Stanford University

The Information Revolution in Latin America
Obstacles and Opportunities through the Internet

México

Contents

Presentation of Research

First Section

"The Internet Infrastructure in México"

Initial research on México, focusing on Telecommunications Infrastructure, the accessibility to technology (in particular the Internet), the mexican educational system, and the characteristics of the labor market.

- Summary: First Presentation
- Technical Capacity
- Labor Markets
- Educational Opportunities
- Nature and Access of Opportunity

Second Section

"Launching a Socially Responsible Venture in México"

In this presentation, we develop the context in which such venture would evolve. The main issues that are explored are sources of financing, the effect of government policies, and the role of the private sector.

- Summary: Second Presentation
- Business Operations
- Marketing

- Regulation

Third Section

"Promoting the Internet Revolution in México"

We present an overview of our research and propose a plan for a non-profit organization, Mundo Internet, to extend Internet access to wider sector of the population. We describe the mission and objectives as well as the strategy to launch this venture.

- "Promoting the Internet Revolution: Mundo Internet".

Back to Top

Information Exchange / Comments and Suggestions

Please follow this link to leave any comments, suggestions, or to exchange information relative to this project.

Comments, Suggestions, & Information Exchange

Back to Top

Contact Information

Raul Escalante Diaz-Ceballos *raescal@leland.stanford.edu*
Kristina Stevens: *stevensk@leland.stanford.edu*
Meghann Tovar: *mztovar@leland.stanford.edu*
Xavier Faz: *xfaz@cs.stanford.edu*

Back to Top

Last revised: October 16, 1999.
webmaster: xfaz@cs.stanford.edu

The Information Revolution in México

Click here to start

Table of Contents

Author: Mexico Team#1

(Kristina, Meghann, Raúl and Xavier)

Home Page:
http://www.stanford.edu/~xfaz/mexico.htm

The Information Revolution in Mexico

CS377c - The Information Revolution in Latin America

Raúl Escalante
Xavier Faz
Kristina Stevens
Meghann Tovar

The major inhibitors to the information revolution having a more widespread impact in Mexico arise from weak basic education performance, reduced access to technology (in school and to the public), and from a brain-drain to more lucrative labor markets.

Telecommunications and Access Opportunities

- Legal framework apparently has not inhibited development of infrastructure.
- Strong Telecommunications infrastructure with large multinationals as stakeholders. Presently not a constraint in growth of Internet usage.
- Low penetration of telephone lines, augmented by high cost of telephone service, may limit growth of Internet usage in the medium-term.
- **Slow technology adoption, reduced IT budgets and low income levels have resulted in reduced access by the general population to Information Technology resources and the Internet.**

Education

- **Education system produces a small number of graduates with the capacity to easily become Internet users; drop-out rates are high at primary and secondary levels whereas investment in IT training is concentrated at more advanced levels.**
- Graduates from the system (especially at the university level) often have a high level of training. This is improving through innovative ventures.

Labor Markets

- **Labor supply is, and will continue to be, constrained by the traditional educational infrastructure and by labor opportunities abroad.**
- Demand for highly qualified labor, although relatively inelastic and increasing, is susceptible to swings in economic activity and varies across different industries.

Good infrastructure... poor accessibility

Regulation

- Regulation has favored investment in infrastructure both by foreign and domestic firms (Telmex privatization, long distance carriers).
- Three government entities involved:
  - COFETEL: Creates rules for competition and interconnection.
  - SCT: Authority in Telecomm issues. Imposes sanctions.
  - COFECO: Resolves anti-trust conflicts.
- Privatization has brought modernization and greater efficiency to the Telecomm industry.
- However, Federal Regulation lacks efficient processing of appeals, and requests (no single agency has the ability to evaluate appeals and impose sanctions).

Good infrastructure... poor accessibility

Infrastructure

- Considerable foreign investment in all sectors of Telecomm (Southwestern Bell, France Telecomm, AT&T, MCI Worldcom in telephony; Bell Atlantic in cellular; Loral Space & Communications in satellite).
- International telecommunications standards fully adopted
- Phone system thoroughly modernized, although still to increase number of installed lines (only 10.7 lines per 100 inhabitants, 33.2 per 100 homes).
- Numerous high-speed data links to the Internet
  - E1 links available for enterprises. (+330 in place)

Internet Service

- Internet connectivity highly available in most states (150+ISP's, with up to 56Kbps dial-up) although relatively expensive (typically $10 for connection and $24.00 per month of unlimited usage).
- Estimated number of PCs: 4.1 for every 100 inhabitants
- 1 million 307 thousand estimated Internet users (23% home, 57% business, 18% education and 2% government).
- Estimated number of Internet hosts: 224,239

Education: Constraints and Opportunities

- Although a high percentage of the population possesses the basic academic skills to learn to use IT resources (literacy rates are 88% for females and 92% for males), familiarization with computers is reduced in the education system.
  - Drop-out rates at basic level education are high: High school and college enrollment are 38.8% and 11.4% of that of primary school, respectively[1].
  - Spending in IT related programs and availability of opportunities to come in contact with IT resources decreases considerably at lower education levels (official primary and secondary school curricula don't require computer instruction).

- The Secretaría de Educación Pública is currently spending 4.2% of its budget on improving science and technology education, including spending in teacher training.

- Alternative sources for computer training (many sponsored by foreign high tech firms) are arising, especially in urban areas. However, these programs focus mainly at the university level.
  - Latin American Institute for Communicative Education (Microsoft, Compaq, Dell, Wang, Acer, IBM, Hewlett-Packard, and Cisco Systems) helps schools acquire PCs.

[1] Ratios adjusted to compensate for number of years in curriculum.

Next steps: Opportunities for enhancing development

Enhancing the impact of the information revolution

- To analyze the effect of government policies and regulation on foreign investment in and development of Mexico's IT industry.
- Analysis of deficiencies in accessibility and structure of Mexico's IT industry - location of weak links and proposal for solution.

Harnessing the potential of the information revolution

- Employing IT in non-traditional forms of education
  - Public education on current affairs, popular culture, healthcare etc.
  - Study on non-profits

Good infrastructure… poor accessibility

Infrastructure

- **Considerable foreign investment in all sectors of Telecomm (Southwestern Bell, France Telecomm, AT&T, MCI Worldcom in telephony; Bell Atlantic in cellular; Loral Space & Communications in satellite).**
- **International telecommunications standards fully adopted**
- **Phone system thoroughly modernized, although still to increase number of installed lines (only 10.7 lines per 100 inhabitants, 33.2 per 100 homes).**
- **Numerous high-speed data links to the Internet**
- ❍ E1 links available for enterprises. (+330 in place)

Internet Service

- **Internet connectivity highly available in most states (150+ ISP's, with up to 56Kbps dial-up) although relatively expensive (typically $10 for connection and $24.00 per month of unlimited usage).**

- **Estimated number of PCs: 4.1 for every 100 inhabitants**
- **1 million 307 thousand estimated Internet users (23% home, 57% business, 18% education and 2% government).**
- **Estimated number of Internet hosts: 224,239**

Previous slide Next slide Back to first slide View graphic version

Labor markets

Supply of labor

- Supply to high tech labor market seriously constrained by poverty (40% of homes built of sub-standard materials) and scarcity of educational opportunities (approximately 8% of labor force has college education).
- Over 10% of trained professionals have engineering backgrounds; engineering graduates have the greatest share of jobs earning more than 20 minimum wages.

Demand for labor

- Demand for labor in the formal sector fluctuates significantly in response to swings in economic activity (unemployment indicators doubled during 1994/95 in response to financial crisis).
- Demand for qualified labor varies across industries: financial services and Telecomm industries (modernized, integrated to world economy) vs. Agriculture/Agribusiness or utilities (over-regulated, generally antiquated technologies, isolated from world economy).

Other factors

- Proportion of work force employed abroad has increased significantly in past years (INEGI), although statistics do not reflect full reality of this phenomenon.
- Migrant workers within Mexico tend to have greater education than the rest of the working population.

Next steps: Opportunities for enhancing development

- **Enhancing the impact of the information revolution**
- **To analyze the effect of government policies and regulation on foreign investment in and development of Mexico's IT industry.**
- **Analysis of deficiencies in accessibility and structure of Mexico's IT industry - location of weak links and proposal for solution.**
- **Harnessing the potential of the information revolution**
- **Employing IT in non-traditional forms of education**
  - Public education on current affairs, popular culture, healthcare etc.
  - Study on non-profits

Previous slide Back to first slide View graphic version

Education: Constraints and Opportunities

- National and international education organizations in the non-profit, government and academic sectors have begun to reach out to marginalized teacher, student, and general populations offering IT training, support services, multimedia and computer facilities and materials, Internet connections, and educational technology programs.
- Although usually directed at improving traditional educational performance, these programs are also increasing exposure and training in the use of IT resources.
- Universities and Centers for IT Investigation and Development have initiated the transfer of knowledge from the educational sector to industry through consulting, outreach programs, and collaborative ventures.

Good infrastructure… poor accessibility

Regulation

- **Regulation has favored investment in infrastructure both by foreign and domestic firms (Telmex privatization, long distance carriers).**
- **Three government entities involved:**
  - COFETEL: Creates rules for competition and interconnection.
  - SCT: Authority in Telecomm issues. Imposes sanctions.
  - COFECO: Resolves anti-trust conflicts.
- **Privatization has brought modernization and greater efficiency to the Telecomm industry.**
- **However, Federal Regulation lacks efficient processing of appeals, and requests (no single agency has the ability to evaluate appeals and impose sanctions).**

Previous slide Next slide Back to first slide View graphic version

The major inhibitors to the information revolution having a more widespread impact in Mexico arise from weak basic education performance, reduced access to technology (in school and to the public), and from a brain-drain to more lucrative labor markets.

Telecommunications and Access Opportunities

- Legal framework apparently has not inhibited development of infrastructure.
- Strong Telecommunications infrastructure with large multinationals as stakeholders. Presently not a constraint in growth of Internet usage.
- Low penetration of telephone lines, augmented by high cost of telephone service, may limit growth of Internet usage in the medium-term.
- Slow technology adoption, reduced IT budgets and low income levels have resulted in reduced access by the general population to Information Technology resources and the Internet.

Education

- **Education system produces a small number of graduates with the capacity to easily become Internet users; drop-out rates are high at primary and secondary levels whereas investment in IT training is concentrated at more advanced levels.**
- **Graduates from the system (especially at the university level) often have a high level of training. This is improving through innovative ventures.**

Labor Markets

- **Labor supply is, and will continue to be, constrained by the traditional educational infrastructure and by labor opportunities abroad.**
- **Demand for highly qualified labor, although relatively inelastic and increasing, is susceptible to swings in economic activity and varies across different industries.**

Previous slide Next slide Back to first slide View graphic version

The major inhibitors to the information revolution having a more wides...o the public), and from a brain-drain to more lucrative labor markets.

PPT Slide

The Information Revolution in Mexico

CS377c - The Information Revolution in Latin America

Raúl Escalante

Xavier Faz

Kristina Stevens

Meghann Tovar

Next slide Back to first slide View graphic version

Education: Constraints and Opportunities

- National and international education organizations in the non-profit, government and academic sectors have begun to reach out to marginalized teacher, student, and general populations offering IT training, support services, multimedia and computer facilities and materials, Internet connections, and educational technology programs.
- Although usually directed at improving traditional educational performance, these programs are also increasing exposure and training in the use of IT resources.
- Universities and Centers for IT Investigation and Development have initiated the transfer of knowledge from the educational sector to industry through consulting, outreach programs, and collaborative ventures.

Previous slide Next slide Back to first slide View graphic version

Education: Constraints and Opportunities

- **Although a high percentage of the population possesses the basic academic skills to learn to use IT resources (literacy rates are 88% for females and 92% for males), familiarization with computers is reduced in the education system.**
  - Drop-out rates at basic level education are high: High school and college enrollment are 38.8% and 11.4% of that of primary school, respectively1.
  - Spending in IT related programs and availability of opportunities to come in contact with IT resources decreases considerably at lower education levels (official primary and secondary school curricula don't require computer instruction).
- **The Secretaría de Educación Pública is currently spending 4.2% of its budget on improving science and technology education, including spending in teacher training.**
- **Alternative sources for computer training (many sponsored by foreign high tech firms) are arising, especially in urban areas. However, these programs focus mainly at the university level.**
  - Latin American Institute for Communicative Education (Microsoft, Compaq, Dell, Wang, Acer, IBM, Hewlett-Packard, and Cisco Systems) helps schools acquire PCs.

1 Ratios adjusted to compensate for number of years in curriculum.

Previous slide Next slide Back to first slide View graphic version

Labor markets

Supply of labor

- Supply to high tech labor market seriously constrained by poverty (40% of homes built of sub-standard materials) and scarcity of educational opportunities (approximately 8% of labor force has college education).
- Over 10% of trained professionals have engineering backgrounds; engineering graduates have the greatest share of jobs earning more than 20 minimum wages.

Demand for labor

- Demand for labor in the formal sector fluctuates significantly in response to swings in economic activity (unemployment indicators doubled during 1994/95 in response to financial crisis).
- Demand for qualified labor varies across industries: financial services and Telecomm industries (modernized, integrated to world economy) vs. Agriculture/Agribusiness or utilities (over-regulated, generally antiquated technologies, isolated from world economy).

Other factors

- **Proportion of work force employed abroad has increased significantly in past years (INEGI), although statistics do not reflect full reality of this phenomenon.**
- **Migrant workers within Mexico tend to have greater education than the rest of the working population.**

Previous slide Next slide Back to first slide View graphic version

Telecommunications

I. Infrastructure

- Investors & Stakeholders

Foreign Investment in Telecommunications	
TELMEX	**MX** Grupo Carso **US** Southwestern Bell **FR** France Telecomm
ALESTRA	**MX** Grupo Alfa **MX** Bancomer **US** AT&T
AVANTEL	**MX** Banamex Accival **US** MCI WorldCom
TELCEL	**MX** Grupo Carso
IUSACEL	**US** Bell Atlantic
SATMEX	**MX** Telefónica Autrey **US** Loral Space & Comm

- Considerable foreign investment in all sectors of Telecomm
- Phone system thoroughly modernized, although still to increase number of installed lines

Number of Phone Lines	
Per each 100 inhabitants	10.7
Per each 100 households	33.2

- International telecommunications standards fully adopted

- Numerous high-speed data links to the Internet (E1 links available for enterprises: +330 in place)

II. Regulation

- Three government entities involved:

  COFETEL: Creates rules for competition and interconnection.

  SCT: Authority in Telecomm issues. Imposes sanctions.

  COFECO: Resolves conflicts in commercial activities (illicit monopoly).

- Privatization brings modernization and efficiency to telecomm industry. In the case of TLEMEX, Regulation played a major role in preparing the company for open competition, as well as protecting foreign investment.

- Regulation helped shape the framework for competition among companies in the operation of Long distance carriers as well as value-added services.

- But, Federal Regulation lacks efficient processing of appeals, and requests.

- The main problem is the inability of a single entity in the government both to evaluate and to sanction appeals with regards to commercial issues in telecommunications. In the US, the FCC is able to rule and also impose sanctions to companies that do not follow the norms that it puts forth.

III. International Treaties

International Treaties are an external factor that influences the telecommunications industry because they impose regulation and economic measures the shape how business will develop.

Some International Treaties which influence Telecommunications	
NAFTA	Free Trade
WTO	Promotes Open Market in Telecomm
GATT	Transparency & Open Participation

IV. Internet Economics

- Highly Available Internet connectivity: 150+ ISP's
- Dial-up connections up to 56Kbps.

  (Typical cost: 10.00 usd for connection + 24.00 usd per month/unlimited usage).
- Number of phone lines for domestic use: 33.2 for every 100 homes
- Estimated number of Internet Users

  Domestic: 298,000 Education: 238,000

  Business: 740,000 Gov't: 31,000

  Total: (?) 1,307,000
- Estimated number of PCs: 4.1 for every 100 inhabitants
- Estimated number of Internet hosts: 224,239*(07/1999)*

Detailed Report

Xavier Faz

xfaz@cs.stanford.edu

Technical Capacity: Telecommunications Infrastructure in Mexico

I. Infrastructure

. ***Who are the Investors and main stakeholders of the physical telecommunications infrastructure in Mexico? Who are the owners?***

Foreign Investment

Between 1989 and 1992, Mexico alone attracted some $35 billion in foreign investment, much of it into the telecommunications sector.

