

Mexico's Telesecundaria: Bringing Education by Television to Rural Areas

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The use of TV is the central component of Telesecundaria, a program that has been operating for over 30 years and benefits over 900,000 seven to nine graders per year. This figure represents approximately 17 percent of total enrollments in grades seven to nine. Telesecundaria is especially designed to reach rural students living in isolated, low-populated areas where general secondary schools would not be feasible. There is data that suggests that the "value added" of learning as well as retention rates in Telesecundaria schools are higher than that of regular secondary or technical schools.

What is Telesecundaria?

Telesecundaria was created over three decades ago to respond to the needs of rural Mexican communities where a general secondary school (grades 7 to 9) was not feasible, since the number of students was very low and attracting teachers was difficult. The main characteristics of Telesecundaria have always been:

- ? the use of television to carry most of the teaching load; and
- ? the utilization of one teacher covering all subjects, rather than the subject matter specialists used in general secondary schools.

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

Telesecundaria has experienced a very substantial growth rate since its inception in 1968. After a reform in 1993 and the introduction of satellite transmission, growth has further increased, 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 1998-1999 school year. In 1968, when the program began operating, there were 304 Telesecundaria schools. Ten years ago there were 7,289 schools in the system and by the end of the 1997-98

**Table 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	3.3	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 Telesecundaria program modules	6,500	N/A

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

¹ The authors are grateful to Jose Calderoni for his article (1998), and to Carola Alvarez, Marcelo Cabrol, and Natanuel Carro Bello for their valuable inputs.

school year there were 13,054 schools and 38,698 teachers. (See Table 1.) These numbers are expected to grow, by the end of the 1998-99 school year, to 14,101 schools and 42,615 teachers. Current enrollment is equivalent to 16.6 percent of total enrollment in grades 7 to 9. Traditional general schools account for 53.6 percent of the enrollment, technical schools for 28.5 percent and “workers’ schools” for the remaining 1.3 percent. Telesecundaria is projected to enroll around 1,100,000 students by the year 2004.

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 1 summarizes the main characteristics of Telesecundaria and general secondary schools.

How the Program Works

Educational television has always 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 its 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 the process and created programs with greater variety and more sophisticated production techniques. The third and present generation, which began in 1995, deploys a satellite to beam the program throughout the country and uses a wider range of styles of delivery. 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 and extensively uses images and available clips to illustrate and help students. It enables schools to deliver the same secondary school curriculum offered in traditional schools.

The Scenario

The programs are aired from 8:00 a.m. to 2:00 p.m. and repeated from 2:00 p.m. to 8:00 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 to understand better 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 to traditional schools where students use a separate text for each subject, Telesecundaria students use two types of books: 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 assists teachers in overcoming some of the limitations they may encounter due to the 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 in-service 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 38,698 teachers in 1998.

Costs

Table 2 summarizes the unit cost breakdown of Telesecundaria, based on data provided by Calderoni (Calderoni 1998), compared with estimates of costs of general secondary schools. Some elements of these

unit costs appear to be lower for 1998-99, due to an increase in enrollment and an apparent class size increase from 60 to 63 students. This results in the reduction of television-related annual costs per student, such as module production, start up and other facilities costs and recurrent costs.

Calderoni did not compare Telesecundaria's costs with the costs of normal urban secondary schools. However, data provided by Secretaría de Educación Pública (SEP) show that the unit recurrent costs in 1996 were \$456 for general secondary schools and \$535 for technical schools. These figures do not include depreciation for school construction. In this same estimate the recurrent cost of Telesecundaria is estimated at \$471 per student. The fact that Telesecundaria is no more than 16 percent more expensive per student is surprising since the student/class ratio in Telesecundaria is 23:1 rather than the average 35 to 40:1 in urban secondary schools, and since the costs of television product material as well as the costs of transmission hardware are considerable.

