



TELEVISION FOR SECONDARY EDUCATION: EXPERIENCE OF MEXICO AND BRAZIL

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INTRODUCTION

Television has been used for educational purposes for many years and throughout the world. The oldest and most established form of educational television is the programming transmitted by major public broadcasting organizations, in the form of open-access programs serving specific groups, such as preschoolers, enrichment programs for school-age children, and adults who wish to learn new skills or gain new knowledge. The United Kingdom's Open University, mainly based on television, and *Sesame Street*, tailor-made versions of which are now broadcast with in many countries (see chapter 11), are two of the best-known and most successful uses of television for educational purposes.

On the other hand, television for direct instruction in primary and secondary education has had a much more problematic history. In the 1970s, it was thought that television might help to “leapfrog” over problems of low-quality education in developing countries by providing high-quality, centralized instruction with receivers located in classrooms, especially at the secondary level. With support from international agencies, secondary instructional programs based on TV were developed in Côte d'Ivoire and El Salvador. The results of in-school television in those two cases were disappointing. Per student costs were too high, teachers resisted centralized institutions, and the programs ended as soon as external financing was discontinued. On the other hand, one program—*Telesecundaria*—started in 1968 by the Mexican government without external financing, has had continued success and recently has grown rapidly. *Telesecundaria*, directed at rural children in isolated communities, illustrates some of the strengths of educational television. The case study provided here seeks to identify why *Telesecundaria* has been so successful while other secondary television programs have had limited impact or have failed.

Beginning in the 1960s, Brazil also experimented with educational television, beginning with in-school broadcasting in the states of Maranhão and Ceará. While these broadcasts

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have not had a significant impact, in the late 1970s, Roberto Marinho Foundation (a private foundation), supported by Brazil's biggest commercial network (Rede Globo), began *Telecurso*, directed at working young adults who were seeking primary or secondary school equivalency certificates. While Brazil's *Telecurso* has not been as well documented as *Telesecundaria*, a number of characteristics appear to be contributing to its success. These are described in the second case study.

MEXICO'S TELESECUNDARIA

Telesecundaria was created more than three decades ago to respond to the needs of rural Mexican communities where a general secondary school (grades 7-9) was not feasible, because there were too few students and it was difficult to attract teachers. The main characteristics of *Telesecundaria* have always been:

- using television to carry most of the teaching load, and
- using one teacher to cover all subjects, rather than the subject matter specialists used in general secondary schools.

This combination permits effective installation and implementation of these schools in sparsely settled rural areas that usually are inhabited by fewer than 2,500 people and have low primary completion and secondary enrollment rates; the complete curriculum can be covered with just three classrooms and three teachers.

Telesecundaria has experienced substantial growth since its inception in 1968. After a reform in 1993 and the introduction of satellite transmission, growth increased further, from approximately 512,700 students in 1993 to 817,200 by the end of the 1997-98 school year and an estimated 890,400 by the end of the 1998-99 school year. Current enrollment is estimated at 1,050,000 students in 14,000 schools. In 1998, enrollment was equivalent to 17.6% of the country's total enrollment in grades 7-9. Traditional general schools accounted for 53.6% of the enrollment, technical schools for 28.5%, and “workers' schools” for the remaining 0.3%. On average, the *Telesecundaria* schools have three teachers—one for every grade—and 22 students per grade. Students attend school 200 days a year, 30 hours a week. Table 10.1 summarizes the differences between the two systems as of 1997-98.

How the Program Works

Educational television has been a mainstay of the program throughout its years of operation. Yet, the mode of use of television has evolved and is already in its third generation. At the earlier stages, a regular teacher (“talking head”)

delivered lectures through a television set installed in classrooms. Books and workbooks were provided to follow the television program with exercises, revisions, applications, and formative evaluations. The second generation improved on this process and created programs with greater variety and more sophisticated production techniques. The third and current generation, which began in 1995, deploys a satellite to beam the program throughout the country and uses a wider range of delivery styles. *Telesecundaria* is now an integrated and comprehensive program providing a complete package of distance and in-person support to students and teachers. It puts teachers and students on the screen; brings context and practical uses of the concepts taught; uses images and available clips extensively to illustrate and help students; and enables schools to deliver the same secondary school curriculum offered in traditional schools.

