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HONDURAS: LOADING TECHNOLOGIES IN ISOLATED COMMUNITIES— LESSONS TO LEARN

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SOLAR VILLAGES LIGHTING A PATH

San Ramón, a village of about 840 people located in the hills above Choluteca (Honduras), is positive proof of the power of new technologies to leapfrog over traditional barriers to development. San Ramón, with support from UNESCO and Consejo Hondureño de Ciencia y Tecnologia (COHCIT) and others, has become the world's first solar-powered community hooked up to the Internet. Above and beyond the potential of the Internet and other less sophisticated technologies (e.g., radio and television) to expand horizons beyond San Ramón and Choluteca, the results are interesting for a number of reasons.

First, the fact that solar energy has been the power source of choice says volumes about the status of San Ramón vis-à-vis public policy. To say that San Ramón is an isolated community may be an understatement. Access to it is difficult: although it is located a mere 24 kilometers from a main thoroughfare, the journey up to San Ramón requires a good 45 minutes in a 4x4 all-terrain vehicle—and a strong stomach. There is no road to speak of. Rather, a path of stones, ravines, and otherwise tough conditions leads slowly upward. It has been this lack of accessibility, coupled with a relatively low number of inhabitants that has made the government less than anxious to extend the distribution network from Choluteca to San Ramón—at least in the short to medium term. Per unit costs and accessibility considerations meant that if power were to come to the village, it would have to do so by means other than the "traditional" methods at the disposal of the state and public policy. Among these, solar energy figured prominently.

Second, San Ramón, like many remote villages throughout the country, suffers from low levels of education, productivity, and, in general, quality of life. In fact, it was rated zero (on a scale of one to 10), according to its *cacique*, or leader, Don Jeronimo. Given its remoteness, the village could neither maintain teachers for its school (primary level only) nor benefit in a timely manner from a number of other public services—e.g., vaccinations. Aspirations were low as well. Indeed, as one villager joked, "The moon seemed closer than Tegucigalpa [the capital]. The moon we could see. Tegucigalpa, no."

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With the support of UNESCO and COHCIT, San Ramón started exploring the potential of alternative energy sources as a way to trek out of its darkness and isolation. In February 1999, and in the wake of Hurricane Mitch, solar panels were installed strategically throughout the village. This process culminated on July 8, 1999, when the President of Honduras, Carlos Roberto Flores, inaugurated San Ramón as the first solar energy village of Latin America. Since then, the results and experiences of San Ramón have caught the attention of many, within Honduras and beyond.

The energy generated through the solar panels powers a variety of community services:

- five streetlights;
- six classrooms, each of which has its own electrical outlets for a TV/VCR, a computer, and other pieces of equipment;
- a community center, also with outlets for fans, computers, TVs, etc.;
- an innovative classroom equipped with 11 computers, a TV, video and tape recorder, digital cameras, scanners, printers, etc.;
- a health clinic, including a heating and cooling system for water and medicine and vaccine storage; and
- lighting in the village's church.

As of October 2000, San Ramón has gone global, wired to the Internet through each of the 11 computers in its innovative classroom. These changes, literally, have given power to the people. On a scale of one to 10, villagers claim the quality of life has improved from a zero to an eight.

Governed by a local development council comprised of representatives from throughout the village, San Ramón has had resources allocated, decisions made, and activities prioritized. The use of new technologies to improve the quality of education has received considerable attention, both from village elders and across Honduran society.

The success of San Ramón has prompted COHCIT and other agencies and donors to identify other villages where similar interventions could bring similar benefits. To date, two additional villages, San Francisco and La Hicaca, have been endowed with solar panels and a package of lights, hardware, and software similar to San Ramón's. San Francisco is a municipality, not a village per se. Located approximately 25 kilometers from the city of Edandique in the Department of Lempira, one of the country's poorest, it has a population of more than 900 inhabitants, and based on this size, operates both a primary and a secondary school. La Hicaca is about a third of the size of San Francisco. It is located outside the

Pico Bonito National Park, an area renowned for its Emerald hummingbirds (an endangered species).[1] San Francisco's educational facility remains limited to a primary school.

TECHNOLOGY OVERLOAD?

Technology has considerable potential for improving the quality of education. The options are many and run the gamut from using distance education modalities to increase access to students and provide training for teachers, to using materials (e.g., CD-ROMs, videos) to supplement official curricula. Using relatively advanced technologies compared to the general technological and educational environment may be considered by some as a technology "overload." For these villages, the bottom line may well come down to a dire choice: an overload of technology or the status quo of poverty, isolation, and ignorance.

