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Information Technology in Central American Libraries

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Introduction¹

From our black beaches to the largest barrier reef in the Western hemisphere and from lowland jungles to highland cloud forests and active volcanoes, six republics and one parliamentary democracy occupy a strip of land of about 500,000 square kilometers and share a common past of indigenous cultures, colonialism, and periodic political and social unrest. Each Central American country is fiercely independent and proud of its own customs. Creole, English, Garifuna, and Maya languages coexist with Spanish, which is spoken by the majority. The per capita GDP is as low as USD 2,500 in Honduras and Nicaragua, and as high as USD 8,300 in Costa Rica, but within each country there are stark economic and cultural contrasts. Half of the population lives in urban areas, where modern districts neighbor very poor zones. And half of the population lives in rural areas, where traditional communities may seem ages away from the hectic pace of industrialized zones.

One also finds great contrasts in the supply and demand of educational services. About 15 million children should currently be in school, as education is by law free and compulsory for those age ranges throughout the region. In reality, the quality of the schooling systems is uneven, and coverage is far from universal. Private schools offer an attractive alternative to the free public schools run by governments. But for many families,

especially in the poorest areas, the real cost of sending the children to school is making do without their help in agricultural or other work. Consequently, illiteracy rates in the region tend to be high. Literacy rates are lowest (less than 80 percent) in Guatemala, Nicaragua, Honduras and El Salvador, and highest (above 90 percent) in Belize, Costa Rica, and Panama. Excellent institutions of higher learning exist in each country and offer undergraduate and graduate degrees in almost any field imaginable. But demand for higher education is low (FLACSO, 2002).

Access to Library Services

A full range of library services, from excellent to nonexistent, exists throughout the region. Searching the published literature on *Library and Information Science Abstracts* (LISA) yielded about 50 references by people from the region. The *IFLA Journal* has not published any related articles since 2001, when Estela Morales described Costa Rica's information system efforts in her paper on Latin American information policies (Morales, 2001, p.31). Google searches for 'libraries in Central America' yielded about 40 hits, counting only those websites produced by institutions from the region.

We do not know even approximately how many libraries exist in the region.² Ten years ago, a rough estimate suggested a total of about 1,000 libraries holding less than 10 million volumes (Pasch 1995, p.98). Today, in our opinion, that estimate should be doubled. But we found no updated data, and we can only venture the following as our personal appreciation of the observed situation and trends. The majority of libraries have very small collections (between 1,000 and 10,000 volumes). Certain non-governmental organizations (NGOs) and educational institutions may have medium-sized collections (10,000 to 100,000 volumes). National libraries and a handful of universities have large collections up to a few million volumes. Public and national libraries are under funded. For example, the Biblioteca Nacional 'Luis Cardoza y Aragón' is always portrayed as a proud part of Guatemala's cultural heritage, but it is barely surviving. It holds over 460,000 volumes, and according to a recent newspaper story it has an annual budget of about USD 2,500 for both day-to-day library operations and acquisitions. The Swedish government contributes an additional USD 60,000 per year for book buying. Salaries for 40 em-

ployees are budgeted separately. The director's monthly salary amounts to USD 450. Because "in our country, schools do not have their own library services, the National Library has been converted into a school library, and most of its users are children and young adults from primary and secondary schools" (Sánchez Rosales, 2004). Public school libraries are rare indeed in Guatemala and Honduras, while efforts in Costa Rica and El Salvador are starting to bear results. Private schools are finding that library and computer services offer them a competitive edge over other schools and are starting to invest more in information services. Computers are used to some extent for cataloging and for Internet activities, less so for database access or other electronic services. Research centers (many run by NGOs) and university libraries generally provide the best library services in the region. Many use technology to its fullest and some deploy home-grown applications. In fact, libraries and information centers in Central America were among the first users of personal computers, CD-ROM readers, modems, and database software in the region (Pasch 1995, p. 98). Thus librarians make efforts at every scale in order to incorporate the new technologies into their work. But, because contrasts abound, it is hard to speak of a 'general situation' of IT use in Central American libraries.

Access to Information Technology (IT) in Central America

The Latin American and Caribbean region, with 6 percent of the world population, "accounts for 3 percent of world IT investment, whereas North America, with 5 percent of the population, accounts for 45 percent of world IT investment" (Callaos, p. 244). Although IT growth in Latin America is higher than the world average, Central America has consistently lagged behind the rest of Latin America in the number of PCs per capita (.002 vs. .02 in 1995) and Internet hosts (.0001 vs. .0005) (World Telecommunication Indicators, 1999).

