

- Cebrián, J. L. (1998) *La red: cómo cambiarán nuestras vidas los nuevos medios de comunicación*. Madrid: Grupo Santillana.
- CEPAL (1998) *Panorama social de América Latina*. Santiago: ECLAC/UNICEF.
- Crovi, D. (2000) *Tecnología satelital para la enseñanza*. Mexico City: Instituto Latinoamericano de la Comunicación Educativa.
- Delors, J. (1996) *Learning: The treasure within*. Report to UNESCO from the International Commission on Education for the 21st Century. UNESCO.
- Gutiérrez, A. (1997) *Educación multimedia y nuevas tecnologías*. Madrid: Ediciones de la Torre.
- Hepp, P. (1998) Chilean experiences in computer education systems. In: C. de Moura Castro (ed.), *Education in the information age*. Washington, DC: Inter-American Development Bank.
- Hopenhayn, M. and E. Ottone (2000) *El gran eslabón*. Buenos Aires: Fondo de Cultura Económica.
- I. Municipalidad de Maule (2000) Department of Education. *Plan anual de educación 2000*.
- Martín-Barbero, J. (2000) Retos culturales: de la comunicación a la educación. *Nueva Sociedad*, No. 169.
- Ministry of Education of Chile (1999) *Internet, un nuevo recurso para la educación*. *Material de apoyo para profesores*. Santiago.
- Ministry of Education of Chile (2000a) *Enlaces. Red educacional*. Santiago.
- Ministry of Education of Chile (2000b) *Catálogo de software. Recursos de apoyo pedagógico*. Santiago.
- Ministry of Education of Chile (2000c) *Aplicaciones pedagógicas de la informática. Año 2000*. Santiago.
- Mexico City: Instituto Latinoamericano de la Comunicación Educativa.
- Morales, C. (2000) *Impacto de las nuevas tecnologías en la enseñanza y el aprendizaje*.
- Moura, C. (ed.) (1998) *Education in the information age*. Washington, DC: Inter-American Development Bank.
- Negroponte, N. (1995) *Ser digital*. Buenos Aires: Editorial Atlántida.
- Pérez, J. (2000) *Comunicación y educación en la sociedad de la información. Nuevos lenguajes y conciencia crítica*. Barcelona: Paidós.
- United Nations Development Program (UNDP) (1990–1998) *Human development indicator for Chile*.
- Uranga, V. (n.d.) *Nuevas tecnologías ¿de información o comunicación? Caso Proyecto Enlaces*. Chile. <<http://www.udp.cl/cem>>.
- Wolton, D. (2000) *Internet ¿y después? Una teoría crítica de los nuevos medios de comunicación*. Barcelona: Editorial Gedisa.