

**Making Technology Work
for Education in Latin America
and the Caribbean**

**Notes on Issues,
Policies and Innovations**

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These notes are being published with the sole objective of contributing to the debate on a topic of importance to the region and to elicit comments and suggestions from interested parties. They have not gone through the Department's peer review process or undergone consideration by the SDS Management Team. As such, it does not represent the official position of the Inter-American Development Bank. Please direct your comments to: sds/edu@iadb.org

These notes have previously appeared in other IDB informal publications as well as in TechKnowlogia (www.techknowlogia.org) and international on-line journal providing information on technologies used for knowledge and learning.

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Summary

This report consists of a compilation of selected short notes written, for the most part by staff and consultants of the Education Unit of the Sustainable Development Department, on various topics related to the use of technology in education and which are relevant for Latin America.¹ They cover a wide range of issues, activities and innovations taking place in Latin America and elsewhere. Some of these innovations have been well documented, while others are at the starting phases of implementation but seem to promise positive outcomes.

This document is intended to be used as a resource for practitioners and planners interested in keeping themselves informed on the numerous ways that technology can lead to improvements in education at all levels. The notes include technological alternatives that can be used at the primary, secondary, vocational, higher education and continuing education levels, as well as for teacher training and education administration. They are divided into the following categories described below: Technology and Education Policy and Management, Distance Learning, Teacher Training and Tools, and Computers in Schools.

Technology and Education Policy and Management

Technology, if used appropriately, can greatly improve the learning process, school management and even implementation of education projects. It can compensate for the limitations of conventional teaching methods and systems, and with its use, education can be expanded to those who would otherwise have little or no education access at all. Satellites, TV, radios, simulations, animation and word processors are some examples of innovations that, in some way or another, have changed the rules of the game of teaching and learning practices. Notes in this section discuss how policy makers can make wise selections based on informed decisions, in order to minimize risks and maximize results.

The notes *Instructional Technology: Then and Now* and *Education in the Information Age* address the overall issues of choosing appropriate and cost-effective instructional technologies taking into account costs, local needs, product quality and available human and financial resources. The note on *Technology and Institutional Change* describes the challenge of adapting learning institutions to the new technological era to ensure that computers are indeed used for education purposes. The note on *Technology and the Management of Learning* describes ways in which computers can be used to increase accountability in education by measuring school and teacher performance. The note *Honduras: Smoothing Out the Project Cycle* provides an example of how Honduras is using technology to increase the quality and transparency of a project's implementation and management process.

As the Internet is increasingly being used as a learning tool in those schools that do have computers, finding cost-effective ways of getting connected to the Internet is key. *High Speed Internet Access* compares and discusses the different alternatives available and suggests some options for developing countries. The note *Honduras: Solar Energy Bridges the Digital Divide* specifically describes an innovative project in a small and remote town where solar energy is used to work with computers and the Internet for education purposes.

Finally, with so much information on education data posted on line, and learning and teaching software, knowing where to look for quality material has become a challenge in itself. A note on *Sources of Objective Assessment of Web and Multimedia Learning Materials in Science and Math* and another on *Using Technology to Manage Education Reform* provide some web sites—such as the Eisenhower National Clearinghouse (ENC), the Educational Resources Information Center (ERIC) and the Red Latinoameri-

¹ These notes have previously appeared in IDB informal publications as well as in the on-line journal *Techknowlogia* which can be found at www.techknowlogia.org

cana de Información y Documentación en Educación (REDUC) sites—that can be of significant help and guidance to students, teachers, parents and policy planners alike.

Distance Learning

The use of media, such as radio and TV, has been proven to be effective in reaching students living in poor, rural and isolated areas. In addition, new projects underway in the region use Internet and computer-based technology to reach new clientele, especially in higher education, and to provide more “developmentally appropriate” multimedia instructional material.

The note on *Multi-grade schools and Technology* describes cost-effective technology alternatives to enhance multi-grade learning, including the Internet and one-way, two-way, low power and digital radio. A concrete example of technology use for primary education is provided in the note on *Venezuela’s Interactive Mathematics for Basic Education*, a program that is transmitted through radio and reaches over a million first, second and third graders in Venezuela.

The notes *Telesecundaria: Bringing Education by Television to Rural Areas*, *Telecurso 2000: The Flexible Solution for Secondary School Equivalency* and *Information Technology for the Masses: Can it be TV?* suggest that television continues to be a powerful technology which can be used for education purposes in the region. Mexico’s Telesecundaria serves over 900,000 seventh, eighth and ninth graders every year. Brazil’s Telecurso 2000 offers a flexible solution to young adults who want to study for open examinations and obtain secondary school certificates. Over seven million people watch the lessons on a regular basis for entertainment or informal learning, and over half a million are formally enrolled in courses taught in *teleaulas*. Finally, *Globo Rural and Pequenas Empresas e Grandes Negócios*, two Brazilian TV programs broadcast by Globo Enterprises, aim to increase the productivity levels of Brazilian farmers and micro-entrepreneurs. Together, they have an audience of over 6 million spectators.

The note on the *International Virtual Education Network for the Enhancement of Science and Mathematics Learning in Latin America (IVEN)* describes a joint project of the IDB, Argentina, Brazil, Colombia and Venezuela that aims to develop multi-media mathematics and science teaching materials for upper secondary schools. The project combines conceptions of effective learning with appropriate computer, video and communications technologies that will enable students to improve their academic skills in different countries throughout the region.