**Table 2:
Comparative Annual Costs per Student of Telesecundaria and General Middle Schools (1997, US\$)**

	Telesecundaria 1996-97	Telesecundaria 1998-99 (est.)*	General Schools 1996-97**	Technical Schools 1996-7
<i>Annualized Investment Costs</i>				
Television- related	57.8	50.1	N/A	N/A
Start-up & Other Facilities	65.9	63.1	20.9	N/A
<i>Recurrent Costs</i>	430.9	413.4	456.2	534.5
<i>Total Costs</i>	554.6	526.6	477.1	N/A

Sources: Telesecundaria 1996-97 figures, p.9 Calderoni (1998). Telesecundaria 1998-99 figures and general and technical schools figures based on SEP (1998).

*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 a 35:1 student/class ratio.

Teacher and Administration Costs: The student-teacher ratio in a general middle school is 16:1. This relatively low ratio is a result of the fact that there are twelve different disciplines in the Mexican 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 a lower number of 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 periods. On the other hand, Telesecundaria schools operate with one single teacher (a "home teacher") dealing with all disciplines of the corresponding three grades instead of having 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 simultaneously deals 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.

Cost of Physical Facilities: Most of the Telesecundaria buildings (85 percent) consist of three rooms, rest-rooms, a science lab, a small library, a playground and a small piece of land used for farming purposes. The average per student cost of building three Telesecundaria classrooms is \$627. In comparison, the average per student cost of constructing the nine classrooms in a general secondary school is estimated at \$336. But these figures do not include libraries, science laboratories, or workshops. The costs for physical facilities of technical secondary schools are significantly higher than both Telesecundaria and general secondary schools.

Cost of Televised Programs: The Telesecundaria Unit (Unidad Telesecundaria) includes teachers, and communication and pedagogical experts and is in charge of the instructional model, curriculum contents, 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 broadcasting. On average, it takes approximately 20 days to produce a 15-minute module that costs between \$30,000 to \$50,000. The average cost of programs per school is \$2,134. A program is usually kept in stock until significant changes in the subject content or pedagogy are made and they usually last for five to ten years. Pro-rated over eight years, the yearly cost of programs per student is estimated at \$27. This figure does not include the unit costs of provision of televisions, antennas, and other equipment to schools. Telesecundaria's annualized investment cost per student for the 1998-99 school year is estimated at \$113.

Cost of Books: 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 the books in good condition. There is a fee of \$0.35 per book if a student does not return the book or returns it in bad condition. The unit cost per book is \$1.30 compared to \$8.00 in general secondary schools.

Cost of General Secondary Schools in Rural Areas: While Telesecundaria schools are more expensive than urban secondary schools, a more appropriate comparison would be with the cost of a general secondary school in a rural area. In principle, the cost would be prohibitive, since a school of 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 that of Telesecundaria. Even after subtracting the unit costs of television programs, the cost would still be three times as great.

Impact of Telesecundaria

Effectiveness

There are two ways to measure effectiveness of Telesecundaria, through analysis of flow rates and through achievement testing. An analysis of flow rates appears in Table 3.

Flow rates in Telesecundaria are slightly better than those of general secondary schools, and significantly better than technical schools. At first sight, this is a counter-intuitive finding. After all, this is a school catering to the poor, predominantly located in rural areas, where we would expect the worst performance in the ability of the school to prevent its students from dropping out. The explanation offered by Telesecundaria officials is that there is strong involvement of local communities, the use of single teachers who are much closer to students, (instead of one teacher per discipline) and the quality of the delivery are factors which encourage retention.

More importantly, data will shortly be available for the first time comparing achievement. The SEP's Dirección General de Evaluación gave tests to the first, second, and third year of Telesecundaria, general middle schools, and technical middle schools, covering the primary school curriculum, designed to see

Table 3. Efficiency Indicators

	Telesecundaria Schools	General Secondary Schools	Technical Schools
Percentage of students completing 9 th grade	79.4	78.8	56.5
Average number of student- year per graduate	3.5	3.6	4.9

Source: IDB estimates (1998).

how these students improve their mastery of a curriculum that they should have already known. The results showed that Telesecundaria students start significantly behind other students but catch up completely in math and cut the deficit in half in language. It strongly suggests that the “value added” of learning is higher in Telesecundaria than in general schools. Interestingly it also confirms previous research around the world that the school is more important for the teaching of mathematics than it is for the teaching of language.

