

CONSORTIAL SUPPORT FOR DIGITAL LIBRARY INITIATIVES AND INFORMATION TECHNOLOGY MANPOWER DEVELOPMENT IN LATIN AMERICA

University of New Mexico, UNM Libraries, and the Ibero-American Science &
Technology Education Consortium, Albuquerque, NM, USA

Abstract: The work of the Ibero-American Science & Technology Education Consortium (ISTEC) in developing information technology and digital library manpower will be discussed, focusing on the organizational arrangements and processes that proved most effective in bringing researchers, engineers, computer scientists and librarians together to act on this vision. The Library Linkages (LibLink) Initiative of ISTEC will be analyzed in detail, especially the best practices to ensure regional cooperation in information delivery and in sharing expertise in digital initiatives. Brief descriptions of other IT projects and partnerships in the region will be provided.

Overview of the Ibero-American Science & Technology Education Consortium (ISTEC)

ISTEC is a non-profit organization comprised of educational, research, and industrial institutions throughout the Americas and the Iberian Peninsula. The Consortium was established in September 1990, to foster scientific, engineering, and technology education, joint international research and development efforts among its members, and to provide a cost-effective vehicle for the application of technology.

The idea evolved out of a needs-analysis study conducted by the University of New Mexico Electrical and Computer Engineering Department in Latin America. This study revealed the following obstacles to science and technology information (S&T) sharing and information technology (IT) developments in the region:

- Lack of current information for planning and developing technology
- Lack of expertise in the use of information
- Lack of international cooperation in developing the critical mass needed for projects and joint efforts
- Lack of interaction (lack of confidence and sometimes lack of information) between universities and industries

This situation has been improving steadily but at the time it was clear that a unifying organization was needed to bring S&T workers together across borders; national, social and economic. With start-up funding from the State of New Mexico and selected IT companies, especially Nortel and Motorola, the ISTEC board created four initiatives to address the above obstacles:

1. The *ACE Initiative* champions continuing engineering and computer sciences education projects. The most important goals are to upgrade human resources and curriculum development through on-site training, distance learning, and non-traditional exchange programs. This involves not only on-site training, but web-based education, video courses, satellite delivery, and "sandwich" graduate programs. The latter brings

graduate students from Ibero-America together with experts from ISTECS member organizations to ensure excellence. Examples of outcomes so far include: 6 satellite courses to 250 institutions with ATEI (an Iberian continuing education television society), numerous short courses for Motorola, and over 200 scientists trained in DIP with support from the Organization of American States (OAS). Over 30,000 ftp grabs of the web-based DIP course have been documented. "Sandwich" programs have been conducted with PhD students in Spain, Brazil, Argentina, Colombia, Uruguay, Ecuador, Costa Rica and Mexico. These programs bring doctoral students from Latin America to the University of New Mexico to obtain additional experience in areas not offered at their own organizations, or alternately, professors from selected US universities spend a month on site at a Latin American university and works intensively with a cluster of students from the region.

2. The *Research and Development (R&D) Initiative* focusses on the development and enhancement of laboratory infrastructure at member organizations. The major goal is the design and installation of modular, flexible, and expandable laboratory facilities for education, training, and R&D with links to the productive/private sector. Successful implementations include the deployment of Motorola microprocessors (680XX), micro-controllers (68HC11) and DSPs (56XXX, 96000) as well as equipment, software and expertise from companies such as Nortel Networks, Fluke, and VeriBest. To date 29 Motorola facilities are in place with planned expansion to 58. Approximately 20,000 users have been trained since 1991. There are 9 facilities with laboratory equipment from Nortel Networks, 2 with Fluke and 1 with VeriBest. The latter are planning to expand to 12 facilities.

