REFERENCE PAPER

Informatics and Telematics in Higher Education in Central America

by

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On February 1996, the Council on Foreign Relations, New York, presented the paper *EDUCATION IN LATIN AMERICA, Problems and Challenges*, concluding that Latin America needs a new model of education.

The report added that Performance in Science and Technology is weak for the region. As of 1990, Latin America lagged behind OECD countries, the newly industrializing East Asian economies, and the countries of Southern Europe in per capita research and development expenditures, and in the percentage of GDP allocated for Research and Development. (Table 1)

Table 1.- Science and Technology indicators for Groups of Selected Countries (años 1988-1990)

Indicator	Latin America	OECD countries	East Asian Newly Industrialized Economies	Southern European Countries
Per capita research and development	10	448	23	44
Percentage of GDP allocated for research and development	0.5	2.5	1.4	1.0

Source: ECLAC-UNESCO

So far, on the other hand, businesses have showed lack of enthusiasm in sponsoring academic networks. Again, Latin America is behind the newly East Asian industrialized countries; while in Singapore, for instance, research and development are funded 50% by industries, in three of the Latin American most developed economies (Argentina, Chile and Mexico) the average is 20%.

We also have to take into account the inequality when looking at Internet availability. According to a EFE Report, The National Telecommunications Union said in Geneva that 97% of Internet users are in rich countries which represent only 15% of the world population. See Table 2.

Table 2. Internet connections by region and Percentage.

Region	% of total connections
North America	66.5
Europe	21.9
Asia	6.2
Pacific	3.7
Latin America and the Caribbean	1
Africa	0.6

Source: La Red es el mayor reto del fin de siglo, EFE. Geneva sep 7, 1997

THE BARRIERS FOR ACADEMIC NETWORKS.

The barriers for the development of successful academic networks in Latin America are summarized by Winthrop Carty:

1.- Higher Education in the region is in crisis.

2.- Public policies failure, which put the communications companies against or in competence with academic networks.

3.- Centralization of Education and the need to develop an information culture.

This is also true for the Central American region, in spite the efforts made by the Organization of American States and the European Community which have funded Internet physical connections, the creation of academic networks and setting up Educational policies.

The Higher Education crisis in Latin America:

According to Daniel Levy, the crisis in Higher Education in Latin America can be summarized as follows:

- Poorly prepared student body.
- Credentialism.
- Limited staff development and resources.
- Outdated curriculum
- Difficulty establishing research structures.
- Declining average academic quality and prestige.
- Diminished job prospects for graduates.
- Disruptive politicization.
- Tremendous resistance to fundamental reform.

Sir John S Daniel, on the other hand, considers that it is the very concept of University which is in crisis not only in the Third World countries, and can be explained as a set of three problems:

- **Crisis of access:** In the developing countries, there is a crisis of access. Right now, one large, new campus would need to open every week, somewhere in the developing world, just to maintain present participation rates. This is like a time bomb ticking under our collective security. Without vigorous action, many (of the) young people will grow up to be unemployed, unconnected, and unstable.
- **The model of the university that we know and love costs too much:** But affordability is not just a Third World problem. Sir Daniel quotes a report from *Usa Today* which shows that for a U.S. family the cost of sending a child to college -tuition, room and board- is approaching 15 percent of the median family income. That is up from 9 percent of median family income 15 years ago. Moreover, if you pick a private university, the figure is nearly 40 per cent of median family income -up from just 20 percent in the same 15 year period. Sir Daniel concludes that a much more appropriate model to tackle with the

problems of a growing demand is the MegaUniversity, like the British Open University, the Pekin University and others.

- **Crisis of flexibility**: Are the Universities teaching the knowledge and skills that students need? Do our teaching methods match the habits of today's learners? Are universities confident about the quality of what they do? Can the traditional campus model refashion itself for the era of lifelong learning?

In Central America we have an even more somber panorama, since resources are being cut off for State universities, but the student population released by the Secondary School is growing quickly. The result has been a progressive loss of control of Higher Education from Ministries of Education and an explosive privatization which has resulted in a big number of private universities not having enough resources to introduce massively informatics in Education, and less to have the ability to create local networks and access to Internet; they have to rely basically on students fees.

Since 1992, nevertheless, governments have started a process of Educational Reform trying to get the control back and guarantee the education quality. The results are still pending. There are new tension points, because different points of view in relation to informatics and its impact on Higher Education, and sometimes government officials seem not to go with the current times.

Cain and Abel Syndrome: communication companies vs academic networks.

As we have told it, academic networks in Central America have been sponsored by the Organization of American States and local governments, the governments, on the other hand, have controlled telecommunications. Three years ago a privatization process has begun with relative success. In Guatemala and El Salvador, for instance, there is a lot of resistance from political parties and trade unions.