Mata and Fuerst identified Guatemala and Costa Rica as "the leading users of IT in Central America" (1997, p.174). They surveyed business managers in Guatemala and Costa Rica and found that they share key issues in regards to IT use: training of information systems personnel, support and training of users, standards and control, and disaster recovery. These issues are operational in nature, compared to the more strategic

issues identified by managers in countries like Australia and the United States. Interestingly, among the issues shared by managers in all countries, one stands out: the *use of the data resource*. Information within the organization, Mata and Fuerst assert, "is growing in size, complexity, and value. Despite this, it remains largely unrecognized, inaccessible and underutilized" and they conclude that it is necessary to create a "climate ... throughout the organization that values the data resource as a corporate asset" in order to advance to the strategic stage (p.22). While this is no news to librarians, it does bring up an important point: as businesses in the region invest more and more in IT, they may come to appreciate the importance of data as a resource, providing an opportunity to focus their attention on the services that libraries already offer.

There is some level of software production in all Central American countries. Guatemala's leading software developer employs 50 computing specialists for research and product development in banking software, and in 2004 hopes to close deals totaling USD 10 million at the regional level (Hernández, 2004). El Salvador also has a few companies doing computing consulting and Panamá is establishing tax incentives for IT companies. Thanks to a long-term commitment to education and aggressive recruitment of high tech investment, "Costa Rica has the highest level of software exports per capita in Latin America" (Rodríguez-Clare, p.79). Electronics companies (e.g., Intel, Remec, Sensortronics), medical device manufacturers (e.g., Abbott, Baxter), and service centers (e.g., Western Union, Procter & Gamble, Adobe) have set up shop there, employing local, educated manpower. The collaboration of companies, especially Intel, with technical universities has led to improved teaching and increased the demand for information services. Thus Costa Rica has moved far ahead in the production of IT.

Internet Access

The first BitNet node in the region was setup at the Universidad de Costa Rica in the early 1990s. In 1991, the Organization of American States (OAS) launched the RedHUCyT initiative, principally to connect member states to the Internet. The OAS encouraged governments to set up educational networks and connections, providing equipment, and connectivity via the PAS satellite (Pasch and Valdés, 1996). By 1996, all coun-

tries had some kind of Internet access and about 25 Internet Service Providers (ISPs) operated in the region (Pasch, 1996). Today, an estimated 600,000 users chat, send email, and surf the Web (*Information Please Almanac*)². Telecommunications policies allow private companies to resell connectivity services and to set up Internet cafés, where thousands of people pay as little as USD 0.50 per hour (Eunjung Cha, 2002). NGOs, educational, and business groups have established Telecentros or Infocentros throughout the region. Most of these centers offer Internet access and basic training.

Non-profit connectivity initiatives have been successful, but usually end up seeking financial self-sufficiency. An example is LINCOS, created in 1998 as an initiative of the Costa Rica Foundation for Sustainable Development (CRFSD). Each community that participates in the project gets its own 'LINCOS unit' – a discarded shipping container that is refurbished according to community needs to house a variety of equipment, including audiovisuals, environmental analysis equipment, telemedicine machines, an FM radio station, and audiovisual materials on health, agriculture, astronomy, adult and child education, and computers with Internet access. In its second generation, LINCOS efforts concentrate on integrating the use of technology to resolve specific problems and strengthen community development through local resources and strengths as well as comprehensive training in available technologies. A business agent handles the sale of services, in order to make the project financially sustainable. LINCOS has worked with sixteen communities in Costa Rica and the Dominican Republic and has received the Alcatel award in technology innovation. Although LINCOS units are not traditional libraries, technology and information are the raw materials that the program uses to improve communities' quality of life.

Web access has also opened the doors for a new and inexpensive kind of publishing. As a result, domain registration has flourished. The first four rows in Table 1 show the number of Internet domains registered in Costa Rica, Guatemala and Nicaragua by type of domain. Commercial domains are by far the largest segment. Educational domains make up about 3 percent of the total. But many institutions, especially businesses, prefer to register a domain that is not country specific (e.g., '.com' instead of '.com.gt'). The country registries therefore are only part of the total registrations.