Lower-End Technologies; Higher-End Impact on Learning

By creating a necessary condition—electricity—the solar villages are in a position to empower themselves. Of immediate access are programs of distance education. Radio and television may fall relatively low on the scale of technological sophistication and costs, but they have a proven track record in improving the access and quality of education. And, in areas where there is little or no supply of education at the seventh to ninth grade level, delivery via radio or television—or tape or video—is preferable to no delivery at all.

Of those distance education programs currently in use, two figure prominently. Both are formal programs of the Ministry of Education, and both receive support from external donors, particularly USAID. *EDUCATODOS* is an interactive radio program (also available on cassette tape) targeted to youth 13 years of age and older and adults without access to schools, the majority of whom live in rural areas (see chapter 9). Implementation parallels the country's decentralization process. Each of the country's 18 departments has a paid coordinator. Under their coordination and direction, about 178 "promoters" (paid and trained) travel to communities and organize groups to disseminate the program and its benefits and to arrange for creation of an *EDUCATODOS* center. There are more than 2,800 centers (in homes, maquilas, schools, nongovernmental organizations [NGOs], and the three solar villages) throughout the country and an estimated 370,810 learners. Voluntary facilitators (numbering 4,000+ throughout the country) staff each center to orient and direct learning activities.

It should be noted that *EDUCATODOS* recently finished work on curricula for grades 7-9 (grades 1-6 curricula were completed in 2000). These curricula are aligned with the competencies and skills outlined in national curricula for use in "regular" schools. *EDUCATODOS* curricula differ, however, in that they integrate the basic skills and competencies (math, communications, social science, science, and technology) into five crosscutting themes: population, environment, health, national identity, and citizenship and democracy. The Ministry of Education is debating the possibility of adopting the *EDUCATODOS* curricula as the official curricula for grades 7-9. In the absence of the resources to deliver face-to-face education at the basic grade 1-9 level, *EDUCATODOS* appears to provide a sound alternative. (In about 110 Basic Education Centers,[2] *EDUCATODOS* remains the only alternative for instruction in grades 7-9.)

Telebasica is a distance education program delivered via television. Modeled after Mexico's *Telesecundaria* (see chapter 10), the program operates along the same general guidelines as *EDUCATODOS*, albeit with differences in staff and infrastructure. Whereas *EDUCATODOS* works with voluntary facilitators in centers "created" or "established" within existing structures (e.g., houses, schools, maquilas), Telebasica uses teachers and operates within the Basic Education Centers, the majority of which are in semiurban areas, and covers grades 7-9. In Centers lacking teaching staff with proper credentials, Telebasica has allowed education to be delivered at a level unlikely to be achieved with uncertified teachers. Thus, it shares many of the same advantages of *EDUCATODOS* in terms of expanding access and ensuring quality. Although planned as an alternative in each of the three solar villages, none has access yet to the program.

Higher-End Technologies

There are many reasons for installing computers and access to the Internet in schools. Through interactive modules and access to the "information superhighway," such technologies are likely to be able to help leapfrog beyond obstacles and limitations left untackled by radio and television. Teachers can be trained in situ, thus increasing the number of days of teaching and reducing expenditures in travel and lodging. For students, technology displays a real potential to increase efficiency and quality, reducing dropout and repetition, increasing completion rates, and compensating for the inputs (e.g., books, materials, labs) teachers and schools may lack. Such technologies also give new meaning and substance to "lifelong learning," opening new possibilities for learning to populations outside the formal education system, and to motor small and micro enterprises.

Yet, there are few reasons for introducing these technologies in schools if the link to learning is not explicit. If technology—particularly more sophisticated and high end—truly is to be used as a tool to improve the quality of education, then a strategy, or at least a broadly agreed-upon pedagogic model, must be in place first.

THE LEARNING CURVE

Sequencing Matters

It is fundamental to start not with the technology but with educational objectives and problems instead, and then seek the most cost-effective integrated teaching/learning system, including a variety of technologies that need not be the most advanced, to meet the objectives and solve the problems. To be successful inside the school, technology-based reforms require strong support from the top, acceptance and understanding by teachers, integration into the overall system of instruction, and phased introduction. Absent a clear idea of which learning goals are most amenable to technology and which technologies are most appropriate or relevant to these goals and the teaching-learning context within which they are pursued, there is a real danger that technology will only make a bad situation worse. Technology does not make teachers into good educators or students into good learners. It can add value to the teaching-learning process, however, if there is a consensus on what constitutes good teaching and what methods help students learn best.