The programs are aired from 8 a.m. to 2 p.m. and repeated from 2 p.m. to 8 p.m. to a second shift of students. At eight o'clock, the teachers in all of the *Telesecundaria* schools in Mexico turn on the TV. The students then watch 15 minutes of television. At the end of the TV session, the set is turned off, and the book, workbook, and teacher take over, following detailed instructions on what to do in the remaining 45 minutes. At first, the teacher asks whether students need a better understanding of the concepts just seen. Then, they might read aloud, apply what was taught in practical exercises, and participate in a brief evaluation of what has been learned. To finish, there is a review of the materials taught. At 9 a.m., another subject starts, following the same routine.

In contrast with traditional schools, where students use a separate text for each subject, *Telesecundaria* students use two: a book of basic concepts that provides explanations of the televised lessons and covers all core subjects, and a student learning guide used to engage students in group activities to apply lesson contents to practical situations. Teachers follow a guide that contains instructional strategies and learning objectives. The guide also helps teachers to overcome some of the limitations they may encounter because of unavailability of teaching materials or learning tools and provides strategies for adapting the lesson to local contexts and individual student needs.

Telesecundaria teachers and supervisors also receive inservice training through televised programs that are broadcast during the afternoons or on Saturdays. In addition, *Telesecundaria* is implementing a training program designed to update teachers on teaching techniques and materials. This program is estimated to have benefited thousands of teachers.

Cost-Effectiveness of *Telesecundaria*

Effectiveness

There are two ways to measure the effectiveness of *Telesecundaria*: by analyzing flow rates and through achievement testing. According to an Inter-American Development Bank (IDB) study, flow rates of *Telesecundaria* are slightly better than those of general secondary schools and significantly better than technical schools. At first sight, this is a counterintuitive finding. After all, this is a school catering to the poor, predominantly located in rural areas, where one would expect the worst performance in a

TABLE 10.1 • TELESECUNDARIA AND GENERAL MIDDLE SCHOOLS, 1997-98

	TELESECUNDARIA SCHOOLS	GENERAL MIDDLE SCHOOLS
TOTAL NUMBER OF SCHOOLS	13,054	8,410
Total number of students enrolled	817,200	2,640,400
Total number of teachers	38,698	166,940
Student/teacher ratio	21	16
Average number of teachers per school	2.9	19.9
Average number of classrooms per school	3.33	8.9
Average number of students per school	63	314
Student/class ratio	22	35
Number of school days	200	200
Total number of existing <i>Telesecundaria</i> program modules	6,500	N/A

SOURCES: Secretaría de Educación Pública (SEP), Informe de Labores 1997-98; Subsecretaría de Educación Básica, Unidad de *Telesecundaria*.

school's ability to prevent its students from dropping out. The explanation offered by *Telesecundaria* officials is that the strong involvement of local communities, use of single teachers who are much closer to students (instead of one teacher per discipline), and the quality of the delivery all encourage retention.

A recent study¹ found that achievement on standardized tests in *Telesecundaria* schools was lower than in regular schools. Differences were relatively small, but they were statistically significant. In the absence of control by socioeconomic origin of children—so far—the study could not answer the most important question about the “value-added” of *Telesecundaria* compared to that of conventional schools after controlling for socioeconomic status. On the other hand, an earlier, unpublished Secretaría de Educación Pública (SEP) study has shown that *Telesecundaria* students start significantly behind other students but catch up completely in math and cut the language deficit in half.²

Qualitative studies have suggested some advantages of *Telesecundaria*. For example, there are a number of *Telesecundaria* schools in urban areas that share with their rural counterparts the use of one teacher for all subjects; this teacher stays with the class through all subjects and uses both the video and written materials typical of the program intensively. The schools usually function in lower-middle-class neighborhoods of working-class parents with modest incomes and jobs in the formal sector. It has been reported that these parents prefer *Telesecundaria* schools because they have textbooks available, and they must keep pace with the broadcasts, which forces teachers to stay on course during the school year, without losing time, missing many classes, or becoming distracted in particular subjects. Teachers seem to perceive the one-teacher-for-all-subjects practice as an advantage instead of a handicap, because children may work better with one teacher who gets to know them better and is able to integrate knowledge for them.