Type of domain	Costa Rica	Guatemala	Nicaragua
Commercial	4,150	3,226	2,033
Organizations	210	542	205
Education	154	86	67
Others	336	535	136
Total country registry domains	4,850	4,389	2,441
Domains per 10,000 population	12.3	3.1	4.8
Overall domains	7,279	11,710	3,231
Overall domains per 10,000 pop.	18.4	8.2	6.3

Table 1. Registered domains, by country.

Access to Computers and Internet in Libraries

Given educational levels, the availability of library services, access to IT and the Internet, one would not think that libraries could or even should make acquiring computer equipment a priority. But libraries are offering IT access to their users. For example, the Panama National Library has access centers at six public libraries and at the National Library. At the small town of Panajachel in Sololá, Guatemala, Ann Cameron, a visitor from the United States, founded the Biblioteca Popular. The library enjoys strong support from the community: after a fire caused the total loss of the collection, the community rallied to rebuild it and today it owns 12,000 volumes. Ten computers are used primarily for practicing computer skills and for preparing homework assignments.

Foundations, large and small, are active in library projects in Central America and are encouraging the use of IT. For example, Proyecto Bibliotecas Guatemala (PROBIGUA), a Spanish language school in Antigua, Guatemala, received an Access to Learning Award from the Bill and Melinda Gates Foundation to install two or more computers in fourteen Guatemalan libraries, plus USD 250,000 to open five community computer centers. The Riecken Foundation builds libraries in small towns in rural areas. The Foundation operates twelve libraries in Honduras and six in Guatemala. Collection sizes range between 1,000 and 3,500 volumes. Each new library comes equipped with three new computers, a printer, and a digital camera. Software includes the Microsoft Office suite, and educational CD-ROMs. Visitors use the computers for homework, personal matters and access the Internet in communities with phone lines.

International governmental support programs are also behind improving libraries' IT access. In

1972, an earthquake damaged the Biblioteca Nacional Rubén Darío building in Managua, Nicaragua, but with help from the Swedish International Development Agency, the library was able to relocate, increase its holdings, install modern library automation, compile a national bibliography, and expand public library service in the interior of Nicaragua. The Swedish project has supported the region's national libraries, including the creation of websites for Honduras, Nicaragua, El Salvador and Guatemala.

Internet access has presented many new opportunities for librarians to help their users get the information they need. The Biblioteca Mark Twain at the Centro Cultural Costarricense Norteamericano in Costa Rica offers basic Internet training courses every Friday afternoon for the general public and for students of all levels. Another course teaches them how to use online databases, as well as electronic encyclopedias and databases. Library orientation for freshmen at Ave María College of the Americas in San Marcos, Nicaragua "includes a brief exposure to Internet training, including how to access our library services available on our website" (García, 2004). Six computers are connected to the Internet, and one is dedicated to catalog searches. More than 25 students started using the new wireless access in 2004.

IT also helps librarians expand their professional connections. E-mail, websites, and chatrooms provide us with new and inexpensive ways to stay informed and contact colleagues from everywhere. The Bibliotecólogos-CR mailing list was created by José Ruperto Arce in 1999 (Arce, 2004). Bibliotecólogos-CR was originally oriented to a Costa Rican audience, but because of its interesting forums and discussions, librarians from other countries have also joined. As of March 2004, Bibliotecólogos-CR has 787 members from Latin America and elsewhere. This is

a considerable number, especially since on the same date, IFLA-L reports 1,304 subscribers worldwide.

Professional associations in Central America have naturally created websites to inform their associates about their mission and upcoming events. Of special note is the Asociación de Bibliotecarios de El Salvador website, where one finds the association's mission, events, and a list of library websites in El Salvador. Salvadoran librarians are in fact so enthusiastic and well connected that in March 2004 they hosted the 1^{er} Encuentro Centroamericano de Asociaciones de Bibliotecarios, sponsored by IFLA, LAC and ALP.

Library Websites

We tried several approaches in order to locate as many library websites as possible. General directories like Yahoo! and dmoz only point to a handful of sites. LIBWEB lists 6,600 pages from libraries in over 115 countries, but as of early 2004 it included only five libraries in Central America. Libdex, a worldwide "index to 18,000 libraries" listed about a dozen. The Latin American Network Information Center's (LANIC) library page only lists fourteen links related to Central America. Across all these resources, the same libraries appear over and over again. We ended up combining the sites listed on LANIC's Higher Education page with the entries in the Academic Research Resources category for each individual country. This, plus the results from searches on Google and the links collected from the directories mentioned above, yielded roughly 260 sites.

