Lessons from Costa Rica

By Arlene Borthwick and Irina Lobo

PHOTOS BY ARLENE BORTHWICK

Acknowledgements

The authors wish to thank National-Louis University for providing grant funding and Daniella Interiano Zecca of Bytes of Learning, Inc., for serving as their guide in Costa Rica.

Many travelers to Costa Rica come for the amazing diversity of geologic features, ecosystems, and plant and animal life. There are active volcanoes, cloud forests, beaches on both the Atlantic and Pacific, red-eyed tree frogs, and hummingbirds. Nature was not the reason for our trip, however. A small grant had provided us the opportunity to try out new multimedia authoring software in our fourth grade classes at Baker Demonstration School in Illinois and to visit Costa Rica, where the software was developed in cooperation with K–12 Costa Rican teachers.

Costa Rica Well Positioned for Change

We sought out Costa Rica because of one specific product innovation—CREATE Together, a multimedia authoring software being used in several Costa Rican schools. But we found technological innovation in so many aspects of the schools. From the focus on teacher training and the choice of software to community involvement, Costa Ricans are ahead of the curve. Each year, countrywide programs train 7,500 educators—lab assistants, advisers, teachers, and principals—in the use of technology tools. By the late 1990s, the technology touched one out of every two primary students. This is no minor feat when you consider that much of the population is in rural areas and much of the land is covered by rainforests. How did this small Central American country achieve such pervasive technology integration?

Costa Rica is a young country. In a country of four million people, almost 30% are children. This large group of students less than 15 years old is in the education system. They drive trends in Costa Rican society, from fashion to innovation. They are big stakeholders, by number and skill, in the changes taking place throughout the country.

Our visit took us to several schools as well as to the Foundation Omar Dengo (FOD) and the Ministry of Public Education (MEP), whose individual and collaborative efforts have been instrumental in introducing computers in education. Already, the results of their programs that began in 1988 can be seen. Costa Rica has one of the highest concentrations of computers in the Americas and is regarded as a Central American pioneer in technology development.

FOD Programs

During our visit to the FOD, we met with Eduardo Monge. Responsible for international relations at FOD, Monge explained that the organization was formed in 1987 by a group of Costa Rican intellectuals and entrepreneurs. It is named for lawyer Omar Dengo, who later became a teacher and eventually the director of the Teachers College of Costa Rica. The FOD has worked with business and university partners, including MIT and Harvard, on a variety of projects including K–9 and adult education, summer camps, and an online magazine for K–9 students. We were most interested in learning more about their school-based technology activities.

Working with the MEP and local communities, FOD began introducing digital technologies in 1988, through the National Program of

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Educational Informatics. This collaborative program has provided computer access as well as teacher training and technical support for more than 750 public schools across the country. Communities must submit an application to FOD demonstrating their commitment and ability to provide an air-conditioned classroom, wiring, furniture, and a security system. Key aspects of the program include FOD-trained advisers who observe and support school activities, professional development for lab teachers, and technical support for hardware and software issues.

The Foundation Program in Action

One morning, we exited our hotel in San José and drove approximately 15 miles southeast to Cartago to visit Escuela San Ignacio de Loyola School. We received a warm reception from students, their computer teacher Isabel Ortiz, and Maritza Campos, the program adviser to the school. We observed fourth grade students using CREATE Together and sixth graders using MicroWorlds. Isabel and Maritza explained that students work in production teams of four students where interaction leads to knowledge construction and creative problem solving during project development. In addition to teaching students to use program tools to accomplish their goals, teachers plan additional activities to help students work effectively as a team. As students consulted concept maps providing direction for their projects, Isabel mentioned that changes made in the concept maps over the life of the project would serve as one form of assessment. In using CREATE Together, students are introduced to the concept of attributes (first describing the attributes of their classmates) and then to cause-and-effect logic in working with programmable objects. The software fostered a constructivist learning environment within the computer lab where both cognitive and social learning were addressed.