- **Phone Lines**

TELMEX (*Teléfonos de México*)

Southwestern Bell

France Telecom 20.4% with 51% of voting power

Grupo Carso

Public (International Market)

ALESTRA

Grupo Alfa 25.6%

Bancomer 25.4 %

AT&T 49%

AVANTEL

Banamex Accival

MCI WorldCom

RTN (*Red Tecnológica Nacional* -- National Technology Network)

Mainly geared towards Education and Research entities.

Financed by Government --through CONACYT (National Council for Science and Technology).

Controlled by an independent entity INFOTEC.

- ***Cellular Telephony***

IUSACell

Bell Atlantic 23% Given Administrative power over the Company since 10/93

TELCEL

Owned by Grupo Carso (TELMEX)

- **Satellite Communications**

SATMEX

Telefónica Autrey

Loral Space & Communications

. ***What is the availability and use of phone lines, particularly in urban centers?***

Estimated Number of Phone Lines		
	Users	**Lines / 100 habs.**
Phone lines in service	10,257,700	10.7
Cellular phone users	5,397,000	5.6

In 1999, *taken form http://www.cofetel.gob.mx/html/5_est/indest.html as of 06/1999*

. ***What are the backbone capacities for data transmission that connect Mexico with the World?***

Several companies provide access from Mexico the global Internet Netwrok, mainly through links to the United States. The four main companies that own the infrastructure are:

- RTN
- TELMEX (UNINET)
- AVANTEL
- ALESTRA

RTN International Links					
City	**Institution**	**Number of Links**	**Type**	**Bandwidth**	**Link**
Monterrey	ITESM	1	E1	2.0 Mbps	Dallas
Guadalajara	UNIV DE GUAD	2	E1	2.0 Mbps	
Hermosillo	UNISON	1	E1	2.0 Mbps	SPRINT
D.F.	INFOTEC	4	E1	2.0 Mbps	
Total				16.0 Mbps	

Avantel International Links					
City	**Institution**	**Number of Links**	**Type**	**Bandwidth**	**Link**
N/A	N/A	2	STM-1	155 Mbps	U.S.
Total				310 Mbps	

Types of Links		
Type	**Bandwidth**	**Medium**
DS0	64 Kbps	Twisted Pair
E0	64 Kbps	Fiber Optic
E1	2.0 Mbps	Fiber Optic
STM-1	155 Mbps	Fiber Optic
Microwave	--	Unidir Antenna
Satellite	--	--

- Information for International Links of

  TELMEX (UNINET)

  ALESTRA

  Not Available.

. *What are the enabling technologies?*

- Physical

  Digital telephone lines (ISDN)

  On wireline cable, fiber optics.

  Microwave and satellite links

- Cellular Telephony

  Medium Access: CDMA (Code-Detect Medium Access)

  Standards: AMPS (Advanced Mobile Phone System) and D-AMPS (Digital - Amps)

  PCS (Personal Communication System)

- Digital Telephony & Data Transmission

  Frame-Relay / SONET

  ATM

I. Regulation

. *The process of Privatization of the Telecommunications industry.*

- Telecommunications sector has been traditionally adopted as a monopoly of the State in most countries (or at least controlled by the State), due largely to its impact in the economy.
- The phone system is the major telecommunications industry that has been privatized by the Mexican government. Privatization completed in Latin America and elsewhere have been partial offerings leaving control in the hands of the government, a process coming to be known as "capitalization". In some cases the participation of non-nationals in these offerings has been limited.
- There are two reasons that cause the telecommunications industry to be privatized before other industries controlled by the state: governments realize the strategic importance of a modern telecommunications infrastructure, and because of the general profitability and security of companies in the telecommunications sector
- The privatized companies typically become more efficient, often because the governments set efficiency measures as a condition of the privatization process. Because regulatory structures may not have existed before privatization, or if they did may have taken the form of self-regulation, privatization usually encourages the development of independent regulatory bodies, which benefit consumers.
- Open market for Long Distance until 1995, and 1997 for local calls.
- From 1990-1995 Telmex built digital lines throughout the country reinforcing the technology for both local and long distance calls.
- The concession agreement entered into between the government and the privatized Telmex obligated the company to move aggressively to modernize and extend the network. To facilitate the success of this expansion, the government gave Telmex a monopoly for the provision of the basic wired line telephone service for a period of seven years (which expired in 1997).

. *What are the government bodies that regulate the telecommunications industry in Mexico?*

- *LFT: Ley Federal de Telecomunicaciones*

  Federal Telecommunications Law

  Regulates all aspects of communications, including the use and operation of radio frequencies, telecommunication networks, and satellite communications in Mexico. Grants the State control over the spectrum, telecommunication networks, and satellite communications. Provides concessions to be assigned by public bidding, and for a period of 20 years maximum.

- *SCT: Secretaría de Telecomunicaciones y Transportes*

  Secretariat of Transportation and Telecommunications

  Part of the Mexican Federal government in charge of the Administration of all means of communication.

- *COFETEL: Comisión Federal de Telecomunicaciones.*

  Federal Commission for Telecommunications

  Created in August 1996, as a decentralized organization that imposes rules on competition and interconnection. It works as a recommendation committee. Not in capacity to impose sanctions.

- *COFECO: Comisión Federal de Competencia*

  Federal Commission for Competitiveness

  This entity has indirect effect on the Telecommunications industry. It promotes competitiveness in the industry and resolves issues in related to illicit monopoly activities.

. *What is the effect of Government Regulation Policy on the Telecommunications industry? What is the effect on its Development?*

- The telecommunications sector has experienced a tremendous growth (five times its value in the first five years after privatization). This shows some level of efficiency in the implementation of government regulatory measures in the sector.
- The monopoly on local calls that was allocated to TELMEX during the first seven years after privatization was a Regulatory measure that insured the ability of TELMEX to strengthen its infrastructure in order to be competitive at the time such regulation was lifted. This measure proved beneficial not only to the enterprise itself but also to the community of users who experienced much higher quality in the telephone service.
- Problems with Regulatory policies seem to stem not from the restrictive nature of the Telecommunications Law, but from the inability of the government to efficiently process exceptions and challenges from individual companies in the industry (issues may take up to two years to resolve). The main obstacle in effectively processing judicial affairs is the fact that the Consultative Committee, a part of the COFETEL (Federal Communications Committee) which evaluates petitions, does not have the power to enforce Law, only to make recommendations. It is the SCT (Secretariat of Communications and Transportation) who actually has the power to enforce Law. This adds unnecessary complexity to the process, which shows as lengthy process.
- Regulatory measures in Mexico in matter of Telecommunications have been considered by foreign investors as being too protective of the national telephony industry particularly in the negotiation of tariffs and fees for the interconnection to US telephony and data networks. Nonetheless, the Mexican government has been gradually lifting restrictions and this continues to attract foreign capital.
- It is presumed that one obstacle in developing an open competition framework for the Telecommunications industry, is the government trying to protect/support personal interests of high-profile private investors (namely TELMEX owner Carlos Slim).
- Another important issue of historic nature is the sovereignty threat that represents foreign capitalists gaining control of the communications infrastructure in the country. This has been a sensitive issue that has prevented privatization efforts for more than a couple of decades in Mexico.

. *Limitations to Foreign Investment*

- Prior to 1993 all foreign investment in Mexican companies was limited to 49%. The 1993 Foreign Investment Law permitted up to 100% foreign ownership of many telecommunications operations, including cellular telephony and value added services. However, certain telecommunications operations, including basic telephone service, videotext, packet-switched data service, and cable television remain limited to 49%. Radio and television broadcasting services are reserved for Mexican nationals.

. *How does Telecomm regulation by the Mexican Government compare to similar entities and policies in first world countries?*

- USA-FCC: Federal Communications Commission.

  Operates as a regulatory body for wireless communications at the Federal Level, and in conjunction with State commissions for wired communications. It has the power to create laws, and to exercise sanctions.

  COFETEL in Mexico, much like the FCC in the United States, regulates the communications law at the Federal Level, but unlike the FCC, it is located wholly within executive branch of the government and must still work closely with SCT on competition policy and licensing issues. Competition in and of itself is regulated through an independent body, COFECO - *Comisión Federal de Competencia*, or Federal Commission for competitiveness.

I. International Treaties

The Mexican Constitution, Article 133 establishes International Treaties at the same level of power than that of Federal Law.

. *GATT/ WTO*

- GATT: General Agreement on Tariffs and Trade.

Provisions for transparency in the regulation of telecommunications industry (administrative, procedures, planning, schedules)

- WTO: World Trade Organization

México is signatory of the Basic Telecomm Agreement. (1998). Promotes the mobilization of telecommunications industry to an open market.

. *NAFTA*

North America Free Trade Agreement

- NAFTA Chapter 13 establishes the terms for access to and use of Public Telecommunications Transport Networks and Services, Measures related to Standards, and anti-monopoly issues in the member countries.
- Remove restrictions on foreign investment for all value-added, enhanced, and packet-switching services in Mexico by July 1995.
- Rates for services proportional to cost.
- Transparency on administrative and telecommunication policies, including technical specifications.
- Inability to impose technical requirements as a means to restrict access to public networks.

. *CLARIN*

The "Co-operation with Latin America for Normalized Computer Networks", initiative led by the "Fundación para el Desarrollo de la Función Social de las Comunicaciones" (FUNDESCO) of Spain. Mainly geared towards creating a unified network for universities and research centers in Latin America with the International community.

b. Normalization of Telecommunications in Mexico.

- *Comité Consultativo Nacional de Normalización de Telecomunicaciones* (CCNN-T)
- *Homologación*: Process through which the SCT officially acknowledges that a given product complies with the norms and regulations prescribed by the SCT.

. *Intellectual Property Law*

The following are protected for a specific period of time: patents (20 yrs.); industrial designs (15 yrs.); utility models (10 yrs.); trademarks (10 yrs.); and trade names (10 yrs.). Under the Federal Copyright Law, the right of authorship extends for 75 years after the date of first publication. (http://www.mib.org.mx/frames/f_country.html)

I. Internet Economics

. *What is the availability of Internet connections in urban centers?*

- Phone lines for domestic use:

Estimated Number of Phone Lines for Domestic Use	
Domestic	33.2 per each 100 homes

(COFETEL, 1995)

- Estimated Number of Internet Users

Estimated Number of Internet Users	
Government	31,000
Domestic	298,000
Education	238,000
Business	740,000
Total	1,307,000

Source: Cofetel, taken from http://www.cofetel.gob.mx/html/5_est/Graf_internet/estiminternet_01.html

- Percentage of households connected to Cable TV (Potential for future user base).

Percentage of Households connected to CableTV	
Argentina	43.7
Brazil	19.2
Mexico	**17.9**
Chile	5.7
Colombia	2.2
Uruguay	2.2
Venezuela	1.8
Guatemala	1.4
Paraguay	1.3

Source: Grupo Clarin, 1998, taken from http://lanic.utexas.edu/project/tilan/reports/report1.html

- Estimated number of PCs

Estimated Number of PCs per 100 habitants		
Country	Number of PC's	Source
United States	35.6	*
Germany	18.3	*
France	17.6	*
Chile	4.5	**
Argentina	4.3	**
Mexico	**4.1**	****
Brazil	4.0	***
Venezuela	4.0	**
Colombia	2.9	**

Sources:

**: eStats, January 1999*

***: Forbes Magazine, June 1998*

****: Revista Exame, 1998*

taken from:
http://lanic.utexas.edu/project/tilan/reports/report1.html

- Number of Internet Service Providers per State

Number of ISPs by State	
Coahuila	30
Baja California Sur	31
Baja California Norte	31
Puebla	32
Queretaro	33
Veracruz	34
Guanajuato	34
Mexico	45
Nuevo Leon	45

Jalisco	45
D.F.	93

Note: Some ISP's offer service in multiple states.

- An estimated 150 different ISP's operate in Mexico.

(1997 NIC-México, taken from http://www.nic.mx/evol/historia.html)

- Number of Internet hosts, compared by country domain name (ccTLD)

	ccTLD	Jul-99
1	jp	2,072,529
2	uk	1,599,497
3	us	1,555,882
4	de	1,426,928
5	ca	1,294,447
6	au	907,637
7	fr	653,686
8	nl	637,591
9	fi	577,029
10	se	515,031
11	tw	424,209
12	it	393,627
13	no	335,898
14	br	310,138
15	es	302,457
16	Dk	287,273
17	Be	272,867
18	Ch	264,426
19	Kr	260,146
20	**Mx**	**224,239**

Source: Network Wizards (www.nw.com), taken from http://www.nic.mx/esta/survey.html

. ***Statistics on Mexican internet domains.***

Estimated number of domain names	
Domain name	**Num of Hosts**
(edu).mx	177
Edu.mx	527
Com.mx	21106
Net.mx	587
Org.mx	1071
Gob.mx	473
Total	23941

Source:Network Information Center -- Mexico 10/23/1999 taken from: http://www.nic.mx/cgi/cuantos_dominios

- 90% of domains in under *.mx are com.mx
- Class "B and Class "C" Network Domain Names

Number of Class "B" and Class "C" Network Domain Names		
ccTLD	NetNames (08/1999)	Net Wizards (07/99)
De	391,113	571,733
uk	356,426	46,351
au	120,874	31,329
nl	96,585	339,511
dk	93,181	121,475
ar	92,947	4,509
ch	77,530	257,881
jp	65,017	56,183
kr	63,233	4,077
it	61,412	254,328
br	59,628	30,673
ca	57,044	414,817
at	48,766	77,630
za	44,008	10,983
nu	43,278	8,672
se	41,591	250,482
fr	37,588	306,993
nz	36,638	5,052
mx	**18,142**	**27,480**

Source: Network Information Center -- Mexico, taken from: http://www.nic.mx/esta/survey.html

Sources:

NAFTA and GATT Intellectual Property Issues

http://www.ladas.com/BULLETINS/1994/NAFTAGATT.html#NAFTA_MX

Public Citizen Global Trade Watch (GATT & WTO Homepage)

http://www.citizen.org/pctrade/gattwto/gatthome.html

WTO - Intellectual Property: Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)

http://www.wto.org/wto/intellec/intellec.htm

http://www.wto.org/wto/intellec/intell2.htm

NAFTA: CHAPTER 13: TELECOMMUNICATIONS

http://www.i-trade.com/dir07/book/ch13.html

NAFTA: ***NAFTA(Summary and Anlysis): TABLE OF CONTENTS***

http://www.i-trade.com/dir07/book/

NAFTA: Chpt 13 Telecommunications: Provisions

http://www.nafta-sec-alena.org/english/nafta/chap-13.htm#A1301

La Normalización de las Telecomunicaciones en México

http://www.cofetel.gob.mx/html/la_era/art/normatel1.html

Telecommunications In Mexico: A Market In Transition (By Aileen A. Pisciotta)

http://www.kelleydrye.com/tc111397.htm

Regulacion y Privatizacion: México y Estados Unidos en la Revolución Mundial de las Telecomunicaciones(Ana Luz Ruelas)

http://lanic.utexas.edu/la/Mexico/telecom/cap7.html

FCC Model in the United States

http://www.fcc.gov/connectglobe/sec2.html

Historia del Internet en Mexico

http://www.nic.mx/evol/historia.html

WTO/GATT

http://www.econ.iastate.edu/classes/econ355/choi/wtoroots.htm#GATT

Comision Federal de Competencia

http://cfc.gob.mx

Telmex

http://www.telmex.com.mx

Conacyt

http://www.conacyt.mx/

Statistics on Internet use

http://www.nic.mx

COFETEL

http://www.cofetel.gob.mx

Secretaria de Comunicaciones y Transportes

http://www.sct.gob.mx

Trends in Latin American Networking

http://lanic.utexas.edu/tilan

Transparency in Telecommunications in Mexico.

Talk by Rodrigo Ojeda de Koning , Casa Bolivar, Stanford University. Oct 1999.