Costs

Estimated unit recurrent costs in 1996 were US\$456 for general lower secondary schools and US\$535 for technical schools. (These figures do not include depreciation for school construction.) The recurrent costs of *Telesecundaria* were estimated at US\$471 per student. The fact that *Telesecundaria* is no more than 16% more expensive per student is surprising, since the student/class ratio in *Telesecundaria* is 23:1 rather than the average of 35:1 to 40:1 in urban secondary schools, and since the costs of television product material and transmission hardware are considerable.

The student-teacher ratio in a general lower secondary school is 16:1. This relatively low ratio is a result of the fact that there are 12 different disciplines in the Mexican lower secondary school curricula, each of which is taught by a different teacher. Clearly, unless the schools are very large, it is practically impossible to avoid having fewer teaching periods than is the norm. The result is that, while students have about 35 periods of class per week, the average teacher more than likely has 20-25 teaching periods, much lower than the expected 35. On the other hand, *Telesecundaria* schools operate with a single teacher (a “home teacher”) who deals with all disciplines of the corresponding three grades instead of with one teacher for each discipline. This means that the number of students in a class is about equal to the student-teacher ratio. In a few cases of very small communities, the same teacher deals simultaneously with more than one grade. Although the average number of students attending *Telesecundaria* schools is 63, some *Telesecundaria* schools are able to operate with just a few dozen students in total.

Most of the *Telesecundaria* buildings (85%) consist of three rooms, restrooms, a science lab, a small library, a playground, and a small parcel of land used for farming. The average per student cost of building three *Telesecundaria* classrooms is US\$627. In comparison, the average per student cost of constructing the nine classrooms in a general secondary school is estimated at US\$336; however, these figures do not include libraries, science laboratories, or workshops. Physical facilities costs for technical secondary schools are significantly higher than for *Telesecundaria* and general secondary schools.

The *Telesecundaria* Unit (*Unidad Telesecundaria*) includes teachers and communication and pedagogical experts and is in charge of the instructional model, curriculum content, teacher training, and text production. The Educational Unit (*Unidad de Televisión Educativa*) produces the TV programs, and the *Instituto Latinoamericano de la Comunicación Educativa* (ILCE) is responsible for their programming and for broadcasting them. On average, it takes approximately 20 days to produce a 15-minute module, which costs between US\$30,000 and US\$50,000 (1998-99 estimates). A program usually is kept in stock until significant changes in the subject content or pedagogy are made; they usually last for five to 10 years. Prorated over eight years, the annual cost of all programs per student is estimated at US\$27 (not including the unit costs of providing televisions, antennas, and other equipment to schools). Overall, *Telesecundaria*'s annualized investment cost per student for the 1998-99 school year is estimated at US\$113.

Each *Telesecundaria* book covers 50 days of schooling, so four books of each type are provided to each student to cover the 200 classes offered during the year. The students receive the books at no charge, but are expected to return them in good condition. There is a fee of US\$0.35 per book if a student does not return it or returns it in bad condition. The unit cost per book is US\$1.30, compared with \$8 in general secondary schools. Table 10.2 summarizes these cost estimates.

Cost-Effectiveness

Cost-effectiveness usually is measured by comparing two different treatments of the same or similar populations. In the case of *Telesecundaria*, there are two different populations, urban and rural children, so we need to examine cost-effectiveness on a hypothetical basis. While *Telesecundaria* schools are more expensive than urban secondary schools, a more appropriate comparison would be with the cost of setting up a general secondary school in a rural area. In principle, the cost would be prohibitive, since a school with 60 students would require 12 teachers, for a 5:1 student-teacher ratio, as well as a full laboratory and administrative personnel. This would mean running costs nearly four times those of *Telesecundaria*. Even after subtracting the unit costs of television programs, the cost still would be three times as great. In principle, *Telesecundaria* in urban areas would cost 16% more than regular schools. Urban *Telesecundaria* would be a good investment if there could be comparable increases in test scores and/or flow rates. An alternative in urban areas would be to increase the *Telesecundaria* student-teacher ratio to, say, 25:1, thereby reducing the cost difference

significantly. A final alternative would be to use the *Telesecundaria* approach only for math and science, where conventional teaching would be weakest, and where, in principle, achievement levels could be raised.

Why Is *Telesecundaria* a Success?