After reviewing about 200 websites, it was possible to see that often, the library is not mentioned on the institutional homepage, but it may appear under 'Services' and in the company of lab descriptions, job offerings, student welfare, photocopying, and cafeterias, thus hinting at the position of the library in the overall institutional structure.

The quality and content of the pages varied widely. Some sites had clearly been abandoned, such as the one that was 'last updated' in 2000, or the site that gave three contact email addresses that no longer exist. Some libraries seemed not to have been involved in the creation of their pages, which consisted of a brief description with perhaps a photograph or two of their building. We

Type of software	Systems in Use
Locally developed	GLIFOS, MicroIsis developments, SIAB, scripting (ASP/Access, php), spreadsheet controls, HTML
Smaller imported systems	Follett, Glas, Logicat, Microcat, SIABUC, SIRSI, TKM, Winnebago
Larger imported systems	ABSYS, Aleph, OLib7

Table 2. Library software in use at libraries in our sample.

also saw many informative pages. For example, the library page of the Colegio Centro América in Nicaragua has a simple design and presents the complete history of the library building, its collection, personnel, and services.

Beyond brochure-like descriptions of facilities and services, library webpages offered three kinds of services: online catalogs of paper and electronic holdings, access to databases, and access to locally published digital content.

Web-based Catalogs in Libraries

The most common service that we found was a catalog of holdings. In some cases, the library did not have a page, but there was a link to the searchable library catalog directly from the institution's homepage. In addition to the web-based catalogs, many libraries have automated systems that are available through local networks but are not yet on line. Table 2 illustrates the variety of systems being used.

We found thirteen libraries that listed their holdings in the form of static HTML pages. These are smaller collections, thus the lists of titles are given in alphabetical order or by subject. Other locally developed controls include simple scripts that search a flat file or a database and return the results in the form of a web page. Academic libraries with big catalogs use systems like Aleph, ABSYS and Olib7.

We also found eighteen web-based catalogs that use Micro CDS/ISIS, also known as MicroIsis. This software was developed by UNESCO and has been freely distributed since the early 1980s. The importance of MicroIsis cannot be under-

estimated. María Cristina Ocón (2004), who is an official MicroIsis distributor in Costa Rica, says that in her country all librarians are aware of the existence of MicroIsis, because for small libraries it is an economical option. In terms of database management, MicroIsis is very flexible, but some training is needed for learning how to set it up. This has created a market for specialized consultants, including many Central American librarians who are now experts in programming and installing related applications. For example, Sistema Integral de Automatización de Bibliotecas (SIAB) started in 1994 as a MicroIsis application. Néstor Uriel Ramos (2004), from Impacto Creativo, says that over eleven institutions in El Salvador use SIAB version 4.0, and that SIAB has been totally re-developed for a web environment, using PHP and MySQL.

For those libraries who have a computerized catalog, but who cannot for technical or connectivity reasons post it on the web, MetaBase is a good option. MetaBase is a project that Costa Rica's Fundación Acceso started in July 2000 with funding from the World Bank's InfoDev Program (Lo & Flores, 2000). It is now a self-sustaining service. Its main function is to import the bibliographic records from member libraries and documentation centers, combine them into a central repository and make them searchable through the project's website. In early 2004, the MetaBase website contained 2,552,266 bibliographic records from 80 databases. Users can limit their searches to a particular database or do a combined search. Participating centers must have Internet access, and their collections must focus on gender, education, health, environment and natural resources, law and administration of justice, public administration, or social sciences. Because of MetaBase, the region has become more visible for the rest of the world and has increased the synergy among libraries in Central America that are now communicating and sharing information and resources (Flores, 2004).

Local developments of fully integrated library systems (ILS) designed to take full advantage of the Web are rare. We are aware of only one such project.³ In 1993, when Windows 3.2 and the first versions of the Netscape browser were just reaching the market, the Universidad Francisco Marroquín (UFM) in Guatemala developed its own ILS based on the latest technology. The new system was designed at the library and programmed by a local software development company (Arias and Pasch, 1995). From the start, it was built as a fully integrated system. Today,

GLIFOS is web-based and totally designed to take advantage of the XML standard. It is relatively inexpensive and as of early 2004 is in use at over 40 installations in Mexico, Guatemala, El Salvador, Honduras, and Panamá. One advantage is that it provides a 'copy cataloging' feature, which automatically imports and translates the fields from a selected bibliographic record, for example, from the US Library of Congress online catalog. This helps the cataloger save time in technical processing. The cataloger can also include digital materials in the same database as any other materials, thus providing a single point of access to all collections. The UFM uses this feature to integrate hundreds of freely accessible e-books into its catalog.