Connexion-Market: The Mexican Model

http://www.ericsson.se/Connexion/connexion1-94/market.html

NAFTA: Chapter Thirteen:Telecommunications

http://www.nafta-sec-alena.org

The Roots of the WTO

http://www.econ.iastate.edu/classes/econ355/choi/wtoroots.htm

CS377 – The Information Revolution in Latin America – Mexico

Analysis of Labor Markets in Mexico

In this document, a short rationalization of each theme is provided along with the listing of the relevant metrics and their source (bolded).

Supply of labor

In strict economic terms, the supply of labor is the relationship between how many man-hours will be supplied in a given period of time at each level of monetary compensation. In the looser sense employed here, it refers to the availability of qualified individuals to fill job positions available in the economy at the prevalent wage level.

Two groups of factors will influence the labor supply as defined above: those affecting what percentage of the labor force will be qualified for the referred positions and those affecting whether the qualified workers will be available or willing to fill the positions.

Factors influencing accumulation of capital:

Poverty. The premise behind including poverty metrics is that people living in or near extreme poverty are not likely to be qualified to fill positions requiring a high degree of technological sophistication. Extreme poverty metrics provide an upper boundary to the number of people who, five to ten years down the line, will have been able to invest in increasing their human capital stock enough to participate in this particular labor market.

- **Percent of population living under poverty line: 27% (CIA World Factbook, 1998)**
- **Household consumption by percentage share: lowest 10% of population, 1.8%;**

highest 10%: 36.6% (CIA World Factbook, 1996)

- **40.2% of housing incorporated substandard materials (INEGI, 1995).**

Basic Education. The acquisition of basic academic skills related to everyday life, is not only a prerequisite for advancing to higher education, but is also the first great boost that empowers individuals to pursue their potential. These skills are required for operation of computers and the degree to which they are acquired throughout the population sets the upper boundary to the number of people employable in the sector for positions with low academic requirement (customer service, etc.).

- **Basic information pulled from education study**

Advanced Education. Higher education allows specialization of individuals into specific professional and academic fields which generate value to high technology industries. The availability of engineers and professionals with a more developed grasp of the technological and management issues affecting the sector limit the formation and growth of new ventures in this sector.

- **Basic information pulled from education study**
- **Percentage of workforce with professional education 8% (INEGI, 1990)**

Factors influencing availability of existing human capital

Job opportunities in Mexico. Skilled workers are at a premium in Mexico. Thus, any venture which employs people with advanced technological skills will face competition from other established sectors in the economy.

- **Engineers (aeronautical, mechanical, industrial, chemical, metallurgical, mining, and electrical) and Management graduates are professional group with highest percentage of workers earning over 10 minimum wages (over 20% of each group) (INEGI, 1990).**

Job opportunities abroad. Jobs in Mexico seldom provide the same degree of compensation to similar jobs in more developed countries. Thus, "brain-drain" is a factor that plays importantly into the availability of highly trained professionals. On a different level, it should be considered that people who migrate not only are usually better trained than the average, but are also more entrepreneurial in nature, and more willing to learn new skills to improve their lot.

- **Percentage of working population living abroad fluctuates between 0.4 - 0.6%, but data likely underestimated (INEGI).**
- **Net migration rate: -2.84 migrant(s)/1,000 population (1999 est.) (CIA World Factbook)**

Demand for labor

Demand for professional services in information technology activities will be driven by a number of factors related to the performance of the industries in which they are employed. This itself will depend on overall macroeconomic conditions, and on the competitive forces at work in the main industries involved.

Macroeconomic factors. The overall state of the economy and its growth will be set the tone for demand of IT qualified personnel. Information on the current state of the economy and future trends will be collected from INEGI, Banxico (central bank), SHCP (Finance Ministry) and research center publications.

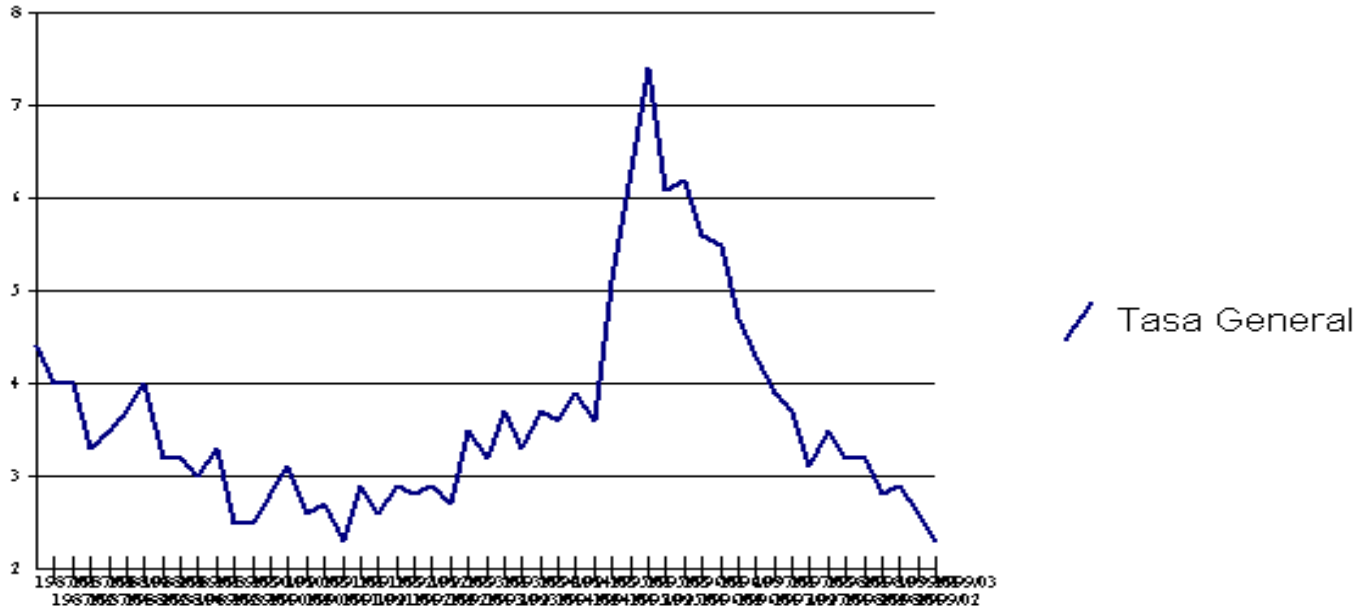
Industry Dynamics. The more important industries (assumed to be market drivers) will be selected on the basis of share in the professional labor market.

- **Distribution of growth by sector (Banxico)**

	GDP	Primary Sector (minus mining)	Mining	**Manuf. Industry**	Construct.	Utilities	Comm., rest., and lodging	**Transport, storage and Telecomm**	**Financial and real estate**	Profess. Services
1998	4.80	0.05	3.39	**7.42**	4.60	4.66	4.22	**10.14**	**3.77**	2.61
1997	6.76	0.16	4.47	**9.96**	9.28	5.21	10.61	**9.93**	**3.73**	3.34
1996	5.15	3.80	8.11	**10.83**	9.77	4.58	4.80	**8.03**	**0.57**	0.99
1995	-6.17	1.83	-2.68	**-4.94**	-23.46	2.15	-15.53	**-4.93**	**-0.32**	-2.32
1994	4.42	0.18	2.54	**4.07**	8.43	4.77	6.78	**8.71**	**5.42**	1.26
1993	1.95	3.08	1.84	**-0.67**	3.02	2.56	0.09	**4.03**	**5.45**	3.32
1992	3.63	-0.97	1.26	**4.16**	6.68	3.07	5.30	**5.29**	**4.58**	1.52
1991	4.22	2.32	1.04	**3.43**	4.88	0.39	6.08	**3.43**	**4.70**	4.48
1990	5.07	5.63	3.39	**6.77**	9.19	2.59	6.21	**3.57**	**4.45**	3.15
1989	4.20	-0.13	-0.29	**7.89**	1.75	4.47	4.62	**4.68**	**3.50**	3.06

All numbers represent percent changes over the previous year's production, at constant prices.

- **GNP from predominantly from services (68%), manufacture (26%) and primary activities (6%) (CIA World Factbook).**
- **Distribution of working population: services 28.8%; agriculture, forestry, hunting, and fishing 21.8%; commerce 17.1%; manufacturing 16.1%, construction 5.2%; public administration and national defense 4.4%; transportation and communications 4.1% (CIA World Factbook).**
- **Unemployment indicators strongly influenced by political cycles and the country's macroeconomic situation (unemployment statistics doubled during nine-month period in 1995).**



Tasa de Desempleo

Information Technology Education in Mexico

10/25/99

Click here to start

Table of Contents

Author: Kristina Stevens

Email: stevensk@leland.Stanford.EDU

Home Page: http://www.stanford.edu/~xfaz/mexico.htm

Information Technology Education in Mexico

Kristina Stevens

10/25/99

INFORMATION TECHNOLOGY ELEMENTARY AND SECONDARY EDUCATION—

- Little information is available on the degree to which Information Technology is integrated into elementary and secondary education. Due to this information gap and the fact that only a handful of K-12 schools host institutional websites, one is lead to believe that Information Technology has not infiltrated into Mexico's primary and secondary educational systems. This assumption is supported by the fact that Mexico's Secretary of Public Education does not require that computer science training be a requisite in the K-12 school curriculum.

- Considered an elective by most K-12 schools, only the top national high schools and professional training schools seem to have implemented Information Technology into their academic programs. One example is the **Instituto Tecnológico de Estudios Superiores de Monterrey,** which requires its students to take courses in Information Systems, Multimedia Introduction, English I-IV and Interactive (for systems technology), Professional Orientation, and Entrepreneurial Development. Also, refer to the Colegio Nacional de Educación Profesional Técnica (CONALEP), described in the professional training link.

- However, compared to the plethora of information on IT academic programs, research centers, support services, etc. in advanced education (please refer to the IT Advanced Education links), it is evident that Information Technology has not pervaded Mexico's primary and secondary educational systems.

10/25/99

INFORMATION TECHNOLOGY ADVANCED EDUCATION—

- **Academic Programs in Information Technology (Advanced Education):**

- Please note that only this not an exhaustive survey of Information Technology programs offered by Mexico's higher education institutions. Instead, the most prestigious academic systems in this country where analyzed to determine the degree of Information Technology-related program offerings. For a breakdown of the computer science curriculum offered in the leading institutions, visit our Information Technology Curriculum in Advanced Education link.

- **Instituto Politécnico Nacional** (National Politechnical Institute)
- B.S. in Technology and Technical Terminal Studies

- **Instituto Tecnólogico Autónoma de México (ITAM)** (Autonomous Technology Institute of Mexico)
- B.S. in Computer Systems Engineering
- M.S. in Informational Technology and Administration

10/25/99

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies); 25 campuses
- B.S., Computer Systems Engineering; Chemical and Systems Engineering; Computer Systems for Management; Electronics and Communications Engineering; Electronic Systems Engineering; Industrial and Systems Engineering; Information Systems; Mechanical Engineering and Management; Mechanical and Electrical Engineering;
- Communication Sciences
- M.S., Intelligent Systems, Biotechnology and Science Information, Computer Science, Communications, System Quality and Productivity, Information Technology, Electronical Engineering and Control, Industrial and Electrical Engineering, Electronic Systems, Telecommunications, Systems Manufacturing, Administration of Technology Information, Administration of Telecommunications
- Ph.D., Computer Science, Industrial Engineering, Artificial Intelligence, Information Science. Program breadth: All doctoral programs hosted at different ITESM campuses (in Spanish). Only the computer science doctoral program is offered in English at one ITESM campus.
- **Universidad Anáhuac** (Anáhuac University)
- B.S., Informational Technology Engineering, Mechanical Engineering, Industrial Engineering
- M.S., Industrial Engineering: Informational Technology; Industrial Engineering: Strategic Planning in Engineering and Technology; Industrial Engineering: Integrated Manufacturing Systems; Engineering: Information Technology and Communications
- Ph.D., Industrial Engineering: Informational Technology and Decision Analysis; Industrial Engineering: Strategic Planning in Engineering and Technology; Industrial Engineering: Integrated Manufacturing Systems

10/25/99

- **Universidad Autonoma Nacional de Mexico (UNAM)** (National Autonomous University of Mexico)
- M.S., Computer Science Engineering, Electrical Engineering, Systems Engineering, Industrial Design, Biotechnology and Information Studies,
- Ph.D., Computer Science Engineering, Electrical Engineering, Systems Engineering, Biotechnology and Information Studies
- Concentrations in: Local Networks and Telecommunications, Market Investigation
- **Universidad de las Américas, Puebla** (University of the Americas)
- B.S., Computer Systems Engineering; Electronic Engineering and Communications/ Computer Science
- M.S., Science with concentration in Computer Science Engineering, Science with concentration in Industrial Engineering; Science with concentration in Mechanical Engineering

- **Universidad Iberoamericana** (Iberoamerican University)
- B.S., Communications and Electronical Engineering
- M.S., Visual Basic Programming
- **Universidad Tecnológico de México (UNITEC)** (Technological University of Mexico)
- B.S., Engineering in Computer Systems; Electrical Engineering and Communications
- Concentrations: Administration of Methods and Informational Services; Development of Informational Systems
- M.S. and Ph.D. programs: none

10/25/99

- **Red Escolar Program** [supported by the **Instituto Latinoamericano de la Comunicación Educativa (ILCE)** (Latin American Institute of Communicative Education) and the **Secretaria de Educación Pública (SEP)** (Secretary of Public Education)]
  - Mission: to provide K-12 Mexican schools appropriate technology and information which addresses teacher and student needs and to prepare them in the operation of emerging information technologies such as programming, Internet navigation, e-mail, video and digital technology. Aspires to: 1) bring specialists in education and telecommunications "virtually" to socially marginalized schools throughout the Mexican federation. 2) increase library archives. 3). Increase dialogue, experimentation and research between students, faculty, and the general public. 4). Motivate teachers and university students to create projects to be incorporate into the Red Escolar network.
  - Services: provides Internet connections, antennas, televisions, VHS players to soliciting schools. Presently, 25,000 antennas have been installed in education centers throughout Mexico.
  - Program Structure: allows K-12 schools throughout the state to access a variety of collaborative learning projects, which are pilot programs developed by educational experts.

10/25/99

PPT Slide

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies); 25 campuses**
- **B.S., Computer Systems Engineering; Chemical and Systems Engineering; Computer Systems for Management; Electronics and Communications Engineering; Electronic Systems Engineering; Industrial and Systems Engineering; Information Systems; Mechanical Engineering and Management; Mechanical and Electrical Engineering;**
- **Communication Sciences**
- **M.S., Intelligent Systems, Biotechnology and Science Information, Computer Science, Communications, System Quality and Productivity, Information Technology, Electronical Engineering and Control, Industrial and Electrical Engineering, Electronic Systems, Telecommunications, Systems Manufacturing, Administration of Technology Information, Administration of Telecommunications**

- **Ph.D., Computer Science, Industrial Engineering, Artificial Intelligence, Information Science. Program breadth: All doctoral programs hosted at different ITESM campuses (in Spanish). Only the computer science doctoral program is offered in English at one ITESM campus.**
- **Universidad Anáhuac (Anáhuac University)**
- **B.S., Informational Technology Engineering, Mechanical Engineering, Industrial Engineering**
- **M.S., Industrial Engineering: Informational Technology; Industrial Engineering: Strategic Planning in Engineering and Technology; Industrial Engineering: Integrated Manufacturing Systems; Engineering: Information Technology and Communications**
- **Ph.D., Industrial Engineering: Informational Technology and Decision Analysis; Industrial Engineering: Strategic Planning in Engineering and Technology; Industrial Engineering: Integrated Manufacturing Systems**

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY EDUCATIONAL PROGRAMS

- **EDUSAT Program** (Educational Television Satellite Network) [supported by the **Instituto Latinoamericano de la Comunicación Educativa (ILCE)** (Latin American Institute of Communicative Education) and the **Secretaria de Educación Pública (SEP)** (Secretary of Public Education)]
  - Mission: to improve the quality of education in Mexico, in particular, adult education.
  - Coverage: 9 educational channels transmitted over the entire American continent with 30,000 reception equipment installed in Mexico. Each state in Mexico has a directive responsible for the region's Edusat implementation.
  - Has produced 26 educational programs (26 minutes each, 13 videos), which aspire to instill a vision of technology education and parent raising among Mexican parents. Also, has published and distributed 35,0000 Edusat Programming Guides to publicize this educational program and provide user-friendly instructions.