Start with Education, Not Technology

This perhaps has been the clearest lesson coming from the solar villages: No technical department or unit responsible for coordinating and introducing the use of technology in education has existed within either the Ministry of Education or COHCIT. The result has been that almost all initiatives, including the early phases of the solar villages and other projects supported by international cooperation, have started with technology, not education. Thus, in the absence of any strategy or other type of guideline, the potential of technology to improve education has yet to be maximized.

The use of an educational software called Microworlds (Micromundos) is particularly telling in this regard. Microworlds was implemented as part of a larger package of technologies that included CD-ROMs of, for example, the Honduran constitution and other symbols of nationalism and Microsoft Office. Microworlds was not chosen on its educational merits per se; its alignment with national curricula is loose at best. Yet, in the absence of a strategy or model for introducing technology into the teaching-learning process, Microworlds was adopted and implemented without much discussion. Indeed, the fact that it arrived as a donation from an international agency all but put the program beyond the scrutiny of policy experts or other interested parties within the Ministry of Education or elsewhere. That said, there has been value in Microworlds: it has familiarized children with computers and helped to overcome the novelty of computers in classrooms.

Yet, the program has failed to meet some expectations. For one, the merits of its underlying highly structured approach remain debated; in instances where the quality of teaching staff is inadequate and student performance is lacking, a more preferable option may be to reduce the degree of freedom in the learning process by leading students, as well as teachers, through more structured activities. And, whereas there is much to be said for the idea that the first step in introducing technology into the classroom is to familiarize all users with hardware and peripherals—a task Microworlds fulfills well—it seems that such familiarization needs be contextualized, linked, and made relevant to other tasks. This seems to be particularly true for teachers, few of whom appeared to understand the value and connection of Microworlds vis-à-vis the rest of the curricula (although they did receive some training on the use of Microworlds). Moreover, Microworlds was not user-friendly, and the students in San Ramón and San Francisco grew bored with it.

The “Honduranization” Process

Recognizing the limitations of Microworlds, Carlos Velásquez of COHCIT analyzed other options. After an intensive search and discover process, the software program Clic, developed in Spain, was adapted to national curricula for grades 4-8 and piloted in San Ramón. Although there is still no framework or strategy in place to guide the introduction of technology into the teaching-learning process (it is under preparation), such efforts seem to be a big step forward toward applying the official curricula developed by the Ministry of Education.

In short, an innovative process of “Honduranization” has taken place. Curricula were obtained from the Ministry of Education and code books from *Xarxa Telemática Educativa de Catalunya*, which created Clic, and from the administrators of the Website where it is posted. From here, codes were adapted to align the software with the specifics of the Honduran curricula. The result has been a menu of activities running the gamut of competencies specified in the national curricula—from English, to Spanish, to math and science—purposely structured to complement lessons and other learning activities.

Clic has been installed in all three of the solar villages, and all teachers have been trained. But there has been an interesting twist: the version currently operating in each of the solar villages is a product of review and redesign by teachers in San Ramón, all of whom participated in efforts to make the software more compatible with classroom and student needs and more relevant to the conditions under which they teach. These revised programs will complement curricula through grade 6. A series of activities specifically targeted to adult education, also available in the public domain, will be installed as well. Again, each of these activities has been aligned with official curricula for formal and nonformal education, including adult education. Bottom line: teach with computers, not from computers.

Plans are underway to extend activities to the secondary level. In the Department of Lempira (one of the poorest in the country, with education levels below the national average), the groundwork has been laid to complement curricula in the technical institutes in much the same way as fortified, Honduranized versions of Clic have been used to complement curricula in primary schools. Curricula in these institutes are—as their name suggests—technical in nature, running the gamut of subjects from agronomy and ecology, to forest and soil management, to cartography. More "traditional" subjects, such as history, also are taught. Although there are six institutes in and around San Francisco that could benefit from a Clic-based dose of quality enhancement, each faces severe equipment and resource limitations. In the short term, then, implementation is likely to be limited to only one institute: the Jacobo Orellana Institute in San Francisco, which, given its proximity to the primary school, has access to the equipment installed through the efforts of COHCIT.