Telesecundaria goes against the grain of Latin American school tradition. It constitutes one of the very few programs in which the poor receive a better-conceived and better-managed program than do the urban middle- and upper-socioeconomic classes. *Telesecundaria* takes away more freedom from the teacher than is acceptable to many teachers, on the grounds of both pedagogical doctrine and ingrained habits of conventional schools. It replaces teachers' lectures, and it structures the remaining classroom time. The accompanying textbook, which is closely linked with each individual class, ensures that each minute of class time is used in a prescribed manner. The moment the teacher turns off the TV set (which is exactly the time other grades turn on theirs), he or she is supposed to follow a preordained routine. Administrators say that, with this routine, *Telesecundaria* students read a minimum of 14 pages each day, supposedly far more than regular students.

Super-teachers can do better with their own imagination and personal style. They can deploy their own bag of tricks and help students to rediscover the physical world and invent novel and creative ways to teach. But very few teachers have the skills, preparation, available time, or initiative to conduct such a class. The overwhelming majority—and an even larger proportion of the teachers who end up in rural

TABLE 10.2 • COMPARATIVE ANNUAL COSTS PER STUDENT IN US\$

ANNUALIZED INVESTMENT COSTS	TELESECUNDARIA 1996-97*	TELESECUNDARIA 1998-99 (EST.)**	GENERAL SCHOOLS 1996-97***	TECHNICAL SCHOOLS 1996-7
Television-related	57.8	50.1	N/A	N/A
Start-up & other facilities	65.9	63.1	20.9	N/A
RECURRENT COSTS	430.9	413.4	456.2	534.5
TOTAL COSTS	554.6	526.6	477.1	N/A

SOURCES: *Telesecundaria* 1996-97 figures from Calderoni, J. (1998). *Telesecundaria: Using TV to Bring Education to Rural Mexico. Education and Technology Notes Series*, 3 (2), p. 9; *Telesecundaria* 1998-99 figures and general and technical schools figures based on Secretaria de Educación Pública (SEP) (1998). *Informe de Labores, 1997-98*. Mexico: SEP.

* Costs are estimated in 1997 US\$.

**Based on Calderoni, with enrollment estimates for 1998-99 provided by SEP as follows: enrollment increases from 767,700 in 1996-97 to 890,400 in 1998-99 and average school size increases from 60 to 63.

***Annualized investment cost assumes an average class size of 35.

schools—have neither the talent nor the dedication to be super-teachers.

The circumstances that make this delivery model possible have much to do with its structure. The first secret is these schools did not have to be transformed from conventional ones to those that use *Telesecundaria*. Schools are hard to change, but *Telesecundaria* schools were created that way, not adapted. Second, teachers are recruited differently from those who teach at general schools. While 60% of *Telesecundaria* teachers are fully qualified to teach in urban schools, 40% are not trained as teachers but are university graduates who are recruited. Those wishing to become *Telesecundaria* teachers need to be explicitly interested in the process, have a community orientation, and be willing to live in rural areas.³ In principle, this would lead to more committed professionals (although teacher turnover in *Telesecundaria* is still very high). Finally, being rural and isolated from the conventional habits of general schools makes it easier to use methods that impose high levels of control.

Current Problems and Issues

Telesecundaria is not without its management problems. For example, although *Telesecundaria* is not designed for one-teacher schools—where one teacher teaches several grades simultaneously—as many as 25% of schools in the program are one-teacher schools, thus calling into question the adaptation of the program to a key feature of many rural schools.⁴ In 1997-98, 17% of schools had either malfunctioning reception equipment or no equipment at all. However, little difference in learning seems to have been found between these schools and the rest, suggesting that TV broadcasts are relatively less important than printed materials, which were distributed efficiently to all of the schools. Teacher absenteeism has been found to be an important determinant of student learning in *Telesecundaria* schools. Teachers who live in the community were less likely to skip class and more likely to spend long hours with children. Apparently, rapid growth, fueled by *Telesecundaria's* advantage as a low-cost alternative well suited to rural environments, may be overwhelming pedagogic and technical support capabilities.⁵

In 2000, ILCE launched an extensive maintenance and repair effort seeking to update and set up all of the antennas and reception equipment in all the schools that participate in the program. Repair and maintenance teams in each of the 30 states were trained to perform this work on a continuing basis. ILCE has concluded that about half the states have done a very good job in this regard, but infrastructure is performing at less than full capacity in the

other half of the jurisdictions, because state governments have failed to live up to their responsibilities.