10/25/99

PPT Slide

- **Red Escolar Program [supported by the Instituto Latinoamericano de la Comunicación Educativa (ILCE) (Latin American Institute of Communicative Education) and the Secretaria de Educación Pública (SEP) (Secretary of Public Education)]**
    - Mission: to provide K-12 Mexican schools appropriate technology and information which addresses teacher and student needs and to prepare them in the operation of emerging information technologies such as programming, Internet navigation, e-mail, video and digital technology. Aspires to: 1) bring specialists in education and telecommunications "virtually" to socially marginalized schools throughout the Mexican federation. 2) increase library archives. 3). Increase dialogue, experimentation and research between students, faculty, and the general public. 4). Motivate teachers and university students to create projects to be incorporate into the Red Escolar network.
    - Services: provides Internet connections, antennas, televisions, VHS players to soliciting schools. Presently, 25,000 antennas have been installed in education centers throughout Mexico.
    - Program Structure: allows K-12 schools throughout the state to access a variety of collaborative learning projects, which are pilot programs developed by educational experts.
-

Previous slide Back to first slide View graphic version

Information Technology Curriculum in Advanced Education

- Please note that following higher education systems have been selected to demonstrate the breadth of pedagogical approaches to Information Technology Studies in Mexico. ITAM is recognized for the degree to which IT students are connected to private and public industry, facilitating a hands-on learning of emerging technologies and market structures and allowing the transfer of knowledge between the academic and business sectors. It is interesting to note that both ITAM and ITESM encourage student leadership and entrepeneurialship. Also consult the wide range of IT courses offered by the Universidad Nacional Autonóma de México in the UNAM curriculum link.

- Considering the breadth of IT courses offered by UNAM and ITESM, which fulfill the same requisites as Stanford University's computer science programs, it is evident that high quality Information Technology training is available in Mexico.

- **Instituto Tecnólogico Autónoma de México (ITAM)** (Autonomous Technology Institute of Mexico)
- Program Structure: undergraduate and graduate students have the option of working with private or national computer businesses to develop and implement informational technologies and software, design their own business to satisfy the technology demands of the national market, or receive additional training in schools throughout Mexico and the world.

10/25/99

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies)

- *ITESM Curriculum for Undergraduate Students of Computer Science*: Introduction to Computing, Computing for Engineers, Data Base I, II, Organizational Computing, Informational Technologies, Assembling Language, System Design and Technique Analysis, Leadership, Development of an Entrepreneurial Vision I, II, III, Operational Systems, Computing Theories, Computer Networks I,II, Programming Language, Systems Administration, Telecommunications Networks, Systems Production Techniques and Functions, Emerging Information Technologies, Software Engineering Project, Integral Business Solutions, Systems for High-level Organizations I,II, Technologies for Cooperative Work, Software Development, Software Production and Marketing, Professional Values.

- *ITESM Curriculum for Master's Students of Computer Science*: Programming Techniques, Computational Logic, Algorithm Analysis, Automate Theories and Formal Languages, Discrete Mathematics (requirements). Electives (5 required): Design and Validation of Communications Protocol, Distributed Systems I, II, Cola Theories, Local Networks, High Velocity Networks, Network Performance, Data Communication, Digital Networks of Integrated Services, Digital Compression and Transmission of Images, Computer Security I,II, Distributed Data Bases, Network Optimization, Parallel and Distributed Computation, Computer Networks, Communication and Concurrence, Advanced Topics in Computational Networks I, II. Degree subjects (1 required): thesis, practical project, or Optional Course I, II.

10/25/99

- *ITESM Curriculum for Doctoral Candidates of Computer Science*: Prerequisite: TOEFL Preparation, Technical Report Elaboration, Research groups administrations and organization. Research courses: State of the Art, Doctoral Proposal, Doctoral Project I-IV. Basic and Specialty courses (2): Basic Subject I-III, Specialization Subject I-III.

- See UNAM curriculum link

10/25/99

Educational Technology Programs (Advanced Education)

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies)
- Masters, Educational Technology
- Program Breadth: offered through the Virtual University program at ITESM campuses in Monterrey; Eugenio Garza Sada, Irapuato, Querétaro, San Luis Potosi, Toluca, Ciudad Juárez, Chihuahua, Laguna, Saltillo, Sonora, Tampico, Colima, Guadalajara, Central Veracruz, Mexico, D.F.
- For a listing of course offerings and requirements visit: http://www.sistema.itesm.mx/va/graduados/Mte.html.

- Masters, Administration of Educational Technology
- Program Breadth: only offered by ITESM's Virtual University program based in Venezuela
- For a listing of course offerings and requirements visit: http://www.sistema.itesm.mx/va/graduados/Mtt.html.

10/25/99

- Ph.D., Innovation and Educational Technology
- Program Breadth: offered in Spanish at 5 campuses at: Eugenio Garza Sada, Monterrey,
- Laguna, Mexico, D.F., and Irapuato, Querétaro.
- No information available on target student population.
- For a listing of course offerings and requirements visit: http://www.sistema.itesm.mx/va/graduados/Dee.html.

- **Universidad Anáhuac** (Anáhuac University)
- Concentrations in: Educational Technology and New Technologies Applied to Education
- Objectives: to form specialists in the field of Applied Educational Technology to strengthen the teaching-learning process in informal and formal education (high school, undergraduate and graduate levels)
- Target Student Population: Instructors and directors of training departments and human resources development in public and private businesses and teaching staff of middle and advanced educational institutions.

10/25/99

- Curriculum: Introduction to New Educational Technologies; Theories of Pedagogical Teaching; Information Technology; Instructional Models and Design; Teaching Strategies; Educational Technology Prospects; Learning Methods and Resources; New Technologies Applied to Education; Multimedia Education; Instruments of Evaluation; Institutional Evaluation; Evaluation of Learning-Teaching Process
- **Universidad de las Américas, Puebla**
- M.A., Information Design
- Objective: to train students to reduce the cognitive complexity of mass information produced and distributed in society, in particular through the use of digital technology to: 1). generate further investigation on information design. 2) foster the professional development of the student and discipline
- Target Student Population: working professionals and researchers of information design in the disciplines of science, engineering, education, administration.
- Program Structure: students pursue three general areas of thematic investigation which help generate research projects generated in this academic program. The areas of investigation include: information design for education and the community, visualization of scientific information and design for corporate and institutional communication. For a listing of course offerings, please visit: http://www.pue.udlap.mx/posgrado/mteo.htm#plantd.

10/25/99

- **Universidad Autonoma Nacional de Mexico (UNAM)** (National Autonomous University of Mexico)

- M.A., Library Services and Information Studies
- Objective: to form academic professionals to: 1) conceptualize social, economic and environmental determinants that affect the production, classification, and diffusion of documents and information systems and 2) offer alternative uses for the development of technology information in the country and innovative methods of improving the community's library services and information systems
- Target Student Population: undergraduate students who majored in library services, the science of informational documentation or a related discipline.
- Program Structure: 80 credits in the areas of: Information, Knowledge and Society; Organization of Information Documentation; Information Technology; Information Systems and Library Services; Users of Information.
- For a listing of specific class requirements and offerings consult: http://www.posgrado.unam.mx/.

10/25/99

- Ph.D., Library Services and Information Studies
- Objective: to form academic professionals to: 1). participate in research teams with specialists of diverse disciplines to develop innovative investigation projects. 2). Promote communication between specialists and diverse scientific and humanist disciplines concerning the problems of library services and information studies.
- Target Student Populaton: Master's students of library services or information studies. Program Structure: 10 semesters, emphasis placed on developing a research project, which will culminate in a doctoral thesis that is supervised by a tutorial committee.

10/25/99

Information Technology Requirements in Teacher Education Programs (Advanced Education)

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies)
- Courses in the field of Information Technology required by ITESM Master's programs in education:
  - Design, Development and Implementation of Projects in Educational Technology: Concentration in Cognition in the Process of Learning-Teaching
  - Use of Information Technologies for Long Distance Learning: Concentration in Cognition in the Process of Learning-Teaching, Concentration in Administration of Education Institutions
  - Educational Innovations: Concentration in Cognition in the Process of Learning-Teaching; Concentration in Humanities; Concentration in Applied Linguistics (Spanish and English Foreign Language Programs); Concentration in Mathematics; Concentration in International Relations
  - Theory of Mass Communication: Actual Tendencies and International Communication I, II: Concentration in Communication

10/25/99

- **Universidad de las Américas, Puebla**
- Undergraduate Program in Educational Sciences
  - One area of investigation is dedicated to educational technology (including courses on designing educational software), computer science training, and the use of computers in the educational sector (6 credits total)
  - To elaborate educational materials, the Department of Education has a laboratory equipped with vanguard technology
  - Required courses in the area of Information Technology include: Educational Technology and Schooling Methods, Computer Science Education I, II and Educational Technology and Training. Elective: Computational Tools.
- Master's Program in Quality of Education (Social Science Division)
  - Required courses in the field of Information Technology: Educational Technology and Instructional Design. Elective: Media and New Technologies.

10/25/99

- **Universidad Iberoamericana** (Iberoamerican University)
  - Mexico D.F. Campus: only has one Master's program in Investigation and Educational Development and there is no emphasis placed on Information Technology
  - Puebla Campus: only offers a Ph.D. program in Education, which fails to incorporate Information Technology in its curriculum
  - Laguna Campus: its undergraduate program in Education includes course offerings on Educational Technology and Technology and Educational Communication. The Master's program in education, however, does not focus on Information Technology.
  - Leon Campus: offers a Master's program in Education, which includes a course on Educational Innovations.
  - Note that there are no requirements for computer training among the various education programs at Universidad Iberoamericana campuses.

- **Universidad Nacional Autonoma de Mexico (UNAM)** (National Autonomous University of Mexico)
- No information available on academic programs in education aside from the Master's and Ph.D. programs in Library Services and Information Studies described in the Educational Technology Program links.
- **Note:** Neither the **Universidad Tecnológico de México (UNITEC)** nor the **Instituto Tecnólogico Autónoma de México (ITAM)** offer academic programs in the field of education.

10/25/99

Advanced Education Computer Facilities and Services:

- **Universidad Anáhuac** (Anáhuac University)
- Computer Facilities:
  - 10 computer labs, 40 technology-equipped classrooms, 3 magna classrooms, 12 special workshops, 4 specialized computing rooms, 350 terminals (as of June 1992).
- Educational Technology Services:
  - "Virtual University," utilizes digital technology with support from TELMEX to produce 50 educational programs, which reach out to 3,500 undergraduate and postgraduate students in Cancún, León, Puebla, Torreón, and Querátaro
- Internet Services:
  - E-mail directory of the directives and principal areas of Anáhuac University
  - Search engines: Anáhuac White Pages, E-mail and Telephone System Search

10/25/99

- **Universidad Autonoma Nacional de Mexico** (National Autonomous University of Mexico)
- UNAM Telecommunications Networks:
  - 2 networks with Internet providers: Advanced Network & Systems, Inc. (Houston, Texas) and Rice University (Houston, Texas), which service the UNAM community and its outlying dependents.
  - 1). NetworkUNAM's Information Center (NICunam). Objective: facilitate technical, administrative, and procedural information on UNAM's Internet database and provide support to UNAM user's as well as the national and international academic community.
  - 2). NetworkUNAM's Center of Operation (NOC-UNAM). Objective: coordinate and monitor the NOC network for all University campuses and institutions and facilitate their connection to the Internet.
  - 200 local nets connected via TCP-IP
- UNAM Online Information Services:
  - News Systems (catalogues of newspapers, magazines, journals; UNAM Gazette; UNAM Weekly Informational Synthesis Agenda)

10/25/99

- Electronic Library and Newspaper Archive (also includes Library of the Future program)
- Electronic Magazines and Bulletins (Informational Bulletin of the General Director of Academic Exchange; College of Science and Humanities Gazette: Educational Profile Magazine; School of Medicine Gazette; D.G.S.C.A. Library Magazines; Mexican Magazine of Sociology; *Informa* Economy Magazine; University's Center for Bibliotechnology Magazine; Institute of Economic Investigations' Weekly Newspaper Archive Synthesis; ENLACE Bulletin; and Coordination of the Humanities' Latin American Bulletin on Biomathematics)
- Library Catalogues (General Library Directive; D.G.S.C.A. Libraries' Consulting Archive; D.G.S.C.A. Libraries' Consulting Magazine Archive; Catalogue of Mexican Magazine; Catalogue of Electronic Magazines from the School of Medicine)
- Image Catalogue (Summary of National Herbarium's Specimens; Images of the Mexican State; Images of the University's Program of Investigation and Spatial Development)

10/25/99

- Databases (Center of Interdisciplinary Investigations of the Humanities; Latin American Group of Investigations on Metabolic Diseases; Institute of Philosophic Investigations; Systems of Information on Latin American and Caribbean Higher Education Institutions and Personal Investigation Projects)
- Gateways (lists of UNAM links and general websites on the WWW in Mexico)

UNAM Computer Services:

- E-mail service for the entire University community and general public
- Archive Server, which is accessible through anonymous FTP programs.
- Various UNIX systems for investigative research and compiling of information (must be accessed through remote systems).
- Gopher systems
  - INFO-UNAM: allows University users and worldwide browsers to access general information published by UNAM.
  - Additional gopher systems in individual departments, institutes and investigation centers.
  - Veronica server: search engine for the majority of Internet gopher systems (first such server implemented in Latin America in June 1995).

10/25/99

- UNAM Computer Facilities:
  - 8,000 computers, 4,500 microcomputers, a CRAY Y-MP4/464 supercomputer within the UNAM network.
  - 150 computing centers with mainframes, servers, laser printers, workstations of varying brands: Sun, Hewlett Packard, Unisys, IBM, Silicon Graphics, Next, and DEC.

- **Universidad de las Américas, Puebla** (University of the Americas)
- Computer Facilities:
  - 5 computer classrooms and 1 laboratory (486 microprocessors; digital design system, antenna equipment)
- Computer and Internet Services:
  - All students have access to Internet, computer and programming training, and technical support free of charge.

10/25/99

- **Universidad Iberoamericana** (Iberoamerican University)
- Computer Facilities
  - Multimedia and engineering library, projection rooms, magna classrooms, satellite reception equipment, computing center and Internet service
- Educational Technology Services
  - Videoconferencing via San Diego State University's International Training Center on technology transfer, global markets and communication systems at a cost of $300

10/25/99

INFORMATION TECHNOLOGY TEACHER TRAINING AND SUPPORT SERVICES

- **Centro de Documentación para América Latina** (Documentation Center for Latin America), directed by the **Instituto Latinoamericano de la Comunicación Educativa (ILCE)** (Latin American Institute of Communicative Education).
  - Mission: to provide information to support academic activities, audiovisual production, project investigation and regional cooperation.
  - Services: bibliographic, text and audiovisual orientation, access to CD-based information banks, online bibliographic searches, internal consulting, external loans, microfiche text consulting, audiovisual consulting and loan, interlibrary loan programs, bibliographic photocopies and documents.
  - Documents: annual bibliographic acquisitions, bulletins of new acquisitions, summary bulletins, catalogues of documents and periodicals, analytic reviews.

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies)

10/25/99

- Technology Support for Educators (via the Vice Rectory of Technological Innovation and Internationalization) provides:
  - Resources for technology support used by professors in their courses (organized by discipline)
  - Contact form for teachers who desire support in using technology in the classroom
  - Help to resolve technical problems or doubts about Learning Space (including Learning Space online manuals, FAQs, and consultants)
  - Information support in installing Norton Antivirus, using MSChat, software licensing, ITESM technology projects, documentation on the ITESM network, etc.
  - Orientation on distinct computer products

- Teacher training in a variety of courses including: Lotus Notes, Microsoft Windows NT 4.0, Java and other programs. Consult the calendar of events for more information on specific courses offered: http://te.mty.itesm.mx/viti/.