A second school visit took us to a middle school, Colegio de Purral, on the northeast side of San José, where computer teacher Giselle Rodríguez described student work as a representation of student learning rather than a presentation of content to be learned. Like the student activities at San Ignacio de Loyola, projects addressed curricular topics, including social issues. For example, teachers and students at three FOD schools had worked together on a medicinal plants project; they grew plants, took their own pictures of the plants, and collected information from a variety of sources, including interviews.

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MEP Programs

The new Project of Education Innovation, led by Minister of Education, Licenciado Manuel Antonio Bolaños, focuses on transforming education through democratic and constructive uses of technology in the teaching-learning process. We visited with Luis Carlos Rodríguez and Fressie Aguilar, members of the MEP implementation team to talk about the initiative, which began in 2004 in 60 secondary schools. Two years of planning went into the program targeting rural, underprivileged regions of the country. The hope is to replicate the approach in schools throughout the country.

Supported with funding from an international development bank, the ministry provides three key infrastructure elements:

1. hardware and technology support for schools
2. teacher training
3. software that matches their pedagogical philosophy.

To involve major stakeholders in the decision-making process, each participating school has an innovation committee made up of school personnel, ministry teacher advisers, and community members. In its innovation committee, each school decides how to use equipment provided by the ministry such as laptops, interactive whiteboards, computer labs, Web cameras, and DVD/VHS players with television monitors. Like the primary and middle schools we visited, students use software designed for constructivist learning, such as The Geometer's Sketchpad, CREATE Together, and MicroWorlds. The teachers use Intel's Teach to the Future program for training on uses of productivity software. The teaching staff, including both core teachers and specialists, explores integration across all areas of the curriculum. The community is an important stakeholder, sharing in the maintenance and use of the facilities. Working with other partners, the ministry brings additional expertise to the schools: the University of Costa Rica for English teaching, National University of Costa Rica for science instruction, and Intel Teach to the Future for teacher training.

The ministry is trying a bottom-up strategy for success in rural communities. This approach seeks to empower secondary school students through development of their technology skills and opportunities to employ creative problem solving, critical analysis, and collaborative work. Further, as they mature, these students will be able to

influence other community members to leverage resources for more technology use in schools. The teachers, on the other hand, often start their careers in rural areas and move to urban areas after a few years, taking their skills and training with them.

Results of the Programs

What is the effect of these programs? The combined efforts of the FOD and the MEP have led to widespread dissemination of computers in schools across the country. The FOD notes increases in student attendance, teacher and student self-esteem, student interest in technology, and infrastructure (computers and peripherals). As the ministry proceeds with its newly adopted program, it hopes that evaluation measures will demonstrate program links to increased student achievement and to reduced dropout rates in rural communities.

What We Learned

We came to Costa Rica with a limited goal—observing the use of the CREATE Together software and meeting its creator, Dr. Ulises Agüero. But our exploration of a constructivist software package led us to the story of technology integration in education across the country. The people we met valued computers as a force for change in learning, from teacher centered to student centered, from direct instruction to constructivism. The government and other partners shared a vision with educators, supporting that vision with funding. FOD Director Clotilde Fonseca is a champion for Costa Rican style of technology integration. A professor at the University of Costa Rica, she holds a master's degree from Harvard and has published widely in the area of educational computing. Her articles make for provocative reading and address the digital divide in surprising ways. Fonseca outlines the anticipated long-term technological and socioeconomic outcomes of a program "focusing on very young children first and for cognitive rather than computer literacy or computer-assisted instruction purposes. … and giving priority to underprivileged rural and urban school populations." She describes a nonlinear approach, one that uses technology to accelerate change through stimulation of creative, higher-level thinking rather than starting with drill and practice of basic skills. This is exactly what we observed in the Costa Rican schools we visited.

Our trip gave us a firsthand view of successful dissemination and creative use of instructional technology across Costa Rica. Their model shows evidence of narrowing the digital divide while emphasizing the use of computers to develop teamwork and higher-order thinking skills. Their progress demonstrates that innovation need not be a linear process. As educators explore best uses of educational technology and ways to minimize educational inequalities, we may find models and wisdom in the experiences of countries such as Costa Rica. Most of all, we'll find that we have much to learn from visiting with others, whether their classrooms are around the world or around the corner!

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