Database Access

The second service available through library websites is database access. We found less than 20 university, research or school libraries that subscribe to at least one database, such as ProQuest or EBSCO Host. Most libraries do not have the resources to pay the annual subscription fees, frequently run into the thousands of dollars.

The Sistema de Bibliotecas, Documentación e Información (SIBDI) at the University of Costa Rica provides access to a variety of paid, low cost, and free databases. Over time, SIBDI built a valuable collection of indices and abstracts in print. Today, electronic versions of these resources are available, including 36 databases in CD format housed at the Luis Demetrio Tinoco Library. Via the SIBDI website, access is provided to ProQuest, EBSCO Host and ISI Web of Knowledge among others. In Central America, SIBDI is the only Latindex associate, and eleven other universities have also joined HINARI. Six institutions participate in JSTOR: three universities and the central banks of El Salvador, Guatemala, and Nicaragua. In April 2004, the UFM also subscribed to the Oxford University Periodicals full-text journal database. This is possible through a special free or reduced-cost subscription offer available to low-income countries.

Educational institutions with strong links to the United States generally have better database access. For example, Florida State University-Panama has access to FSU electronic resources, including ABC/CLIO and ABI/INFORM, to Lexis-Nexis, PsycInfo, WorldCat, and more. The

library website of the Instituto Centroamericano de Administración de Empresas (INCAE), located in Costa Rica and Nicaragua, has access to a total of seventeen full-text databases plus 15,000 e-books via eBrary. In addition, an interface to five databases provides access to about 19,000 records for case studies and articles.

Digital Publishing

Libraries pioneered CD-ROM publishing in Central America. In 1992, the Universidad Centroamericana (UCA) in El Salvador published their national bibliography database as part of a University of Colima CD-ROM (Arteaga, 1994). The first CD fully produced in Central America was the CRIES (Coordinadora Regional de Investigaciones Económicas y Sociales, based in Nicaragua) that contained twelve databases, including the catalog of publications at CRIES, a directory of Central American research projects in social sciences, and two databases covering politics in Nicaragua (Stewart, 1994).

One of the most focused digitization projects in the region is based at the Instituto de Historia Nicaragüense y Centroamericana (IHNCA) in Nicaragua. The project started in 1995 with an urgent need: providing access to 19th century newspapers in the IHNCA collections. Microfilm did not deliver either clear or complete images and a decision was made to digitize the collection instead. By early 2004, sixteen Nicaraguan and eleven Salvadoran titles have been published.

Librarians have also used e-mail as a publishing tool. The Regional Project for the Development of Central American Micro Enterprises was supported by the Royal Netherlands Embassy and the International Labor Organization (ILO) from 1996 to 1999. Its main purpose was to provide small businesses in rural Central America with relevant political and economic information. An office was opened in the capital city of each country, to serve the local small business associations. These offices also served as intermediaries between small businesses and the main project office located in Costa Rica.⁴ This group produced a monthly bulletin, which was e-mailed to each association. Local staff made copies and sent them on by bus to the rural areas. At the end of year four, the project was incorporated into the Sistema de Información sobre Microempresa en América Central (SIPROMICRO).

In this day and age, the most efficient way of publishing is via the Web. Ten of the websites we found offered access to small (a few dozen to a few hundred) digitized document collections in HTML or in PDF format. Examples include the Biblioteca Nacional Ernesto J. Castillero, with its program of document conversion and 150 digitized books; the Centro Virtual de Información of the Promotora del Comercio Exterior de Costa Rica, offering manuals and guides for commercial exporters; the Biblioteca Virtual at the Universidad de El Salvador, with theses, articles and books; and the Universidad de San Carlos de Guatemala (USAC) also with its catalog of digitized graduation theses.