3. The *Los Libertadores Initiative* champions networks of excellence in the region. The main goal is to network such Centers of Excellence equipped with the latest telecommunications and computer technology to provide real-time access to a worldwide system of expertise and knowledge. This requires partnerships among industries and governments to create a robust Ibero-American academic and R&D Internet backbone. Towards this goal technical assistance in telecommunications and S&T legislation has been provided to Ecuador and Bolivia. Participation in regional policy conferences such as the IADB's *Informatics 2000 Conference* is a part of ISTECS strategy. We also assist national, regional and international organizations such as the OAS and UNESCO to develop IT&T strategies for Ibero-America, but in particular for Latin America.

4. The *Library Linkages Initiative (LibLINK)* is ISTECS information sharing, knowledge management, and connectivity project. The next section will focus on this initiative and its efforts in developing digital library projects in Latin America. Suffice to say that the digital libraries component of LibLINK is currently the centerpiece of all the initiatives as it brings people and projects together through sharing information freely and rapidly.

Overview of the *Library Linkages (LibLINK)* project of ISTECS

The major goal of *LibLINK* is to design and implement innovative, international Science and Technology (S&T) information sharing and management services. Thus the Internet and connectivity is of primary importance. The seed funding for *LibLINK* was provided by Nortel Networks and it is currently supported by membership dues.

The annual compound growth rate of the Rapid Document Delivery (RDD) project was around 200% between 1995 and 1999. Since 2000 this is evening out due to successful regional sharing of local resources. Over 27 libraries in 19 countries are connected in real-time and documents are provided using the *Ariel*® software from the Research Libraries Group. The *Centennial Science & Engineering Library* (CSEL) at the University of New Mexico, USA, is the headquarters for this initiative and provides document delivery resources free from local collections. Expanded services are also provided at cost from the *Canada Institute for Science and Technology Information* (CISTI). The RDD project, although the most popular service is a foundation for the more important digital library initiatives which were started in 1998. The projects within *LibLINK* can be categorized as follows:

- Connecting libraries for Information Transfer. This is accomplished through opening Science and Technology library collections - especially Latin American collections - for scholars through regional networks created to compliment the *LibLINK* document delivery services. Currently these include *LigDoc* in Brazil, *PrEBi* in Argentina, *REBIDIMEX* in Mexico, and most recently, cooperative groups of libraries in Colombia and Venezuela.
- Training librarians and researchers in the efficient and cost-effective search and retrieval of information, document delivery software and processes, and digital library concepts. *LibLINK* volunteers plan and carry out workshops and mini-conferences to facilitate the above. Funding generally come from successful grants from organizations such as the US National Science Foundation (NSF) and other national science councils such as CONACyT in Mexico, and regional organizations such as the Organization of American States (OAS) and UNESCO.
- Continually expanding services to more S&T libraries, especially in Latin American countries. The intention is to also expand to other library types (especially Health Sciences) and services.
- Developing software for information sharing. One of our member organizations, the University of Vigo in Spain, is developing a document sharing and collaborative workspace technology, called RANDEX. All such developments are tested by members and provided free to members once proven useful.
- Developing “push and search” engines for information delivery in conjunction with the ISTECH Portal.
- Working with the Networked Dissertation/Thesis Library (NDTL) initiative at Virginia Tech to expand the concept in Ibero-America.
- Providing the main interaction method for the ACE and R&D initiatives and participation in the development of a database on S&T people, projects, policies, interests, publications, and opportunities in Latin America.
- Advancing and piloting new types of scholarly communication. An electronic journal in computer engineering was established at the Universidad Nacional de la Plata (Argentina) to develop experience in this area. We are actively supporting new

publishing efforts such as the NDTL mentioned above and the Open Archives initiative.

- Writing grants to further our goals. Grants have been written to IDB, UNESCO, World Bank, NSF and various science councils in the region, OAS, UNESCO, and to other national organizations and industrial partners.

To accomplish the above, the LibLink program has developed four sub-initiatives. These are listed below with their current major goals.

Initiative 1: Rapid Electronic Document Delivery and general services

- Connect more libraries and collections in the region
- Expand services to related multidisciplinary subject areas, e.g. Health care
- Continued creation, improvement, and/or expansion of regional LibLink Offices (LigDoc, PrEBi, Red de Colombia, REBIDIMEX, etc.)