10/25/99

- **Secretaria de Educación Pública (SEP)** (Secretary of Public Education)
- IT Teacher Training and Professional Development:
  - SEP's Unidad de Normatividad y Desarrollo para la Actualización, Capacitación y Superación de Maestros (UN y PACT) (Teacher Training College Entity and Development for the Modernization, Training and Excelling of Teachers. Has established 300 centers throughout Mexico to provide teacher consulting, assesory and follow-up for National Modernization Courses (see below) and federal programs such as EDUSAT (see IT virtual programs link).
  - SEP National Modernization Courses offered to teachers in the following areas: Windows; Excel; Introduction to Computing; Programming; Designing Educational Materials for Computing; Technology and Education; Analysis of Technical Objectives as a Work Method; Evaluation of Learning in Education Technology; Simulation Games in Teaching Technology; Didactic Planning in Education Technology; Proposals for Didactic Work in Educational Technology; Video Technology; Developing Sustainable Technology and its Challenges for Educational Systems; Computer and Educational Use in Preschool Classrooms).
  - Coordinated by SEP and the **Instituto Latinoamericano de la Comunicación Educativa (ILCE)** (Latin American Institute of Communicative Education), the RedEscolar Virtual Program (see IT virtual programs link) imparts K-12 national IT teacher workshops on Learning Circles, Methods of Distance Learning, Pedagogic Use of Television, Didactic Strategies for Teaching Geography, and Didactic Strategies for Teaching Spanish, which are facilitated by a team of education and telecommunications specialists. Teachers accredited for receiving workshops.

10/25/99

SEP Teacher Support and IT Services

- Online study plans, programs, and authorized textbooks for primary and secondary education.
- Study plans for teacher college training in primary education (provided by SEP's Program for the Transformation and Academic Strengthening of Primary Teacher Training Colleges)
- Links to online teacher support materials including catalogues, books, study guides, etc. In particular, SEP has partnered with UNESCO to create the **Center of International Documentation**, which is a gateway of information on education, science, culture, publications, loans, and educational CD-Rom's. The Center also provides assessory, audiovisual consulting, and photocopies of documents and research investigations.
- SEP's 300 **UN y PACT Centers** throughout Mexico provide K-12 teachers with projection and audiovisual materials, multimedia resources, computer and Internet access, educational packets and materials library, and TV monitors with Red EDUSAT (see virtual programs links) connections.
- SEP and ILCE's **Red Escolar** program allows teachers to access educational databases on pedagogical concepts, videos, documents, and webpages of educational value.
- SEP's Program of Teacher Improvement (Promep) offers teachers of all levels opportunities for professional development including educational scholarships, academic links with foreign countries, workshops, and IT systems.
- SEP's **Subsecretary of Superior Education and Science Education** offers software programs, which can be downloaded from the Internet, as well as kioskos, and linkls to chat rooms, calendar of events and educational search engines.

10/25/99

INFORMATION TECHNOLOGY PROFESSIONAL TRAINING

- **Colegio Nacional de Educación Profesional Técnica (CONALEP)** (National College of Professional Technical Education)
- Institutional history: created by the federal government in 1978 to train professionals in information technology.
- Program structure: students learn to operate, analyze, and design information systems by studying general application software and techniques of analysis and system design.

- **Instituto Tecnológico de Estudios Superiores de Monterrey's (ITESM)** (Monterrey Technological Institute of Superior Studies) **Center for Information Technology (CTI)** offers courses in: Operation and Administration of Systems RISC/6000 and AS400, and Operation, Administration and Maintenance of Computer Networks; diplomas in: Expert Systems, and Telecommunications; and a Master's program in Science in the Computer School.

- **Universidad Hispanoamericana** (Hispanic American University) offers videoconferencing via San Diego State University's International Training Center on IT issues including Technology Transfer, Global Markets, Global Communication Systems at a cost of $300 per conference.

- **Universidad Iberoamericana** (Iberoamerican University) offers diplomas in the area of communications.

10/25/99

- **Universidad Tecnológica de México (UNITEC)** (Technological University of Mexico) offers University extension classes to the general public in computer science training (PCS, operating systems, Windows, Excel, Word, Programming, Internet, Viruses, Databases) and diplomas in computer science training and administration of UNIX systems.

10/25/99

INFORMATION TECHNOLOGY INTERNATIONAL TRAINING

- **Instituto Tecnológico de Estudios Superiores de Monterrey's (ITESM)** (Monterrey Technological Institute of Superior Studies)
- Special Programs: Intensive English Language Programs at the University of British Columbia and four North American Universities (cost: U.S. $4,750 for 12 weeks and $6,750 for 18 weeks), Professional Practice Programs at University of Detroit-Mercy (cost of ITESM tuition), Washington Center (U.S. $5,500), System Development Life Center, Singapore (for systems engineer, compensation:$500/month).

- **Universidad Anáhuac** (Anáhuac University)
- Exchange Programs: in Chile and Spain with Universidad Fransisco
- Sister campuses: Merida, Veracruz, Ciudad de Mexico

- Exchange Programs also offered by UNAM, Universidad Iberoamericana, ITAM, Universidad de las Americas, Puebla

10/25/99

INFORMATION TECHNOLOGY EDUCATIONAL RESEARCH AND DEVELOPMENT

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM)** (Monterrey Technological Institute of Superior Studies)

  - XXX Congress of Investigation and Extention of the ITESM System, organism dedicated to innovation, technology development and educational improvement at ITESM
  - The Center for Information Technology (CTI) offers services, consulting and research projects in the following areas: Development of Information Systems; Scientific Simulation and Graphic Representation of Information; Development of Multimedia Systems; Analysis and Design of Databases; Development and Implementation of Computational Systems; Design, Implementation and Development of Computer Networks; Development of Solutions to Engineering, Administrative, Scientific Problems, utilizing advanced computing techniques; Development of Computer Graphic Systems; Development of Executive Informational Systems; Development of Information Systems under the Client-Server Architecture; Auditing Information Systems; Development of Visual Computational Systems; Patron Voice Recognition; and Development of Artificial Intelligence Systems.

- **Universidad Anáhuac** (Anáhuac University)
- Anáhuac Center for Investigation and Strategic Development (CAIDE)
- Mission: to promote and coordinate the University's scientific investigations and facilitate the transfer of technology and knowledge to service the public and private sectors.

10/25/99

- Organization: 150 investigators funded by the University and private entrepeneurs in the following areas: Center of High Direction of Economics and Business; Center of High Direction of Engineering and Technology; Center of Investigation in Educational Computing; Anahuac Center of Investigation in Educational Services; Center of Scientific Investigation and Tourism Technology; Center of Investigation in Applied Mathematics and Finances; and 6 other centers in the sciences and humanities.

- **Universidad Iberoamericana** (Iberoamerican University)
- Center for Social Promotion and Service (CSPS) researches development, innovation and adaptation of sustainable technology in marginalized sectors and provides consulting to microindustry.

10/25/99

INFORMATION TECHNOLOGY ADVANCED EDUCATION—

- **Academic Programs in Information Technology (Advanced Education):**
- **Please note that only this not an exhaustive survey of Information Technology programs offered by Mexico's higher education institutions. Instead, the most prestigious academic systems in this country where analyzed to determine the degree of Information Technology-related program offerings. For a breakdown of the computer science curriculum offered in the leading institutions, visit our Information Technology Curriculum in Advanced Education link.**
- **Instituto Politécnico Nacional (National Politechnical Institute)**
- **B.S. in Technology and Technical Terminal Studies**
- **Instituto Tecnólogico Autónoma de México (ITAM) (Autonomous Technology Institute of Mexico)**

- **B.S. in Computer Systems Engineering**
- **M.S. in Informational Technology and Administration**

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY ELEMENTARY AND SECONDARY EDUCATION—

- **Little information is available on the degree to which Information Technology is integrated into elementary and secondary education. Due to this information gap and the fact that only a handful of K-12 schools host institutional websites, one is lead to believe that Information Technology has not infiltrated into Mexico's primary and secondary educational systems. This assumption is supported by the fact that Mexico's Secretary of Public Education does not require that computer science training be a requisite in the K-12 school curriculum.**
- **Considered an elective by most K-12 schools, only the top national high schools and professional training schools seem to have implemented Information Technology into their academic programs. One example is the Instituto Tecnológico de Estudios Superiores de Monterrey, which requires its students to take courses in Information Systems, Multimedia Introduction, English I-IV and Interactive (for systems technology), Professional Orientation,**

- **and Entrepreneurial Development. Also, refer to the Colegio Nacional de Educación Profesional Técnica (CONALEP), described in the professional training link.**
- **However, compared to the plethora of information on IT academic programs, research centers, support services, etc. in advanced education (please refer to the IT Advanced Education links), it is evident that Information Technology has not pervaded Mexico's primary and secondary educational systems.**

Previous slide Next slide Back to first slide View graphic version

Information Technology Education in Mexico

Kristina Stevens

Next slide Back to first slide View graphic version

Information Technology Curriculum in Advanced Education

- **Please note that following higher education systems have been selected to demonstrate the breadth of pedagogical approaches to Information Technology Studies in Mexico. ITAM is recognized for the degree to which IT students are connected to private and public industry, facilitating a hands-on learning of emerging technologies and market structures and allowing the transfer of knowledge between the academic and business sectors. It is interesting to note that both ITAM and ITESM encourage student leadership and entrepeneurialship. Also consult the wide range of IT courses offered by the Universidad Nacional Autonóma de México in the UNAM curriculum link.**
- **Considering the breadth of IT courses offered by UNAM and ITESM, which fulfill the same requisites as Stanford University's computer science programs, it is evident that high quality Information Technology training is available in Mexico.**

- **Instituto Tecnólogico Autónoma de México (ITAM) (Autonomous Technology Institute of Mexico)**
- **Program Structure: undergraduate and graduate students have the option of working with private or national computer businesses to develop and implement informational technologies and software, design their own business to satisfy the technology demands of the national market, or receive additional training in schools throughout Mexico and the world.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Universidad Autonoma Nacional de Mexico (UNAM) (National Autonomous University of Mexico)
- M.S., Computer Science Engineering, Electrical Engineering, Systems Engineering, Industrial Design, Biotechnology and Information Studies,
- Ph.D., Computer Science Engineering, Electrical Engineering, Systems Engineering, Biotechnology and Information Studies
- Concentrations in: Local Networks and Telecommunications, Market Investigation
- Universidad de las Américas, Puebla (University of the Americas)
- B.S., Computer Systems Engineering; Electronic Engineering and Communications/ Computer Science
- M.S., Science with concentration in Computer Science Engineering, Science with concentration in Industrial Engineering; Science with concentration in Mechanical Engineering
-

- **Universidad Iberoamericana (Iberoamerican University)**
- **B.S., Communications and Electronical Engineering**
- **M.S., Visual Basic Programming**
- **Universidad Tecnológico de México (UNITEC) (Technological University of Mexico)**
- **B.S., Engineering in Computer Systems; Electrical Engineering and Communications**
- **Concentrations: Administration of Methods and Informational Services; Development of Informational Systems**
- **M.S. and Ph.D. programs: none**

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY EDUCATIONAL PROGRAMS

- **EDUSAT Program (Educational Television Satellite Network) [supported by the Instituto Latinoamericano de la Comunicación Educativa (ILCE) (Latin American Institute of Communicative Education) and the Secretaria de Educación Pública (SEP) (Secretary of Public Education)]**
  - Mission: to improve the quality of education in Mexico, in particular, adult education.
  - Coverage: 9 educational channels transmitted over the entire American continent with 30,000 reception equipment installed in Mexico. Each state in Mexico has a directive responsible for the region's Edusat implementation.
  - Has produced 26 educational programs (26 minutes each, 13 videos), which aspire to instill a vision of technology education and parent raising among Mexican parents. Also, has published and distributed 35,0000 Edusat Programming Guides to publicize this educational program and provide user-friendly instructions.

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies)
- ITESM Curriculum for Undergraduate Students of Computer Science: Introduction to Computing, Computing for Engineers, Data Base I, II, Organizational Computing, Informational Technologies, Assembling Language, System Design and Technique Analysis, Leadership, Development of an Entrepreneurial Vision I, II, III, Operational Systems, Computing Theories, Computer Networks I,II, Programming Language, Systems Administration, Telecommunications Networks, Systems Production Techniques and Functions, Emerging Information Technologies, Software Engineering Project, Integral Business Solutions, Systems for High-level Organizations I,II, Technologies for Cooperative Work, Software Development, Software Production and Marketing, Professional Values.
- ITESM Curriculum for Master's Students of Computer Science: Programming Techniques, Computational Logic, Algorithm Analysis,

Automate Theories and Formal Languages, Discrete Mathematics (requirements). Electives (5 required): Design and Validation of Communications Protocol, Distributed Systems I, II, Cola Theories, Local Networks, High Velocity Networks, Network Performance, Data Communication, Digital Networks of Integrated Services, Digital Compression and Transmission of Images, Computer Security I,II, Distributed Data Bases, Network Optimization, Parallel and Distributed Computation, Computer Networks, Communication and Concurrence, Advanced Topics in Computational Networks I, II. Degree subjects (1 required): thesis, practical project, or Optional Course I, II.

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **ITESM Curriculum for Doctoral Candidates of Computer Science: Prerequisite: TOEFL Preparation, Technical Report Elaboration, Research groups administrations and organization. Research courses: State of the Art, Doctoral Proposal, Doctoral Project I-IV. Basic and Specialty courses (2): Basic Subject I-III, Specialization Subject I-III.**
- **See UNAM curriculum link**

Previous slide Next slide Back to first slide View graphic version

Educational Technology Programs (Advanced Education)

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies)**
- **Masters, Educational Technology**
- **Program Breadth: offered through the Virtual University program at ITESM campuses in Monterrey; Eugenio Garza Sada, Irapuato, Querétaro, San Luis Potosi, Toluca, Ciudad Juárez, Chihuahua, Laguna, Saltillo, Sonora, Tampico, Colima, Guadalajara, Central Veracruz, Mexico, D.F.**
- **For a listing of course offerings and requirements visit:**
- **http://www.sistema.itesm.mx/va/graduados/Mte.html.**
- **Masters, Administration of Educational Technology**
- **Program Breadth: only offered by ITESM's Virtual University program based in Venezuela**
- **For a listing of course offerings and requirements visit: http://www.sistema.itesm.mx/va/graduados/Mtt.html.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Ph.D., Innovation and Educational Technology
- Program Breadth: offered in Spanish at 5 campuses at: Eugenio Garza Sada, Monterrey,
- Laguna, Mexico, D.F., and Irapuato, Querétaro.
- No information available on target student population.
- For a listing of course offerings and requirements visit: http://www.sistema.itesm.mx/va/graduados/Dee.html.
- Universidad Anáhuac (Anáhuac University)
- Concentrations in: Educational Technology and New Technologies Applied to Education
- Objectives: to form specialists in the field of Applied Educational Technology to strengthen the teaching-learning process in informal and formal education (high school, undergraduate and graduate levels)
- Target Student Population: Instructors and directors of training departments and human resources development in public and private businesses and teaching staff of middle and advanced educational institutions.

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Curriculum: Introduction to New Educational Technologies; Theories of Pedagogical Teaching; Information Technology; Instructional Models and Design; Teaching Strategies; Educational Technology Prospects; Learning Methods and Resources; New Technologies Applied to Education; Multimedia Education; Instruments of Evaluation; Institutional Evaluation; Evaluation of Learning-Teaching Process**
- **Universidad de las Américas, Puebla**
- **M.A., Information Design**
- **Objective: to train students to reduce the cognitive complexity of mass information produced and distributed in society, in particular through the use of digital technology to: 1). generate further investigation on information design. 2) foster the professional development of the student and discipline**
- **Target Student Population: working professionals and researchers of information design in the disciplines of science, engineering, education, administration.**

- **Program Structure: students pursue three general areas of thematic investigation which help generate research projects generated in this academic program. The areas of investigation include: information design for education and the community, visualization of scientific information and design for corporate and institutional communication. For a listing of course offerings, please visit: http://www.pue.udlap.mx/posgrado/mteo.htm#plantd.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Universidad Autonoma Nacional de Mexico (UNAM) (National Autonomous University of Mexico)
- M.A., Library Services and Information Studies
- Objective: to form academic professionals to: 1) conceptualize social, economic and environmental determinants that affect the production, classification, and diffusion of documents and information systems and 2) offer alternative uses for the development of technology information in the country and innovative methods of improving the community's library services and information systems
- Target Student Population: undergraduate students who majored in library services, the science of informational documentation or a related discipline.
- Program Structure: 80 credits in the areas of: Information, Knowledge and Society; Organization of Information Documentation; Information Technology; Information Systems and Library Services; Users of Information.