The notes on Mexico’s *ITESM Virtual University*, Peru’s *TECSUP Virtu@l*, and the U.S.’s *Francis Tuttle Vocational School* show how virtual universities and vocational training institutions are taking advantage of satellites, the Internet, CD-ROMs and other technologies to offer distance education to their students. ITESM Virtual University delivers courses via satellite and Internet to over 1,400 reception sites and learning centers, including 116 in other Latin American countries. TECSUP currently has 1,600 technical workers enrolled and its students are able to study at their own pace from home, Internet kiosks, work or from the university campus. Oklahoma’s Francis Tuttle school has gone as far as replacing live lectures by delivering videotaped lectures, competency-based written materials and Internet courses to over 30,000 students.

According to *Adult Education in the Americas*, in some countries many people are receiving distance informal lifelong learning through the Internet, by watching channels that focus on subjects ranging from history documents to home cooking and repair techniques, and using “do it yourself” manuals, CD-ROMs and other forms of educational software. The note on *Lifelong Learning for the Third Age* explores the issues related to education, technology, and the aging of society. Distance learning does not always have to be delivered by using sophisticated and relatively expensive technology. The note on the *Lowly Correspondence Courses for the Masses* reminds the reader of a cost-effective alternative of delivering education by mail that has been widely used, and continues to provide skills training, especially to low-income

clienteles. *Why I Love (Good) Training Videos* describes relatively cheap informal practical training provided through videotapes.

Teacher Training and Tools

The note *Teacher Training: What Works and What Doesn't* identifies six major trends in teacher training innovations and mentions ways in which technology can increase the quality of training activities, including the delivery of training over the Internet, for those teachers who need to update and sharpen their skills. As described in *Costa Rica: Teacher Training for Education Technology*, Costa Rica offers an example of a “computers in school” program in which teacher training for education technology is a key component. Through this program, technology helps teachers perform their job in a more efficient manner. So far, over 15,000 teachers and school administrators have been trained. The *Images of Teaching: The TIMSS Video Taping Project* note shows how systemic observation captured on video can be used as a tool to compare the effectiveness of teaching methods across countries. As *Scripted Learning Needs Teachers Who Follow the Script* points out, directed learning, by which content is delivered directly by the medium, has proven to be particularly effective in distance education programs like Acelera Brasil and Mexico’s Telesecundaria, in which teachers are not always able to receive proper training.

Computers in Schools

Currently, many of the governments in the region are seeking to introduce computers into formal schooling. This process is not an easy task by any means. It is very important to take into account past positive and negative experiences. The note *Computers in Schools: 10 Points to Avoid Past Errors* may help the decision maker to avoid mistakes that can retard rather than enhance the learning process. *Costa Rica: Are Computers in School Cost-Effective?* describes the country’s ‘Computers in Secondary School’ program, and examines its long-term economic implications. As instructional technologies continue to evolve at a high speed, academic institutions are trying hard to adapt and keep up. As a result, new and increased uses for computers and new teaching methods are being put to practice. The note on *Skills Training: Simulations are at Home* discusses innovative ways that students are using computers to recreate concrete situations in a “virtual reality” setting.

TOPIC MATRIX BY LEVEL OF EDUCATION

	Technology and Education Policy Management	Distance Learning	Teacher Training & Tools	Computers in School
Primary	1. Sources of Objective Assessment of Web and Multi-Media Learning Materials in Science and Mathematics	1. Venezuela's Interactive Mathematics for Basic Education 2. Multi-grade Schools and Technology		
Secondary		1. Telecurso 2000: The Flexible Solution for Secondary School Equivalency 2. Mexico's Telesecundaria: Bringing Education by TV to Rural Areas 3. International Virtual Education Network for the Enhancement of Science and Math Learning in LAC	1. Images of Teaching: The TIMSS Video Taping Project	1. Costa Rica: Are Computers in School Cost-Effective?
Voc-Tech		1. The Lowly Correspondence Courses for the Masses 2. IT for the Masses: Can it be TV? 3. Why I Love (Good) Training Videos 4. What, No Lectures? The Francis Tuttle Vocational School		1. Skills Training: Where Simulations are at Home

	Technology and Education Policy Management	Distance Learning	Teacher Training & Tools	Computers in School
Higher		1. Technological Institute of Monterrey's Virtual University 2. Higher Education and Enterprise Training in LAC: TECSUP's Virtual Campus		
Adult		1. Adult Education in the Americas: The Victory of Spontaneous Action 2. Lifelong Learning for the Third Age		
Multiple Levels	1. Education in the Information Age: Promises and Frustrations 2. Technology and Institutional Change: Why Some Educational Institutions Use Technology and Others Don't 3. Instructional Training: Then and Now 4. Technology and The Management of Learning: The New Accountability 5. Honduras: Smoothing Out the Project Cycle 6. Using Technology to Manage Education Information: ERIC and REDUC 7. High Speed Internet Access: The Future for the World and the Implications for Developing Countries 8. Honduras: The Solar Energy Bridges the Digital Gap		1. Scripted Learning Needs Teachers Who Follow the Script 2. Costa Rica: Teacher Training for Education Technology 3. Teacher Training: What Works and What Doesn't: Innovations and Trends in LAC	1. Computers in Schools: 10 Points to Avoid Past Errors