Since there is not a clear policy on telecommunications and their relationship with academic networks, we have witnessed what has been called Cain and Abel Syndrome. Even if the governments subsidize telecommunication companies and academic networks, their actual relationship is of competition and their objectives do not necessarily coincide. Telephone companies prefer few users paying high costs, while Internet users want low price connections. Obsolescence of telephone equipment, on the other hand, quickly saturates the nodes: long waiting time, unstable connections, saturated Internet servers, etc., are the rule. It is in Central America where we can talk about the World Wide Wait.

Telecommunications companies do not have the up to date equipment necessary for the growing demand of the Internet bandwidth. This short offer has generated the rapid growth of private companies that have their own satellite connection with the North American backbone. Some of them, like in Guatemala, operate almost illegally in face of the State monopoly of telecommunications.

Centralization and information culture

Since the last century economic reforms, the Central American States have been characterized by a high degree of centralization and a heavy weight for the Executive power. This has been particularly decisive in telecommunications policies in Higher Education in the region.

Inter-institutional collaboration, on the other hand, is very poor. As a result, it has been impossible to create a users critical mass, fundamental factor in academic networks, which have growth in a parallel way and even in competition. That is the reason why some people, when talking about academic networks, prefer to call them "users trade unions" since every institution, when creating a network, actually sets it up as an exclusive club for its members.

There is neither an information culture nor an on-line discussion practice, or even to interchange ideas via listservs or the other services. The e-mail appears to be used only for family messages or communications inside the institution. Nobody trusts national production, on the other hand; if foreign, better and the best, which do not help to our own development.

Since the early 90s, in Latin and Central America there is a decentralization process, particularly giving local power to municipalities. So far, we do not know how this can influence positively the academic networks development; until now, they seem to work as independent islands communicated only via the Web pages.

The long march of telecommunications in Central America.

The situation described above, apart from the Higher Education weaknesses, has produced a negative impact on information and telematics development in the Central American region.

The region integration has been a long lasting dream since a bloody civil war stopped the unity attempts in the middle of the last century. The last months, nevertheless, Central American policy makers have started a process of talks and unity declarations; globalization is seen as a threatening issue and, even if there are countries that do not like the idea of political integration, for all of us it is obvious that there is no alternative.

Internet connection, on the other hand, started when a project was presented to the Spatial Conference on the Americas in 1990 and approved by the Development Interamerican Bank. The first BITNET node was set up in Costa Rica in November 1990.

The Organization of American States has played an important role in academic networks development, with the Project of Scientific and Technologic Information Inter-University Hemispheric Network, RedHUCyT. The academic sector was directly benefited; businesses have been a little reluctant to join the network, and have done it slowly.

In November 1995, the Central American Economic Integration Bank approved the creation of the Internet "backbone" with the aim to link government,

industrial, commercial and academic sectors. As we can see in Table 3, the Internet development has been slow

Table 3.- Internet Hosts growth in Central America.

Country	Jan 96	Jul 96	Jan 97
Costa Rica	798	1495	3491
Panamá	17	148	751
Nicaragua	49	141	531
Honduras	0	0	408
Guatemala	0	27	274
El Salvador	23	43	132

Source: Network Wizards (www.nw.com)

It is clear that Costa Rica took the leadership no only linking to Internet, at the point that at the beginning linked other three countries (Panama, Nicaragua, El Salvador) to Internet, being the first Latin American experience of that nature. Costa Rica has been very aggressive in Informatics introduction in all levels of Education, from Primary School to Universities. According to government sources, it is expected that next year half the Primary Schools and 100% of Secondary Colleges and Universities will have informatic networks. They also plan to provide e-mail to all of the Secondary School students; to achieve that, they now dedicate 6% of the GNP to Education.

The Internet growth has been very unequal, even if it stimulated the academic networks and the Science and Technology National Councils creation. See Table 4

Table 4.- Research and academic networks in Central.

Country network   Year of creation
Costa Rica: Research National Network CRNet   April 1993
Nicaragua: Research and Academic Network of Nicaragua, RAIN
    February 1994
Panamá: Academic Network of Panama, PNANet June 1994
Honduras: Academic Network of Honduras, HODUNet   May 1995
Guatemala: Academic Network of Guatemala, MAYANet   December 1995
El Salvador: Internet Network of El Salvador, SVNet   July 1996
Source: PC World, Año III, No. 7, July 1997

The obstacles above mentioned attempt against a real Academic inter-communication. At such point, that in countries like Costa Rica there are places where users have to pay to access and a login name and password is needed to get into some academic networks

There is some progress in Tele-Medicine and the use of Internet databases as well.

In the First Regional Forum "The Central American facing the Third Millennium" (17-18 oct 1996) it was created the Central American Internet Backbone, initially at 64 Kbps and the aim to raise it to 2 Mbps. It was also set up the Central American and Panama Scientific and Technologic Development Commission, formed by the Ministries and/or National institutions leading Science and Technology in each country.

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