- **For a listing of specific class requirements and offerings consult: http://www.posgrado.unam.mx/.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Ph.D., Library Services and Information Studies**
- **Objective: to form academic professionals to: 1). participate in research teams with specialists of diverse disciplines to develop innovative investigation projects. 2). Promote communication between specialists and diverse scientific and humanist disciplines concerning the problems of library services and information studies.**
- **Target Student Populaton: Master's students of library services or information studies. Program Structure: 10 semesters, emphasis placed on developing a research project, which will culminate in a doctoral thesis that is supervised by a tutorial committee.**

Previous slide Next slide Back to first slide View graphic version

Information Technology Requirements in Teacher Education Programs (Advanced Education)

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies)**
- **Courses in the field of Information Technology required by ITESM Master's programs in education:**
  - Design, Development and Implementation of Projects in Educational Technology: Concentration in Cognition in the Process of Learning-Teaching
  - Use of Information Technologies for Long Distance Learning: Concentration in Cognition in the Process of Learning-Teaching, Concentration in Administration of Education Institutions
  - Educational Innovations: Concentration in Cognition in the Process of Learning-Teaching; Concentration in Humanities; Concentration in Applied Linguistics (Spanish and English Foreign Language Programs); Concentration in Mathematics; Concentration in International Relations
  - Theory of Mass Communication: Actual Tendencies and International Communication I, II: Concentration in Communication

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Universidad de las Américas, Puebla**
- **Undergraduate Program in Educational Sciences**
  - One area of investigation is dedicated to educational technology (including courses on designing educational software), computer science training, and the use of computers in the educational sector (6 credits total)
  - To elaborate educational materials, the Department of Education has a laboratory equipped with vanguard technology
  - Required courses in the area of Information Technology include: Educational Technology and Schooling Methods, Computer Science Education I, II and Educational Technology and Training. Elective: Computational Tools.
- **Master's Program in Quality of Education (Social Science Division)**
  - Required courses in the field of Information Technology: Educational Technology and Instructional Design. Elective: Media and New Technologies.

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Universidad Iberoamericana (Iberoamerican University)**
  - Mexico D.F. Campus: only has one Master's program in Investigation and Educational Development and there is no emphasis placed on Information Technology
  - Puebla Campus: only offers a Ph.D. program in Education, which fails to incorporate Information Technology in its curriculum
  - Laguna Campus: its undergraduate program in Education includes course offerings on Educational Technology and Technology and Educational Communication. The Master's program in education, however, does not focus on Information Technology.
  - Leon Campus: offers a Master's program in Education, which includes a course on Educational Innovations.
  - Note that there are no requirements for computer training among the various education programs at Universidad Iberoamericana campuses.
- **Universidad Nacional Autonoma de Mexico (UNAM) (National Autonomous University of Mexico)**
- **No information available on academic programs in education aside from the Master's and Ph.D. programs in Library Services and Information Studies described in the Educational Technology Program links.**
- **Note: Neither the Universidad Tecnológico de México (UNITEC) nor the Instituto Tecnólogico Autónoma de México (ITAM) offer academic programs in the field of education.**

Previous slide Next slide Back to first slide View graphic version

Advanced Education Computer Facilities and Services:

- ## Universidad Anáhuac (Anáhuac University)
- ## Computer Facilities:
  - 10 computer labs, 40 technology-equipped classrooms, 3 magna classrooms, 12 special workshops, 4 specialized computing rooms, 350 terminals (as of June 1992).
- ## Educational Technology Services:
  - “Virtual University,” utilizes digital technology with support from TELMEX to produce 50 educational programs, which reach out to 3,500 undergraduate and postgraduate students in Cancún, León, Puebla, Torreón, and Querátaro
- ## Internet Services:
  - E-mail directory of the directives and principal areas of Anáhuac University
  - Search engines: Anáhuac White Pages, E-mail and Telephone System Search

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Universidad Autonoma Nacional de Mexico (National Autonomous University of Mexico)**
- **UNAM Telecommunications Networks:**
  - 2 networks with Internet providers: Advanced Network & Systems, Inc. (Houston, Texas) and Rice University (Houston, Texas), which service the UNAM community and its outlying dependents.
  - 1). NetworkUNAM's Information Center (NICunam). Objective: facilitate technical, administrative, and procedural information on UNAM's Internet database and provide support to UNAM user's as well as the national and international academic community.
  - 2). NetworkUNAM's Center of Operation (NOC-UNAM). Objective: coordinate and monitor the NOC network for all University campuses and institutions and facilitate their connection to the Internet.
  - 200 local nets connected via TCP-IP
- **UNAM Online Information Services:**
  - News Systems (catalogues of newspapers, magazines, journals; UNAM Gazette; UNAM Weekly Informational Synthesis Agenda)

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Electronic Library and Newspaper Archive (also includes Library of the Future program)
- Electronic Magazines and Bulletins (Informational Bulletin of the General Director of Academic Exchange; College of Science and Humanities Gazette: Educational Profile Magazine; School of Medicine Gazette; D.G.S.C.A. Library Magazines; Mexican Magazine of Sociology; Informa Economy Magazine; University's Center for Bibliotechnology Magazine; Institute of Economic Investigations' Weekly Newspaper Archive Synthesis; ENLACE Bulletin; and Coordination of the Humanities' Latin American Bulletin on Biomathematics)
- Library Catalogues (General Library Directive; D.G.S.C.A. Libraries' Consulting Archive; D.G.S.C.A. Libraries' Consulting Magazine Archive; Catalogue of Mexican Magazine; Catalogue of Electronic Magazines from the School of Medicine)
- Image Catalogue (Summary of National Herbarium's Specimens; Images of the Mexican State; Images of the University's Program of Investigation and Spatial Development)

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Databases (Center of Interdisciplinary Investigations of the Humanities; Latin American Group of Investigations on Metabolic Diseases; Institute of Philosophic Investigations; Systems of Information on Latin American and Caribbean Higher Education Institutions and Personal Investigation Projects)
- Gateways (lists of UNAM links and general websites on the WWW in Mexico)

UNAM Computer Services:

- E-mail service for the entire University community and general public
- Archive Server, which is accessible through anonymous FTP programs.
- Various UNIX systems for investigative research and compiling of information (must be accessed through remote systems).
- Gopher systems
  - INFO-UNAM: allows University users and worldwide browsers to access general information published by UNAM.
  - Additional gopher systems in individual departments, institutes and investigation centers.
  - Veronica server: search engine for the majority of Internet gopher systems (first such server implemented in Latin America in June 1995).

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **UNAM Computer Facilities:**
  - 8,000 computers, 4,500 microcomputers, a CRAY Y-MP4/464 supercomputer within the UNAM network.
  - 150 computing centers with mainframes, servers, laser printers, workstations of varying brands: Sun, Hewlett Packard, Unisys, IBM, Silicon Graphics, Next, and DEC.
- **Universidad de las Américas, Puebla (University of the Americas)**
- **Computer Facilities:**
- **5 computer classrooms and 1 laboratory (486 microprocessors; digital design system, antenna equipment)**
- **Computer and Internet Services:**
- **All students have access to Internet, computer and programming training, and technical support free of charge.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- Universidad Iberoamericana (Iberoamerican University)
- Computer Facilities
- Multimedia and engineering library, projection rooms, magna classrooms, satellite reception equipment, computing center and Internet service
- Educational Technology Services
- Videoconferencing via San Diego State University's International Training Center on technology transfer, global markets and communication systems at a cost of $300

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY TEACHER TRAINING AND SUPPORT SERVICES

- **Centro de Documentación para América Latina (Documentation Center for Latin America), directed by the Instituto Latinoamericano de la Comunicación Educativa (ILCE) (Latin American Institute of Communicative Education).**
    - Mission: to provide information to support academic activities, audiovisual production, project investigation and regional cooperation.
    - Services: bibliographic, text and audiovisual orientation, access to CD-based information banks, online bibliographic searches, internal consulting, external loans, microfiche text consulting, audiovisual consulting and loan, interlibrary loan programs, bibliographic photocopies and documents.
    - Documents: annual bibliographic acquisitions, bulletins of new acquisitions, summary bulletins, catalogues of documents and periodicals, analytic reviews.
- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies)**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Technology Support for Educators (via the Vice Rectory of Technological Innovation and Internationalization) provides:**
  - Resources for technology support used by professors in their courses (organized by discipline)
  - Contact form for teachers who desire support in using technology in the classroom
  - Help to resolve technical problems or doubts about Learning Space (including Learning Space online manuals, FAQs, and consultants)
  - Information support in installing Norton Antivirus, using MSChat, software licensing, ITESM technology projects, documentation on the ITESM network, etc.
  - Orientation on distinct computer products
- **Teacher training in a variety of courses including: Lotus Notes, Microsoft Windows NT 4.0, Java and other programs. Consult the calendar of events for more information on specific courses offered: http://te.mty.itesm.mx/viti/.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Secretaria de Educación Pública (SEP) (Secretary of Public Education)**
- **IT Teacher Training and Professional Development:**
  - SEP's Unidad de Normatividad y Desarrollo para la Actualización, Capacitación y Superación de Maestros (UN y PACT) (Teacher Training College Entity and Development for the Modernization, Training and Excelling of Teachers. Has established 300 centers throughout Mexico to provide teacher consulting, assesory and follow-up for National Modernization Courses (see below) and federal programs such as EDUSAT (see IT virtual programs link).
  - SEP National Modernization Courses offered to teachers in the following areas: Windows; Excel; Introduction to Computing; Programming; Designing Educational Materials for Computing; Technology and Education; Analysis of Technical Objectives as a Work Method; Evaluation of Learning in Education Technology; Simulation Games in Teaching Technology; Didactic Planning in Education Technology; Proposals for Didactic Work in Educational Technology; Video Technology; Developing Sustainable Technology and its Challenges for Educational Systems; Computer and Educational Use in Preschool Classrooms).
  - Coordinated by SEP and the Instituto Latinoamericano de la Comunicación Educativa (ILCE) (Latin American Institute of Communicative Education), the RedEscolar Virtual Program (see IT virtual programs link) imparts K-12 national IT teacher workshops on Learning Circles, Methods of Distance Learning, Pedagogic Use of Television, Didactic Strategies for Teaching Geography, and Didactic Strategies for Teaching Spanish, which are facilitated by a team of education and telecommunications specialists. Teachers accredited for receiving workshops.

Previous slide Next slide Back to first slide View graphic version

PPT Slide

• SEP Teacher Support and IT Services

- ❍ Online study plans, programs, and authorized textbooks for primary and secondary education.
- ❍ Study plans for teacher college training in primary education (provided by SEP's Program for the Transformation and Academic Strengthening of Primary Teacher Training Colleges)
- ❍ Links to online teacher support materials including catalogues, books, study guides, etc. In particular, SEP has partnered with UNESCO to create the Center of International Documentation, which is a gateway of information on education, science, culture, publications, loans, and educational CD-Rom's. The Center also provides assessory, audiovisual consulting, and photocopies of documents and research investigations.
- ❍ SEP's 300 UN y PACT Centers throughout Mexico provide K-12 teachers with projection and audiovisual materials, multimedia resources, computer and Internet access, educational packets and materials library, and TV monitors with Red EDUSAT (see virtual programs links) connections.
- ❍ SEP and ILCE's Red Escolar program allows teachers to access educational databases on pedagogical concepts, videos, documents, and webpages of educational value.
- ❍ SEP's Program of Teacher Improvement (Promep) offers teachers of all levels opportunities for professional development including educational scholarships, academic links with foreign countries, workshops, and IT systems.
- ❍ SEP's Subsecretary of Superior Education and Science Education offers software programs, which can be downloaded from the Internet, as well as kioskos, and linkls to chat rooms, calendar of events and educational search engines.

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY PROFESSIONAL TRAINING

- **Colegio Nacional de Educación Profesional Técnica (CONALEP) (National College of Professional Technical Education)**
- **Institutional history: created by the federal government in 1978 to train professionals in information technology.**
- **Program structure: students learn to operate, analyze, and design information systems by studying general application software and techniques of analysis and system design.**
- **Instituto Tecnológico de Estudios Superiores de Monterrey's (ITESM) (Monterrey Technological Institute of Superior Studies) Center for Information Technology (CTI) offers courses in: Operation and Administration of Systems RISC/6000 and AS400, and Operation, Administration and Maintenance of Computer Networks; diplomas in: Expert Systems, and Telecommunications; and a Master's program in Science in the Computer School.**

- **Universidad Hispanoamericana (Hispanic American University) offers videoconferencing via San Diego State University's International Training Center on IT issues including Technology Transfer, Global Markets, Global Communication Systems at a cost of $300 per conference.**
- **Universidad Iberoamericana (Iberoamerican University) offers diplomas in the area of communications.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Universidad Tecnológica de México (UNITEC) (Technological University of Mexico) offers University extension classes to the general public in computer science training (PCS, operating systems, Windows, Excel, Word, Programming, Internet, Viruses, Databases) and diplomas in computer science training and administration of UNIX systems.**

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY INTERNATIONAL TRAINING

- **Instituto Tecnológico de Estudios Superiores de Monterrey's (ITESM) (Monterrey Technological Institute of Superior Studies)**
- **Special Programs: Intensive English Language Programs at the University of British Columbia and four North American Universities (cost: U.S. $4,750 for 12 weeks and $6,750 for 18 weeks), Professional Practice Programs at University of Detroit-Mercy (cost of ITESM tuition), Washington Center (U.S. $5,500), System Development Life Center, Singapore (for systems engineer, compensation:$500/month).**
- **Universidad Anáhuac (Anáhuac University)**
- **Exchange Programs: in Chile and Spain with Universidad Fransisco**
- **Sister campuses: Merida, Veracruz, Ciudad de Mexico**
- **Exchange Programs also offered by UNAM, Universidad Iberoamericana, ITAM, Universidad de las Americas, Puebla**

Previous slide Next slide Back to first slide View graphic version

INFORMATION TECHNOLOGY EDUCATIONAL RESEARCH AND DEVELOPMENT

- **Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) (Monterrey Technological Institute of Superior Studies)**
- **XXX Congress of Investigation and Extention of the ITESM System, organism dedicated to innovation, technology development and educational improvement at ITESM**
- **The Center for Information Technology (CTI) offers services, consulting and research projects in the following areas: Development of Information Systems; Scientific Simulation and Graphic Representation of Information; Development of Multimedia Systems; Analysis and Design of Databases; Development and Implementation of Computational Systems; Design, Implementation and Development of Computer Networks; Development of Solutions to Engineering, Administrative, Scientific Problems, utilizing advanced computing techniques; Development of Computer Graphic Systems; Development of Executive**

- **Informational Systems; Development of Information Systems under the Client-Server Architecture; Auditing Information Systems; Development of Visual Computational Systems; Patron Voice Recognition; and Development of Artificial Intelligence Systems.**
- **Universidad Anáhuac (Anáhuac University)**
- **Anáhuac Center for Investigation and Strategic Development (CAIDE)**
- **Mission: to promote and coordinate the University's scientific investigations and facilitate the transfer of technology and knowledge to service the public and private sectors.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Organization: 150 investigators funded by the University and private entrepeneurs in the following areas: Center of High Direction of Economics and Business; Center of High Direction of Engineering and Technology; Center of Investigation in Educational Computing; Anahuac Center of Investigation in Educational Services; Center of Scientific Investigation and Tourism Technology; Center of Investigation in Applied Mathematics and Finances; and 6 other centers in the sciences and humanities.**
- **Universidad Iberoamericana (Iberoamerican University)**
- **Center for Social Promotion and Service (CSPS) researches development, innovation and adaptation of sustainable technology in marginalized sectors and provides consulting to microindustry.**

Previous slide Next slide Back to first slide View graphic version

Education and Technology in Mexico

10/25/99

Click here to start

Table of Contents

Author: Meghann Zoe Tovar

Email: mztovar@leland.Stanford.EDU

Home Page:
http://www.stanford.edu/~xfaz/mexico.htm

Education and Technology in Mexico

Meghann Tovar

10/25/99

Education and Technology in Mexico: Conclusions

- The Mexican Education system is producing a population that is prepared to use technology and that has a quality education in this field. This combining of technology and education, however, is generally being done in a top down manner with post graduate and university level students having more access to training and the technology itself. Consequences of this top down method include the creation of a smaller and more elite population that are prepared and able to use technology.