An important multinational effort is BIREME's Biblioteca Virtual de Salud initiative. By early 2004, institutions in Guatemala, El Salvador, Costa Rica and Honduras were involved in this health project through libraries or groups of institutions. A key part of the virtual health libraries development is the access to full text resources. This is known as the ScIELO component, for 'Scientific Electronic Library Online'. Libraries are also using BIREME's Sistema Cooperativo de Acceso al Documento (SCAD), which allows libraries to pre-pay for copies of journal articles and then obtain the materials from cooperating institutions.

An effective combination of texts, images, and databases working together to create a valuable resource is found in the so-called 'UBIs' developed by the Instituto Nacional de Biodiversidad (INBIO). This institute was founded in 1989 in Costa Rica, and seeks to produce and make accessible knowledge about biodiversity. The UBIs were created to disseminate information about animal, plant, insect and fungus species in Costa Rica through a friendly Web interface. UBIs include taxonomical information about each species found, the name and date the species was discovered, common names, recollection method, natural history of the species, use, myths and legends related to it, reproduction methods, and bibliographical references. In order to facilitate the user's interaction with the information and their understanding of the material, UBIs use simple language, pictures, diagrams, drawings and a map of the country with the localization of the species. The UBIs are interesting not only for their information display, but also because the INBIO has developed a set of modules that allow taxonomists and specialists in the field to work more efficiently, saving time and resources. For example, a tax-

onomist in Costa Rica discovers two new species of butterflies, so he types the information into the database, including a picture of the butterflies. A specialist in the field that collaborates with this project, and who could be working anywhere in the world, reviews and confirms the taxonomist's information. The specialist publishes the UBI on the Web, making that information immediately available to the public. Thus, the database is easily enriched by taxonomists around the world in a way that is much faster than any traditional methods.

In addition to textual or image resources, a rich-media digital library operates at the Guatemala's Universidad Francisco Marroquín (UFM). Since July 2001 the UFM's New Media department has been building a streaming video archives of classes and lectures. As of March 2004, over 220 hours of original video content are freely accessible via the New Media website. The content of the videos is analyzed to produce a table of contents synchronized with the video. So if someone wishes to move to a particular topic, he simply clicks on that topic from the table of contents and the browser starts playing the video from that point. All kinds of materials (PowerPoint slides, images, full texts, links, notes, credits, references, etc.) can be synchronized to audio or video contents. Such enriched content is being used to offer online courses that are part of regular on-campus programs (Pasch, 2003).

All of these resources are only a small sample of the richness of content that is available in our region and illustrate the ability of local information professionals to organize and present information on the Web.

Conclusions

Central America's library statistics are not readily available, but our region is generally perceived as 'information deprived' for two reasons: a low level of library services and a low demand for such services due to illiteracy and poverty. But while many libraries lack the means or motivation to embark on IT-related projects, many others have found ways to cooperate and find support from local or international sponsors who appreciate their potential. Such initiatives are growing, thanks in good part to growing availability of technology and the faster spread of information and opportunities via email and webpages.

In addition to descriptions of physical location and services, three main features are available at this time from Central America's library web-pages: online catalogs, database searching, and digital publishing of local resources. We found that a variety of software packages are in use and in development for library automation and for web-based catalog searching. The various projects that are underway for digitizing and organizing local materials are great opportunities for learning and for enriching the knowledge of all librarians in the region – that is, if this knowledge is shared among us. Thankfully, the Internet makes it easier than ever to communicate via websites and email, the main tools we used to gather the information presented here.

This paper has described only a fraction of the IT-related library projects underway in Central America. It presents a snapshot of the situation as early of 2004. We are aware that the information we managed to collect is incomplete, and that possibly nobody is collecting it methodically. For this reason we encourage our readers to submit any library websites or important statistics and reports to LANIC, so that others may find them in the future.

Acknowledgment

Thanks to Sean Hale for his collaboration in the revision of this article.

Notes

1. Visit <http://www.chanfle.org/diana/iflaarticle/websites.html> to see the list of websites mentioned in this article.
2. The authors would appreciate hearing of studies that have measured the availability of library and library services in the Central American region. Please email gpasch@ufm.edu.gt with related links or bibliographic references. All information will be referred to LANIC for possible inclusion in its directory of library-related Latin American resources.
3. Data for Internet users is for 2002, may be underestimated, in our opinion. See www.infoplease.com/almanacs.html
4. One of the authors, Grete Pasch, worked on the initial design for this system and is a principal consultant for the company distributing it. See www.glyphos.com
5. One of the authors, Diana Miranda, was involved in this project.

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