Finally, *Telesecundaria* suffers from rigidity because of scheduling. An Internet-based system would allow teachers and students to view programs at different times and to repeat them. Mexico is upgrading its satellite capabilities and expects to be able to provide data transmission to schools very soon, but full Internet connectivity is still technically difficult, expensive, and requires high maintenance.

BRAZIL'S TELECURSO 2000

History of Telecurso

With its large area and low school attendance, Brazil has been experimenting with radio and television education for more than three decades. Two states in the Northeast (Ceará and Maranhão) created secondary schools through television in the 1970s. Then, a bit later, another player—the private Globo Television Network—stepped onto the stage and completely changed the relationship between secondary schools and television. The world's fourth-largest network, Globo had ample experience in production, particularly excelling in soap operas that found huge markets on every continent. Twenty years ago, the Roberto Marinho Foundation (FRM), a grant-making and educational foundation financed by Globo, created the first *Telecurso*, adding a number of important innovations beyond what had been offered in the Northeast. The first of these was very expensive production values, and, second, it used actors instead of teachers. This program was a major success, in terms of number of listeners and sale of accompanying textbooks, and was aired for more than 15 years. It was never formally evaluated, however.

In contrast to Mexico's *Telesecundaria*, *Telecurso* targeted young adults who left primary or secondary schools before graduation. Brazil always had open examinations for primary (eight years) and secondary (11 years) certificates (*exame supletivo*) for young adults who are beyond a certain age. Since these were open examinations, students could prepare on their own or enroll in preparatory courses. *Telecurso* took the place of these preparatory courses, allowing students to follow the curricula by watching television. A number of institutions received supervision from FRM to create classrooms where, under the supervision of a teacher (improvised or certified), students could watch the programs/classes and use the complementary written materials.

In the early 1990s, with the rapid transformation and globalization of the Brazilian economy, industrialists began having problems with the low schooling levels of their workers. In many cases, they sponsored employees taking

preparatory courses leading to the government examinations. However, the quality of these courses was mediocre at best. The Federation of Industries of the State of São Paulo then struck a deal with FRM to prepare a new *Telecurso* for its workers. For this joint venture, the industrialists contributed US\$30 million to produce a new program, and Globo offered to broadcast it free of charge. Globo also donated the equivalent of US\$60 million worth of commercial TV time to promote the new program, called *Telecurso 2000*.

Content and Approach

Telecurso 2000 is a condensed version of a basic curriculum for secondary education, to be provided through a combination of direct television, videotaped classroom sessions, and books. Thus, both television sets and videocassette equipment are used. In addition, an optional curriculum is offered that focuses on teaching basic mechanical skills (the vocational course on mechanics).

Initial discussions on development of a curriculum for the three courses to be offered by *Telecurso 2000* (Level One, Level Two, and the Vocational Course on Mechanics) were led by education specialists who wished to define basic skills in the context of a postindustrial society. With that beginning, the following guiding principles for the educational program of *Telecurso 2000* were developed:

- > *Job-oriented education.* The purpose is to educate individuals for a job: to educate workers to enable them to relate in a meaningful way to life in society, bearing in mind the fundamental role of education in ensuring worker productivity.
- > *Development of basic skills.* In a society marked by scientific and technological progress, it is not enough simply to learn to read, write, count, and solve simple arithmetic and geometry problems. People also must learn how to organize their thoughts, solve problems involving numbers, interpret what they read and

TABLE 10.3 • COMPOSITION AND RESOURCES OF *TELECURSO 2000*

COURSE	DISCIPLINE	TV SESSIONS		RESOURCE		HOURS OF STUDY REQUIRED
		N	HOURS	VIDEO	BOOKS	
Level 1	Math	80	20.0	10	4	1 hour 45 minutes per class session
	Portuguese	90	22.5	12	4	
	Brazilian History	40	10.0	5	2	
	Geography	50	12.5	7	2	
	Science	70	17.5	9	3	
	English	30	7.5	4	1	
TOTAL	6	360	90.0	47	16	630 HOURS
Level 2	Math	70	17.5	9	3	1 hour 45 minutes per class session
	Portuguese	80	20.0	10	3	
	Chemistry	50	12.5	7	2	
	Physics	50	12.5	7	2	
	English	40	10.0	5	2	
	Biology	50	12.5	2		
	Brazilian History	80	20.0	10	4	
	Gen. Geography	40	10.0	5	2	
	TOTAL	8	460	15.0	60	
Technical Course in Mechanics	17 modules including a variety of subjects	360	90.0	53	19	1 hour 45 minutes per class session = 630 hours

apply it in different situations, read and express themselves in another language, understand instruction manuals, develop basic know-how in economics and quality control to be able to produce more and better products and eliminate waste, and hold discussions by making use of cognitive and social skills.