Cost-Effectiveness

Cost-effectiveness is usually measured comparing two different treatments of the same or similar populations. In the case of Telesecundaria, there are two different populations, urban and rural children, and therefore we need to examine cost-effectiveness on a hypothetical basis. One approach would be to see if conventional secondary schools could be instituted in rural areas. The result, as discussed above, would be a cost of 3 to 4 times the cost of Telesecundaria, as well as lower student achievement. So the cost-effectiveness ratio from this point of view is infinite.

Another approach would be to consider establishing Telesecundaria in urban areas. This is being undertaken on a pilot basis in a few states. Here, we could expect increases in student scores of 5 to 10 percent, as well as a 1 percent increase in flow rates. However, without any changes, the costs would be 16 percent higher. An alternative would be to consider modestly increasing the Telesecundaria student/teacher ratio, say to 25:1, therefore reducing significantly the cost difference. Another approach might be to use Telesecundaria in only selected cases, such as math and science, where conventional teaching would be weakest.

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 urban middle and upper socioeconomic classes.

Why is this an exception to a pattern of high endogeneity between schools and their students? Telesecundaria goes against the grain of general schools. It takes away more degrees of freedom from the teacher than is acceptable to pedagogues both on grounds of pedagogical doctrine or ingrained habits of conventional schools. It replaces the lectures of the teachers and structures the remaining classroom time. The book, which is closely linked with each individual class, ensures that each minute of class time is used according to what it prescribes. The moment the teacher turns off the TV set (which is exactly the time other grades turn on theirs), the teacher is supposed to follow a pre-ordained routine. Administrators indicate that 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 probe students to rediscover the physical world and invent novel and creative ways to teach. But very few teachers have these skills, the preparation, the available time and the initiative to conduct such a class. The overwhelming majority—and an even larger proportion of the teachers who end up in rural schools—are unable to deploy such talent and with such dedication.

The circumstances that make this model possible have much to do with its structure. The first secret is these schools did not have to be transformed, from a conventional into a Telesecundaria. Schools are hard to change. Telesecundaria schools started that way, created from zero, not adapted. The second is that teachers are recruited differently. While 60 percent are fully qualified to teach in urban schools, 40 percent are not trained as teachers but are instead university graduates who are directly recruited. Those wishing to become Telesecundaria teachers, according to Calderoni, need to be explicitly interested in the process, have a community orientation, and be willing to live in rural areas. By definition these schools have more committed professionals.

Being rural and isolated from the conventional habits of general schools makes easier the task of using methods which impose high levels of control.

Of course, Telesecundaria is not perfect and there is anecdotal evidence of problems. For example, it is reported that a number of schools and classrooms lack TV programs, often because of theft and sometimes because of malfunctioning antennas, making it very difficult to implement the program. One of the authors visited a school that had operated without TVs for three years. Furthermore, sometimes the books do not get out to rural areas in time. Communities are supposed to replenish materials but sometimes they don't have the funds or the desire to do so. Also, there is a need to motivate teachers to remain in schools, since they usually like to leave these rural areas as soon as possible. Work is needed to ensure that the curriculum increasingly focuses on developing critical thinking. There is discussion of a new course in personal ethics and health that would replace the old civics course.

Finally, Telesecundaria by definition suffers from rigidity because of scheduling. Experiments are already underway with an Internet based system that would allow teachers and students to view programs at different times and to view program repeats. More than likely, the long-run future of Telesecundaria would be web-based to give it far more flexibility. In the meantime, it remains a well-run, television-based program cost-effectively serving vulnerable rural populations.

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