10/25/99

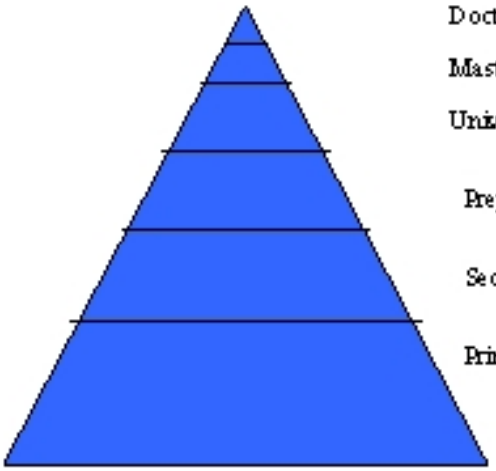
Slide 2 of 6

Basic Education Information

The great majority of the Mexican population has the basic skills necessary to use technology Based on literacy rates and the required primary education. The problem, however, lies in the Fact that acess to and training in technology is much more prevalent in university and higher levels of education which has the smallest population of students .

Literacy Rates:
Female: 88% of people 15 and above
Male: 92% of people 15 and above

School Attendance (Thousands of Students)



10/25/99

Technologically Prepared

- By evidence of increasing government spending on education, and technology in education the awareness of the importance of technology and education is seen. The spending seems to follow the top down method.

- 1. Government Spending (as % of GNP)
- a. On Education (as % of GNP)
- 1990 15.7%
- 1999 26.3%
- b. Per Student (in pesos)
- Primary 5297.3
- University 6928.0
- c. On technology in education
  - The Secretary of Education claims to spend 4.2% of their budget on improving science and technology within schools. This also includes training for teachers in the areas of science and technology.

- 2. The curriculum set by the Secretary of Education did not require any hours of computer instruction for primary or secondary education. The evidence, however, seems to show that these classes are available at both public and private schools in primarily urban areas.

- Percent of Students in Engineering and Technological Fields
  - University or Technological University: 1998: 6.4%
  - Masters Programs 1998: 15.4%
  - Doctoral Programs 1998: 15.0%

10/25/99

Foreign Involvement in Technology and Education

- Foreign involvement in technology and education has been seen as an alternative to some of the obstacles presented. Many high-tech, foreign based companies have become involved in in bringing technology to education in Mexico. Their involvement mainly comes through training programs and computer purchase subsidies for schools. Although many of these programs bring technology to primary and secondary schools, the vast majority focus on university level education.

- Some participants include: Microsoft, Compac, Dell, Wang, Acer, IBM, Hewlett-Packard, and Cisco systems.
- These companies work with the Latin American Institute for Communicative Education (non-profit founded in 1956) to subsidize computer purchases for school in all parts of the country. In Mexico City alone the group has helped 3,000 schools obtain 25,000 PCs.
- Together they have set up training labs to train students as well as teachers in the ways to use technology. Microsoft alone has set up 20 free training centers across the country.
- Cisco has concentrated on the University population and has created a four semester program which give teachers and students a Cisco Certified Network Associate degree in which students can enter the industry or opt to teach at other Cisco training centers.
- Other companies have focused on bringing free internet access to public libraries.
- Many institutes of higher education in Mexico offer study abroad/training programs for students wishing to study in the computer science, engineering or technological sciences.

10/25/99

Slide 5 of 6

Where do we go from here?

- What does the population do with their education in technology?
  - Desire to continue to use it?
  - Is the market ready for them?
  - Seed corn problem in Mexico?
  - Brain drain?
- Non-traditional forms of education
  - Public education on current affairs, popular culture, healthcare etc.
  - Study on non-profits
- Future goals of the education system
  - Socio-economic obstacles at the bottom of the pyramid and possible solutions

10/25/99

Slide 6 of 6

Technologically Prepared

- **By evidence of increasing government spending on education, and technology in education the awareness of the importance of technology and education is seen. The spending seems to follow the top down method.**
- **1. Government Spending (as % of GNP)**
- **a. On Education (as % of GNP)**
- **1990 15.7%**
- **1999 26.3%**
- **b. Per Student (in pesos)**
- **Primary 5297.3**
- **University 6928.0**
- **c. On technology in education**
    - The Secretary of Education claims to spend 4.2% of their budget on improving science and technology within schools. This also includes training for teachers in the areas of science and technology.
    -
- **2. The curriculum set by the Secretary of Education did not require any hours of computer instruction for primary or secondary education. The evidence, however, seems to**

- **show that these classes are available at both public and private schools in primarily urban areas.**
- **Percent of Students in Engineering and Technological Fields**
  - University or Technological University: 1998: 6.4%
  - Masters Programs 1998: 15.4%
  - Doctoral Programs 1998: 15.0%

Previous slide Next slide Back to first slide View graphic version

Where do we go from here?

- **What does the population do with their education in technology?**
  - Desire to continue to use it?
  - Is the market ready for them?
  - Seed corn problem in Mexico?
  - Brain drain?
- **Non-traditional forms of education**
  - Public education on current affairs, popular culture, healthcare etc.
  - Study on non-profits
  -
- **Future goals of the education system**
  - Socio-economic obstacles at the bottom of the pyramid and possible solutions
  -
  -
  -

Previous slide Back to first slide View graphic version

Basic Education Information

Primary 14,640

Secondary 5,084

Preparatory 2.841

University/Tech. University 1,392

Masters Programs 49.3

Doctoral Programs 5.2

School Attendance (Thousands of Students)

The great majority of the Mexican population has the basic skills necessary to use technology

Based on literacy rates and the required primary education. The problem, however, lies in the

Fact that acess to and training in technology is much more prevalent in university and higher levels of

education which has the smallest population of students .

Literacy Rates: Female: 88% of people 15 and above

Male: 92% of people 15 and above

Previous slide Next slide Back to first slide View graphic version

Education and Technology in Mexico: Conclusions

- **The Mexican Education system is producing a population that is prepared to use technology and that has a quality education in this field. This combining of technology and education, however, is generally being done in a top down manner with post graduate and university level students having more access to training and the technology itself. Consequences of this top down method include the creation of a smaller and more elite population that are prepared and able to use technology.**

Previous slide Next slide Back to first slide View graphic version

Education and Technology in Mexico

Meghann Tovar

Next slide Back to first slide View graphic version

Foreign Involvement in Technology and Education

- Foreign involvement in technology and education has been seen as an alternative to some of the obstacles presented. Many high-tech, foreign based companies have become involved in in bringing technology to education in Mexico. Their involvement mainly comes through training programs and computer purchase subsidies for schools. Although many of these programs bring technology to primary and secondary schools, the vast majority focus on university level education.
- Some participants include: Microsoft, Compac, Dell, Wang, Acer, IBM, Hewlett-Packard, and Cisco systems.
- These companies work with the Latin American Institute for Communicative Education (non-profit founded in 1956) to subsidize computer purchases for school in all parts of the country. In Mexico City alone the group has helped 3,000 schools obtain 25,000 PCs.

- **Together they have set up training labs to train students as well as teachers in the ways to use technology. Microsoft alone has set up 20 free training centers across the country.**
- **Cisco has concentrated on the University population and has created a four semester program which give teachers and students a Cisco Certified Network Associate degree in which students can enter the industry or opt to teach at other Cisco training centers.**
- **Other companies have focused on bringing free internet access to public libraries.**
- **Many institutes of higher education in Mexico offer study abroad/training programs for students wishing to study in the computer science, engineering or technological sciences.**

Previous slide Next slide Back to first slide View graphic version

OVERVIEW

11/11/99

Click here to start

Table of Contents

Author: Mexico Team#1

(Kristina, Meghann, Raúl & Xavier)

Home Page:
http://www.stanford.edu/~xfaz/mexico.htm

Launching a Socially Responsible Venture in México

México

OVERVIEW

OBJECTIVE: to start a new venture in Mexico, capitalizing on the IT revolution to generate social change.

FOUR MAIN COMPONENTS:

- Financing
- Operations
- Regulation
- Business Structure

Slide 2 of 12

México

FINANCING

- **OBJECTIVES**:
  - Identify sources of financing
  - Determine the optimal partnership strategy

- **SOURCES**:
  - NATURE OF FINANCING: Equity vs. Debt
  - ORIGIN: Domestic vs. Foreign
  - TYPE OF LAUNCH: Pure Play vs. Bricks & Mortar

México

FINANCING SOURCES

	Equity		Debt	
	Domestic	Foreign	Domestic	Foreign
Pure Play	- Incubators - SINCAS - Consultancy Firms	- Venture Capitalists	- Development Banks	- Not Available
Bricks & Mortar	- Local Organization Growth - SINCAS - Consultancy Firms	- Multinationals - K-Mkts for well-established enterprises	- Short/Med - Banking System - Development Banks (for longer term)	- Bank loans for large ventures - K-Mkts

- Equity Financing: mainly from US (VC, grants).
- Debt Financing: local (private and development) banks. Strategy→ partner with enterprise with strong collateral.

México

OPERATIONS

- **OBJECTIVE:**
  To identify cost-effective methods of operation

- **FACTORS:**
  - Marketing
  - Human Resources
  - Production
  - Distribution

México

CONCLUSIONS

- The main considerations in building a socially responsible venture in México are:
  - ***FINANCING***: Optimal financing conditions achievable with combined foreign (equity) and domestic (debt) sources.
  - ***OPERATIONS***: Potential constraint on business due to lack of human resources and communications infrastructure.
  - ***REGULATION***: E-commerce constrained by Commercial Law. Contract enforcement is a potential problem.

- **ADDITIONAL CONSIDERATIONS:**
  - What factors will guarantee long-term sustainable impact?
  - What have been best/worst practices embraced by socially responsible organizations?
  - How do cultural issues affect consumer attitude towards Information Technology?

FINANCING SOURCES

- Equity Financing: mainly from US (VC, grants).
- Debt Financing: local (private and development) banks. Strategy? partner with enterprise with strong collateral.

Previous slide Next slide Back to first slide View graphic version

México

BUSINESS STRUCTURE

- **DETERMINE PRODUCT/SERVICE**
  - What is the social need we want to address?
  - What resources are available?
- **DETERMINE FOR-PROFIT/ NOT-FOR-PROFIT NATURE**
  - Availability of funding
  - Tax incentives
  - Public relations advantage?
  - Worker compensation
  - Level of competition

CONCLUSIONS

- **The main considerations in building a socially responsible venture in México are:**
  - FINANCING: Optimal financing conditions achievable with combined foreign (equity) and domestic (debt) sources.
  - OPERATIONS: Potential constraint on business due to lack of human resources and communications infrastructure.
  - REGULATION: E-commerce constrained by Commercial Law. Contract enforcement is a potential problem.
- **ADDITIONAL CONSIDERATIONS:**
  - What factors will guarantee long-term sustainable impact?
  - What have been best/worst practices embraced by socially responsible organizations?
  - How do cultural issues affect consumer attitude towards Information Technology?

Previous slide Back to first slide View graphic version

México

OPERATIONS

- MARKETING
  - TARGET AUDIENCE FOR AN IT VENTURE:
    - Different media reach specific audiences
    - Target audience defined in terms of accessibility to technology
  - MEDIA:
    - TV: National coverage. Drawback: expensive
    - RADIO: Local coverage. Advantage: reaches focused, homogenous audience.
    - PRINT (Newspaper): Local and regional coverage. Advantage: cost-effective.
  - OTHER:
    - INTERNET, BILLBOARD, DIRECT MAIL, TELEMARKETING

México

OPERATIONS

- **HUMAN RESOURCES**
  - ***MAJOR OBSTACLE:*** Scarcity of IT professionals due to limited access to technology/education
  - Different technology needs require distinct solutions:
    - For low/medium tech needs: training programs
    - For advanced tech needs: consulting firms; technical assistance programs offered by universities, etc.

México

OPERATIONS

- **DISTRIBUTION** (*depends on product*)
  - Geographical location affects cost and accessibility.
  - Obstacles include restrictions on carriers and unreliable postal system.
- **PRODUCTION** (*depends on product*)
  - High capital costs may influence choice of technology.
  - Quality control is of particular importance in building consumer loyalty.

México

REGULATION

- **INCORPORATION: TAX OPTIONS**
  - SRL (Limited liability partnership)
  - SA/SA de CV (Corporation)
  - AC (no income tax)
  - IAP (no income tax, donations tax deductible)

- **INTELLECTUAL PROPERTY RIGHTS**
  - Bern Convention / Universal Convention recognized
  - VERY difficult to enforce (IMPI-Instituto Mexicano de la Propiedad Industrial)
  - Patent office operational

México

REGULATION

- **E-COMMERCE**
  - No specific legal framework: governed by conventional commerce law
  - Contracts perfected beyond Mexican territory are valid.
  - Electronic payment: charge only upon delivery of service or by signed voucher
  - Trademarks: Mexican Institute of Industrial Property(IMPI)
  - Mexican Copyright Law:

FINANCING

- ## OBJECTIVES:
  - Identify sources of financing
  - Determine the optimal partnership strategy
  -
- ## SOURCES:
  - NATURE OF FINANCING: Equity vs. Debt
  - ORIGIN: Domestic vs. Foreign
  - TYPE OF LAUNCH: Pure Play vs. Bricks & Mortar
  -
  -
  -

Previous slide Next slide Back to first slide View graphic version

OVERVIEW

OBJECTIVE: to start a new venture in Mexico, capitalizing on the IT revolution to generate social change.

FOUR MAIN COMPONENTS:

- Financing
- Operations
- Regulation
- Business Structure

Previous slide Next slide Back to first slide View graphic version

PPT Slide

Launching a Socially Responsible Venture in México

Next slide Back to first slide View graphic version

OPERATIONS

- MARKETING
  - TARGET AUDIENCE FOR AN IT VENTURE:
    - Different media reach specific audiences
    - Target audience defined in terms of accessibility to technology
  - MEDIA:
    - TV: National coverage. Drawback: expensive
    - RADIO: Local coverage. Advantage: reaches focused, homogenous audience.
    - PRINT (Newspaper): Local and regional coverage. Advantage: cost-effective.
  - OTHER:
    - INTERNET, BILLBOARD, DIRECT MAIL, TELEMARKETING

Previous slide Next slide Back to first slide View graphic version

OPERATIONS

- **OBJECTIVE:**

  To identify cost-effective methods of operation

- **FACTORS:**

  - Marketing
  - Human Resources
  - Production
  - Distribution

Previous slide Next slide Back to first slide View graphic version

BUSINESS STRUCTURE

- DETERMINE PRODUCT/SERVICE
  - What is the social need we want to address?
  - What resources are available?
- DETERMINE FOR-PROFIT/ NOT-FOR-PROFIT NATURE
  - Availability of funding
  - Tax incentives
  - Public relations advantage?
  - Worker compensation
  - Level of competition
  -

Previous slide Next slide Back to first slide View graphic version

OPERATIONS

- HUMAN RESOURCES
  - MAJOR OBSTACLE: Scarcity of IT professionals due to limited access to technology/education
  - Different technology needs require distinct solutions:
    - For low/medium tech needs: training programs
    - For advanced tech needs: consulting firms; technical assistance programs offered by universities, etc.
    -

Previous slide Next slide Back to first slide View graphic version

OPERATIONS

- DISTRIBUTION (depends on product)
  - Geographical location affects cost and accessibility.
  - Obstacles include restrictions on carriers and unreliable postal system.

  - PRODUCTION (depends on product)
    - High capital costs may influence choice of technology.
    - Quality control is of particular importance in building consumer loyalty.