No Need to Reinvent the Wheel

This "Honduranization" of existing software merits closer examination. The costs are comparatively low, and the benefits are likely to be significant. Students show interest in the program, and teachers maintain they are impressed by the extent to which such activities sink in and facilitate the learning process. Yet, if this or any similar effort were to be taken to scale, other actors—particularly the Ministry of Education and the National Pedagogic University—would have to be involved. Use of Clic remains limited to the three solar villages established through the technical assistance of COHCIT and international donors, and engineered by a single person who had an idea, reprogrammed software in the public domain, adapted it to national curricula, and trained teachers accordingly—no small feat. But the time has come to develop a low-cost, realistic option with broad participation from ministries and communities that shows considerable promise for improving the quality of education, even in the most remote and isolated of schools.

WHAT ELSE TECHNOLOGY DOES FOR EDUCATION

In the solar villages, solar energy and other technologies have served to leverage more from the state. San Ramón and La Hicaca have inaugurated the third cycle of "basic education,"[3] thus expanding the supply of education from six to nine years; preprimary cycles also have been added. Future plans include creating the diversified cycle (grades 10-12). Technology also gives new meaning and substance to "lifelong learning," opening new possibilities for learning to populations outside the formal education system, and may energize small and micro enterprises.

Although no hard data are available, there is sufficient justification for what may appear to be a "technology overload" in villages such as San Ramón, San Francisco, and La Hicaca. Technology—including TVs, VCRs, and computers—increase the "attractiveness" of school. This may be subjective, but it is no minor consideration. In a country plagued by low education attainment, where repetition and dropout run rampant, any "incentive" that keeps children in school and channels their energies toward learning-related activities is likely to go a long way in reducing overall costs. Witness the volume of resources governments throughout the world lose due to repetition. (By one estimate, the total resources the Inter-American Development Bank has invested in education over the last four decades pales in comparison with the amount lost each year throughout Latin America and the Caribbean due to repetition.) Seen in this light, investments made in machines, software, and training are likely to be recovered in a relatively short time.

In much the same vein, and especially in communities as isolated and remote as Honduras's solar villages, technology increases the chances that teachers actually will show up for class and remain in the service of the village for years to come. Again, this is no small consideration. Students across Honduras often receive less than 100 hours a year of class time (compared to 1,200 hours a year in industrialized countries), given high rates of absenteeism among teachers and other factors, including strikes; time on task tends to be even less in rural areas where supervision is lacking and multigrade schools are the norm. Thus, a formidable challenge is making better use of time actually spent in the classroom.

WHAT TECHNOLOGY CANNOT DO

Technology offers neither a magic wand for improving the quality of education nor a means for shortcutting the educational process. Technology can help inform, but it cannot "knowledge." Knowledge results from using a series of intellectual and analytical tools to interpret information and make it relevant to a given situation. Considerable care needs to be taken in introducing technology into the educational process by recognizing the difference between information and knowledge. If technology is used and programmed as an add-on that requires extra time and effort from teachers, and not as an integrated component of the learning process itself, neither attitudes nor learning are likely to change. On the contrary, such technology may trivialize education.

If the solar villages are to take full advantage of access to technology, the state, despite all obstacles (including infrastructure), will have to have a larger presence in the community (this process has begun already). Sustainability will have to be explored in details, as will issues related to cost recovery. To wit, local development councils in each of the villages already have mandated user fees for all activities not strictly related to the community. For example, villagers wish to use the Internet to communicate with relatives beyond village limits, and Hondurans must pay to do so. Coordination issues also will take on added importance. COHCIT will have to expand its supervision and, if access and coverage of public policies such as education and health is to be increased, collaboration between the local levels and respective Secretariats at the state, regional, and municipal levels will have to be deepened. The foundation for such collaboration has been laid and, if the experience to date is any indication of what the future holds, expectations should be kept high. It is in this regard that the solar villages' experience may have the most lasting effects: serving as a catalyst for mobilizing communities around and in the name of the common good.

ENDNOTES

[1] Two additional solar villages are currently under preparation: Las Trojas (with a population of just over 190) and La Montaña (population of 240), both of which are in the Department of Francisco Morazán (in which Tegucigalpa is also located) and have a primary school in operation. Las Trojas serves as a gateway to the La Tigre National Park; La Montaña is located 30 minutes outside of Tegucigalpa. These villages already have access to telecommunications.

[2] Initiated in 1999, the Basic Education Centers offer an innovative approach to expanding access in rural areas. These centers offer grades 1-9 under the same roof. By doing so, they allow students in rural areas to have access to the full cycle of "basic" education, likely to be made obligatory in the near future (see endnote 3).

[3] Only six years of education are obligatory in Honduras. A law currently before the Congress would extend the obligatory cycle through ninth grade, converting primary education into "basic education." This same law also would create one year of obligatory preprimary education.