- *Citizenship education.* The nature of the new relationship among science, technology, and society makes it necessary for workers in all categories and at all levels to broaden the scope of their learning, so they can play an active role in the political and cultural life of their countries. Production-oriented skills must go hand-in-hand with civic responsibility.
- *Contextualization.* The most advanced teaching theories stress the importance of applying what is learned in class to situations that arise in daily life. In other words, life provides the material for the teaching of specific skills.

These four principles—job-oriented education, development of basic skills, citizenship education, and contextualization—underlie all the disciplines taught through *Telecurso 2000*. Teams of professors associated with the country's major universities, all of whom were required to have ample experience in curriculum development for basic education, were selected to develop the program content for each discipline. This requirement was particularly important given the highly specialized nature of adult education and the need to adjust the language used accordingly. Textbooks had to be easy to read without having content more suitable for children or adolescents.

Table 10.3 shows the content of the curricula for the three courses offered by *Telecurso 2000*, as well as the number of TV classrooms and books used in each discipline.

The new program employs only professional (soap opera) actors, thus making the production even more expensive than the first *Telecurso*. There are other differences as well. Since it is aimed at young adults, it does not put classrooms, teachers, or students on the screen. All scenes take place in factories, streets, homes, offices, newspaper stands, and travel agencies. Real-life problems precede presentation of theories and explanations. *Telecurso 2000* also borrows heavily from the pace of commercial TV, moving very fast and including plenty of humor, very much like regular TV programs Brazilians usually watch. Although the program occasionally may sacrifice depth, it seldom sacrifices rhythm.

The forms of delivery also evolved. The programs are broadcast nationwide between six and seven in the morning, a most inconvenient time. Then they are rebroadcast

through cable and satellite at more convenient hours. Public television stations also broadcast them during the day. In many cases, these programs are recorded in the school or by the viewer and later played at a more convenient time. In contrast to *Telesecundaria*, such “video-tape education” is common, occurring not necessarily by design, but by the users’ choice. A telephone survey indicated that few watch the programs on TV to prepare for the examination, confirming the hypothesis that those who want to take the examinations work from tapes in classrooms with teacher support.

Users of *Telecurso 2000*

It is difficult to identify all who use *Telecurso*. Suffice it to say that 5.2 million accompanying texts were sold or distributed between 1995 and 1999. *Telesalas* (classrooms with television sets) have been established in enterprises, and a support system for those working with students has been established. At present, more than 200,000 students attend classes in factories, schools, churches, offices, prisons, ships, and buses.

An unknown—but probably large—number of people watch television and study on their own. But even more surprising, another large and uncounted crowd watches the programs regularly or occasionally, apparently because they are interesting and entertaining. A recent telephone poll indicated that 5% of the respondents—closely representative of the Brazilian population—had watched *Telecurso 2000* during the previous week (this is close to 7 million people). The interviews revealed that most of the audience has had some higher education, and most respondents say they watch the programs because they like education programs.

An additional development is the spontaneous and increased use of the programs in regular schools, something that had started already with the old *Telecurso*. The data are unreliable, but it seems that in 1999, more than 200,000 students attended classes where *Telecurso* was the predominant mode of delivery. A number of states are now developing explicit programs to incorporate portions of *Telecurso* into regular secondary schools, especially in rural areas, that are similar to *Telesecundaria*.

The Economics of *Telecurso*: Big Is Beautiful

Like all forms of education using technology, television requires extensive initial investment. There can be significant savings in recurrent costs, because using less expensive teachers can still result in success. However, the up-front fixed costs are quite high.