Initiative 2: Consortial Electronic Content

- Negotiate with vendors for E-journal packages
- Regional database contracts for citation as well as full-text databases
- Development and/or participation in Open Archives initiatives

Initiative 3: Manpower Development in Information and Library Science

- Continue to plan and present workshops and training opportunities for librarians
- Web-based Masters degree program in Library and Information Science for Latin American librarians in conjunction with the Library school of the University of South Florida
- Providing library consultation services

Initiative 4: Digital Library development

- Training in basic DL concepts
- Science and Technology Networked Digital Theses & Dissertation project support and development in Ibero-America
- Finding and disseminating information about existing DL projects
- Finding and highlighting *Best Practices* found among members
- Assisting national and/or regional DL projects
- Digitization support for unique collections in member organizations.

We are continually re-energizing the *LibLINK* initiative through input from member libraries and strategic planning. Currently, a new operating model is under consideration that will involve a representative from each of three organizations to form the regional executive committees. Leadership activities are then distributed among the three executives. It is hoped that this type of arrangement will solve the problem of one person/organization always being responsible for all local arrangements. REBIDIMEX is the farthest along this path having appointed representatives from CREFAL, Colegio de Mexico and from ITSM, Cuernavaca Campus. These are three very different organizations that bring different perspectives and expertise to the group

Outcomes:

Some of the *LibLINK* accomplishments include a training seminar for Latin American librarians from seven countries at the UNM Science & Engineering Library in 1998 and regular training sessions at the General Assembly (GA) meeting of ISTEAC. At the GA of 1999 in Porto Alegre, Brazil, we trained librarians and distance educators in the role of libraries in S&T distance education. The tremendous increase in the use of the *LibLINK* document delivery service and the increase in membership are other indicators of success. In 1997 UNM/CSEL supplied 86.5% of the S&T articles requested internationally for LigDoc, an association of Brazilian S&T libraries mentioned above and modeled after *LibLINK*. During the same period the British Lending Library supplied only 13.5%, when only two years earlier, it was the largest external supplier. In 1998-99 UNM/CSEL supplied 4,660 documents electronically to LibLINK members. If standard document delivery charges were applied, the cost would have been US\$ 116,500 to those libraries. We currently supply between 6,000 to 8,000 items electronically per year.

Case Study: The *LibLINK* initiative in Mexico.

The process of developing a strong ISTEAC presence in Mexico will serve to illustrate the principles on which ISTEAC and *LibLINK* base their outreach efforts.

Since it's founding in 1990, ISTEAC had hoped for active participation from Mexican S&T organizations. However, this was not so and the most active countries initially were in South America. In 1998 it was decided to launch a concerted effort to involve Mexican Universities with strong S&T departments. The following chronology track our efforts since then:

- Spring 1998: ISTEAC sends a technology specialist, Juan Larranaga, to Mexico. He visited seven Mexican S&T institutions. Outcome: *New ISTEAC members and more information about capacity. Training in the use of Ariel® software for Librarians.*
- Summer 1998: An ISTEAC representative, Johann van Reenen, participated in the NSF/CONACyT Computer Sciences Workshop in Puebla, Mexico, where it became clear that many computer scientists were working on digital library components in isolation from each other and from their local libraries. Thus, Digital Library initiatives and researchers were identified and a DL group was initiated under the auspices of the Universidad de las Americas - Puebla. Outcome: *Critical mass of computer scientists linked to each other and to ISTEAC*
- Fall 1998: Johann van Reenen and Ramiro Jordan submitted a grant to the NSF to capitalize on the contacts made and to bring Mexican librarians and digital library researchers together. At the same time ISTEAC and local Mexican universities worked together to ensure a matching grant from the CONACyT Computer Science Section. Outcome: *Both grants were funded in Spring 1999 providing the resources to create partnerships and joint projects.*
- Summer 1999: A Digital Library Workshop for Mexican DL workers was held in Albuquerque, NM. Outcome: *Mexican DL workers, librarians & funding agencies were brought together for the first time to plan a future Mexican National DL Project. An added bonus was the participation of the OAS who sponsored DL workers from other Latin American countries to observe the process.*