To have reasonable costs per student, many students are needed to share the fixed costs. Assuming a cost of US\$30

million for preparing *Telecurso 2000*, if the program were to stop today, figures for book sales indicate that several million students participated in *Telecurso* somewhat seriously. If 3 million used the program, this would amount to US\$10 per student. This is a very modest price per student for a set of 1,200 15-minute lectures. Costs per book are approximately US\$4 (the primary school program uses a single book, and the secondary program uses more). Hence, the social cost per student working on his or her own is US\$14.

Classroom modalities change this cost equation completely. Since the program requires one teacher per classroom, the costs begin to approach those of conventional education. Estimates per student for classes offered in factories and in well-respected philanthropic institutions are around US\$400. This is no more than the average cost of public education but less than the cost in the more affluent states where most of these classes take place. In other words, once we put a teacher in each classroom, the costs of *Telecurso* are approximately equivalent to those of regular schools, without the support of technology and good books. At the same time, at current scales of operation, the imputed costs of the US\$30 million initial investment almost disappear inside the much larger recurring cost of paying teachers or instructors. There is also a tendency to hire regular teachers for the *telesalas*, so, in terms of cost, the *Telecurso* is similar to a regular school, because the television component has negligible weight. But there are unexplored ways of reducing costs, even with a teacher in the classroom. For example, the number of classroom hours for night schools, attended by 60% of all secondary school students, could be reduced by, say, half, requiring students to watch the program on their own for half the time and in teleclassrooms for the rest of the time, where teachers or monitors can help with problems.

How Effective Is *Telecurso*?

Telecurso 2000 is an ambitious initiative, mobilizing hundreds of people at the production, distribution, and instructor-training levels. Does it pay? Are the results commensurate with the costs?

Contrary to the experience of *Telesecundaria*, reliable research studies on effectiveness are not yet available. Costs are easy to compute, and the delivery and its organization are clear enough, but good measurements of outputs are lacking. And, when they are available, they lack comparability with other groups (regular students attending four hours per day of day or night school or students preparing for *supletivo* by other means). Research is underway to answer these fundamental questions. In any event, *Telecurso* has proved its value through already providing opportunities

that previously were unavailable to young adults, by opening a new perspective on pedagogy and educational materials. As in the case of *Telesecundaria*, being outside the formal secondary system permits *Telecurso* to be highly innovative.

CONCLUSION

These two case studies lead to some very powerful conclusions. In mid-size and large countries, television at the secondary level works: it can be used to reach underprivileged groups, either rural children or young adults who have left schools. It is likely that the learning described above is equal to or greater than at conventional schools. Costs are lower than the equivalent requirements (e.g., setting up full schools in rural areas or fully operational, four-hour-long “night schools” in urban areas). The very rigidity of the television format may be to its advantage, especially in the Mexican case, since it requires students and teachers to be punctual and to keep up with the pace of the program. While the future suggests that television will be replaced at least partially by the Internet, TV is available now, and does not have to wait for the more sophisticated environment of fully two-way Internet and data connections.

It must be pointed out that any centrally prepared program, be it television or Internet, requires a large, up-front investment. Only mid-size and large countries can achieve the economies of scale needed to make the program feasible. On the other hand, Mexico has made its programs available free of charge to several Central American countries, which are using *Telesecundaria* in their own schools, thus reducing the fixed costs per student enormously. There is anecdotal evidence that these programs are effective in spite of cultural differences among countries. It must be noted, however, that any country considering setting up a new distance education system will have to consider the role and costs of the Internet and its relationship to television. Finally, setting up an alternative distance secondary education system requires convincing and/or bypassing the traditional education establishment.

ENDNOTES

- ¹ Santos de Real, A. (2001). Oportunidades educativas en telesecundaria y factores que las condicionan. *Revista latinoamericana de estudios educativos*, XXXI (3).
- ² Secretaría de Educación Pública (SEP). (1998). *Informe de Labores: 1997-98*. Mexico: SEP.
- ³ Calderoni, J. (1998). *Telesecundaria: Using TV to Bring Education to Rural Mexico*. *Education and Technology Notes Series*, 3 (2). Washington: World Bank.
- ⁴ Santos de Real, A., & Cantillo, E.C. (2001). Operación de la *Telesecundaria* en zonas rurales marginaadas de Mexico. *Revista latinoamericana de estudios educativos*, XXXI (2).
- ⁵ Santos de Real, op cit.