- Late Summer 1999: An ISTEAC representative, Jorge Garcia, toured Mexican S&T libraries and began discussions to create a Mexican *LibLINK* office. Outcome: *A critical mass of Mexican SciTech librarians was linked to ISTEAC.*
- Fall 1999: The first meeting of Mexican computer scientists and librarians from the above initiatives were arranged by Jorge Garcia (ISTEAC) and Enidina Ortega (ITSM) in Cuernavaca, Mexico. Outcome: *Established a Mexican LibLINK office and S&T Library Network called REBIDIMEX.*
- 2000. The groundwork was done for the Mexican DL project and REBIDIMEX to continue on their own steam. ISTEAC and *LibLINK* are still involved in attending conferences, providing speakers and arranging meetings with industry, but our participation is not essential for success.
- This process, through involving representatives from other countries, led to sponsorship by the Organization of American States of a successful DL conference in Costa Rica in November 1999 for Central American countries. And so the process grows and continues.

Central America:

At the *Primer Seminario-Taller Subregional sobre Bibliotecas Digitales*, sponsored by the OAS at the Universidad de Costa Rica, San Jose, Costa Rica, mentioned above, the aim was to include many of the initial steps that led to the successes in Mexico in a single meeting. Thus, each participating country was asked to identify universities with sufficient technological infrastructure to support a digital library project. Then each organization was funded to send a representative from each of their systems and library groups. The agenda focussed on providing one whole day of basic training by Ed Fox in digital library concepts followed by leadership training and a planning session. During this portion the groups identified a project that all could participate in. They chose the digitization of their organization's theses and dissertations and making it available through the Open Archives system using the process developed by Virginia Tech (see <http://www.ndltd.org/workflow/index.htm>). The most important outcomes, however, were the creation of a network of librarians and computer scientists that understand the issues and that now have contacts for joint projects in the region.

What next?

The model of creating synergism and connections between librarians and computer scientists and focussing their energies on basic digital library projects will be replicated in other parts of Latin America. In September 2000 a group of librarians from Colombia, Bolivia and Peru met in conjunction with the *VII Jornadas Iberoamericanas de Informatica* in Cartagena de Indias (Colombia). They received a whole day workshop on digital theses and dissertations by Ana Pavani from the Catholic University in Rio de Janeiro and were exposed to the broader aspects of information science in society. Participants made important contacts for future joint initiatives. Funding was provided by ISTEAC, UNESCO, the Agencia Espanola de Cooperacion Internacional and CYTED (Programa Iberoamericano de Ciencia y Tecnologia para el Desarrollo) through their sub-program Electronica e Informatica Aplicadas. This type of joint funding takes a lot of time and effort to organize but is critical for creating opportunities in under-served

countries. This same model was used to create a Digital Libraries meeting in Montevideo, Uruguay, but the training session on electronic theses and dissertation development by Ana Pavani was extended to three days to provide more hands-on experiences and included presentations by Ed Fox from the Virginia Tech program.

ISTEC and its international/regional partners are planning regional digital library workshops in other parts of Latin America and are assisting governments to draft suitable policies to improve access to information, especially in electronic format. The Ibero-American Science & Technology Portal under development by ISTEC will greatly facilitate our outreach work.

Sources:

- The ISTEC and LibLink websites are at www.istec.org
- For electronic theses and dissertation projects see: <http://www.ndltd.org/>
- The Mexican DL project website is at: http://ict.pue.udlap.mx/dl/dl_in_mexico.html
- The site for the first NSF-Conacyt-ISTEC Workshop on Digital Libraries in Albuquerque, NM can be seen at:
<http://www.istec.org/liblink/jerome/dlform.html#program>
- The Mexican version, including the official report (in Spanish) is at:
<http://ict.pue.udlap.mx/dl/workshop99/>