Previous slide Next slide Back to first slide View graphic version

REGULATION

- INCORPORATION: TAX OPTIONS
  - SRL (Limited liability partnership)
  - SA/SA de CV (Corporation)
  - AC (no income tax)
  - IAP (no income tax, donations tax deductible)
- INTELLECTUAL PROPERTY RIGHTS
  - Bern Convention / Universal Convention recognized
  - VERY difficult to enforce (IMPI-Instituto Mexicano de la Propiedad Industrial)
  - Patent office operational

Previous slide Next slide Back to first slide View graphic version

REGULATION

- E-COMMERCE
  - No specific legal framework: governed by conventional commerce law
  - Contracts perfected beyond Mexican territory are valid.
  - Electronic payment: charge only upon delivery of service or by signed voucher
  - Trademarks: Mexican Institute of Industrial Property(IMPI)
  - Mexican Copyright Law:

Previous slide Next slide Back to first slide View graphic version

HUMAN RESOURCES

- **MAJOR OBSTACLE**: Scarcity of IT professionals due to limited access to technology/education
- **Different technology needs require distinct solutions:**
  - For low/medium tech needs: training programs
  - For advanced tech needs: consulting firms; technical assistance programs offered by universities, etc.

Finding a pool of technologically educated people with access to technology itself may prove to be an obstacle when considering human resources for a new venture. This is due to the structure of the education system in combination with certain socio-economic constraints in Mexico. New ventures in Mexico may want to start their own training programs, as companies such as Microsoft have done. Several corporations have also worked in conjunction with the universities within Mexico as well. For companies that require more advanced technological training for their employees they may turn to consulting companies or hire abroad. More detailed information is found in the section pertaining to Education and Technology.

http://www.stanford.edu/~xfaz/Presentacion1/sld005.htm

DISTRIBUTION *(depends on product)*

- Geographical location affects cost and accessibility.
- Obstacles include restrictions on carriers and unreliable postal system.

Cost and availability of distribution may impact the type of product or service a new venture intends on beginning in Mexico. Rail, ground, air and sea transportation is available in Mexico. The great majority of distribution is done through ground transportation (trucking) in all parts of Mexico. This is true also for goods that are crossing the border from the United States to Mexico. There is, however, great disparity in cost and availability of distribution/transportation in Mexico depending on the region. Southern Mexico is the most costly and has less infrastructure than other parts of Mexico. The Secretary of Communication and Transportation has invested a great deal of money into improving the transportation infrastructure throughout Mexico.

Regulations on transportation of goods may also be a consideration for new ventures. Mexico has a policy which states that goods can only be transported internally by nationally incorporated carriers along with several stipulations about border crossing stated in NAFTA. Another obstacle may be found in the unreliability of the Mexican postal system. Other postal companies provide service in Mexico but are more expensive.

http://www.cfi-us.com

http://www.sct.gob.mx

http://www.cfi-us.com/logistics/nafta/html

http://www.dhl.com/main_index.html

PRODUCTION *(depends on product)*

- High capital costs may influence choice of technology.
- Quality control is of particular importance in building consumer loyalty.

When deciding where production for a new venture will take place it is important to remember that the cost of labor in Mexico is relatively low especially in comparison to the United States. For this reason, companies often rely more on increases in labor rather than in capital for production. Quality control as well as establishing relationships based on trust are important for businesses in Mexico. This is due in part to the economic history of Mexico and the ineffectiveness of the court system.

http://www.mexicool.com/business/default.html

http://www.bimsa.com.mx

OPERATIONS *(MARKETING)*

Marketing is a key element in implementing any successful business venture or non-profit organization, since increased publicity will usually generate sales and will increase the probability of service/product usage and partnership opportunities.

- **OBJECTIVE:** to examine the different forms of media within Mexico and to identify their respective target audiences and their points of advantage/disadvantage, which will help us develop a marketing strategy for our socially responsible organization.

- **MEDIA**

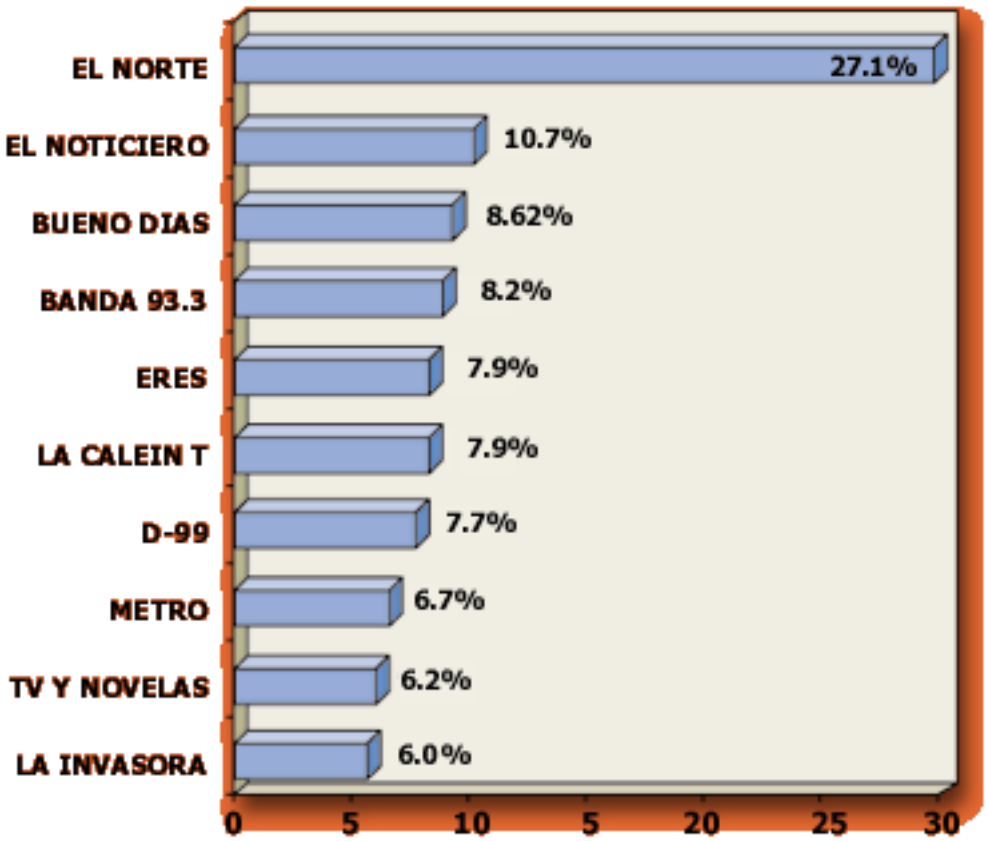
- **TELEVISION**
  - **MAJOR PLAYERS:**
  - Televisa, which controls 80.2% of the market*
  - TV Azteca, which controls 18.8% of the market*
  - **AUDIENCE** (defined in terms of accessibility to technology):
  - **Children (4-12):** 10.5% total (7.7% Televisa, 2.8% Azteca)*
  - **Adolescents (13-18):** 21.1% total (17.3% Televisa, 3.8% Azteca)*
  - **Women (19-44):** 24.1% total (18.9 Televisa, 5.2 Azteca)*
  - **Men (19-44):**17.2% total (13.3% Televisa, 3.9% Azteca)*
  - ***TARGET AUDIENCE*:** housewives. This is due to the fact that housewives form the largest audience size (27.5% total)* and because they, in most cases, make decisions on household purchases.

    (Source: Grupo Televisa; IBOBE national average rating from January 1997-June 1998, M-F, males and females 19-44).
  - **COVERAGE:** National
  - **ADVANTAGES:**
  - Large market. 74% of all Mexican advertising dollars are in broadcast television with revenues totaling U.S. $1.5 billion (*Source: TV Azteca, 1998).*
  - National market. Can reach audiences across Mexico.
  - Cultural advantage with popularity of *telenovelas* (soap operas). Can research TV ratings to identify the most commonly seen *telenovela* and run your advertisement based on the spot with the largest viewer population.
  - **DISADVANTAGE:**
  - High advertising costs for TV commercials.

- **PRINT/ NEWSPAPER**
  - **MAJOR PLAYERS:** El Norte, La Reforma, Excelsior, El Heraldo, and others throughout Mexico.

- **AUDIENCE** (for Business Section):*
- **Socioeconomic Level:** High Class: 48%, Upper Middle Class: 43%, Low Class: 9%
- **Sex:** Women: 46%, Men: 54%
- **Age:** 14-17: 7%, 18-30: 34%, 31-50: 36%, 51+ 23%
- **Education:** Grade School: 2%, Secondary: 8%, High School: 20%, Professional: 61%, Postgraduate: 9%
- **Civil Status:** Single: 36%, Married: 61%, Other: 3%
- **Occupations:** Retired: 4%, Housewife: 27%, Student: 19%, Businessman: 4%, Merchant: 9%, Independent Professional: 22%, Employee: 7%, Office Worker: 1%, Public Servant: 1%, Other: 1%*
- ***TARGET AUDIENCE:*** Male upper to high class married professional.
- **COVERAGE:** Regional and local.
- **ADVANTAGES:**
- Cost-efficient method of advertising. El Norte, for example, charges approximately $3,000 U.S. for half a page advertisement in color in the Business Section. *(Source: El Norte, Tariffs-Business Section).*
- Effective method of local publicity. If we look to Monterrey City as an example, we find that the newspaper, El Norte, outranks all other advertising vehicles:

Top 10 Local Advertising Vehicles*



- **DISADVANTAGES:**
- No national coverage

*__Source__: El Norte, 4/9/99. Data based on 945 interviews administered in the metropolitan zone in Monterrey, Mexico during the last week of October 1999. 45 interviews were given according to each socioeconomic class (by NSE definitions).

- **RADIO**
- **MAJOR PLAYERS:** Radio Centro
- **AUDIENCE:**
  - Information unavailable, but we speculate that the audience would be middle to upper class students and professionals in urban settings and middle to lower class agricultural workers and merchants in rural areas. Minimum education levels we theorize would be at high school in urban areas and grade school in rural communities. Both male and female listening audiences.
  - **COVERAGE:** local.
  - **ADVANTAGE:**
  - Cost-effective advertising method, we speculate.
  - Can reach a focused, homogenous audience in a specific region
  - High Accessibility due to relative low costs of radios.
  - **DISADVANTAGE:**
  - No national coverage
- **OTHER**
- INTERNET, BILLBOARD, DIRECT MAIL, TELEMARKETING
- All of these media target urban settings and predominantly upper to middle class audiences because of the high costs of telephone and IT services and PCs.
- These audiences are very limited due to the small IT user population, which has been supported in earlier research (consult IT infrastructure, labor markets links).

CONCLUSIONS:

- For companies or organizations seeking national publicity and with adequate resources, television would be the recommended advertising media.
- For ventures desiring regional or local publicity and cost efficiency, print (newspaper) would be the suggested media for upper to middle upper class urban professionals and radio would be recommended for more lower class rural workers.
- Please not that except in the case of radio, socioeconomic conditions limit access to technology. Therefore, most target audiences tend to be middle to upper middle class educated Mexicans.

SOURCES:

- **TELEVISION:** Televisa: http://www.televisa.com.mx; TV Azteca: http://tvazteca.com.mx/.

- **PRINT/NEWSPAPER:** El Norte: http://elnorte.infosel.com/, La Reforma: http://reforma.infosel.com, Novedades: http://www.novedades.com, Excelsior: http://www.excelsior.com.mx
- **RADIO:** Radio Centro, http://radiocentro.com.mx

E-commerce Regulation in México

- **INCORPORATION: TAX OPTIONS**

  One of the main issues in incorporating a business in México is to determine the type of entity that best suits the intended structure of the company. The following entities are subject to different rules of the Tax Regulation:

  - Sociedad de Responsabilidad Limitada (Limited liability partnership)
  - Sociedad Anónima/ Sociedad Anónima de Capital Variable (Corporation)
  - Asociación Civil (no income tax)
  - Institución de Asistencia Pública (no income tax, donations tax deductible)

- **INTELLECTUAL PROPERTY RIGHTS**

  The Intellectual property of works with deposits in countries that are members of the Bern Convention or

the Universal Convention are recognized in México. The Instituto Mexicano de la Propiedad Industrial (IMPI) is the Federal body of the government that is in charge of regulating the trade of intellectual property. The main problem with this framework is the lack of effectiveness in resolving issues of infringement.

- Bern Convention / Universal Convention recognized
- VERY difficult to enforce (IMPI)
- Patent office operational

- **E-COMMERCE**

  The regulation of ecommerce has not yet been established formally. For any practical purposes, México recognizes the "freedom to contract" which allows any two parties to bind themselves in a contract with mutual agreement. Online transactions are a valid instance of such contracts. Conducting ebusiness nevertheless cannot follow the same model as in the US since México has a regulatory law that restricts the ability of a supplier to charge an account at the moment a transaction is made. Such supplier must have written agreement from the client (i.e. a

signed voucher), or a proof of delivery of a product or service, before he is actually able to charge the customer.

- No specific legal framework: governed by conventional commerce law
- Contracts perfected beyond Mexican territory are valid.
- Electronic payment: charge only upon delivery of service or by signed voucher
- Trademarks: Mexican Institute of Industrial Property(IMPI)

  Patents (20 yrs), Industrial Designs (15 yrs), Utility Models (10 yrs), Trademarks (10 yrs) and Tradenames (10 yrs).

- Mexican Copyright Law: (75 years after first publication)

- **Conclusions**

  Ecommerce practice is constrained by current commercial law.

  Contract enforcement is a major problem.

Alternate forms of payment could be explored in the short term to circumvent obstacles to electronic payment.

Sources:

- **"Portrait of a People"** http://www.nafta.net/mexbiz/articles/rincon.htm
- **CREDIT CARD REGULATIONS: Leaving a paper trail** http://www.nafta.net/mexbiz/articles/papertrl.htm
- **La Fundación Mexicana para la Innovación y Transferencia de Tecnología en la Pequeña y Mediana Empresa** http://www.funtec.org/
- **NAFINSA -- PROYECTOS DE INVERSION** http://www.secofi-siem.gob.mx/siem1999/
- **Programa de Mejora Regulatoria en México** http://www.cde.gob.mx/tmp/programa/programa.htm
- **United Nations' Information on Mexico (Sustainable Development)** http://www.un.org/esa/agenda21/natlinfo/countr/mexico/index.htm
- **Inversión Extranjera Directa (Banco de Comercio Exterior)** http://www.bancomext.com/espa/opor_invertir/index_EIED.html
- **The Mexican Investment Board, "MEXICO: BASIC ASPECTS OF DOING BUSINESS "** http://www.mib.org.mx/frames/f_investment.html
- **Boston Consulting Group: Brazil Driving Latin American Ecommerce Jul 27 1999** http://www.nua.ie/surveys/index.cgi?f=VS&art_id=905355057&rel=true
- **E-com Legal Guide to Mexico** http://www.bakerinfo.com/apec/mexicoapec.htm
- **Payment mechanisms designed for the Internet** http://ganges.cs.tcd.ie/mepeirce/Project/oninternet.html

- **5 Payment Models on the Internet** http://www.htennant.com/hta/askus/5models.htm
- **Mexico Business Directory** http://www.mexonline.com/business.htm
- **Guide To Starting A Business In Mexico** http://www.mexonline.com/busines1.htm
- **Can the Venture Capital Model Work for Latin America?** http://www.latpro.com/articles/venture-capital.htm
- **Instituto Mexicano de la Propiedad Industrial** http://www.impi.gob.mx/fe006000.htm

Promoviendo la Revolución de Internet

12/5/99

Click here to start

Table of Contents

Author: Mexico Team #1

(Kristina, Meghann, Raúl and Xavier)

Home Page:
http://www.stanford.edu/~xfaz/mexico.htm

México

The Information Revolution in Latin America

Slide 1 of 16

Promoviendo la Revolución de Internet

"Promoting the Internet Revolution"

Contents

Research Overview

	+	-
INFRASTRUCTURE	• Modern telecom system • Basic Internet services	• Limited # of telephone lines • Small # of PC owners
FINANCING	• Domestic (debt) and foreign (equity) financing available	• Little domestic VC funding • Financial sector unfamiliar with Internet business
REGULATION	• Intellectual Property Rights recognized • Patent office operational	• Contract enforcement unreliable
LABOR	• Pool of trained IT professionals for lower-end technical needs	• IT labor supply limited by education and opportunities abroad
EDUCATION	• Quality advanced IT curricula • Increased IT public training initiatives	• Restricted access to IT education and technology

Case Study: For-Profit

Telmex/Prodigy

- **Objective:**
  - To position itself as the leader in the ISP market in Mexico
- **Positional Advantage:**
  - Owns telephony last-mile infrastructure.
  - Large capital funding (largest foreign traded shares in NYSE).
  - Market share large and growing
- **Strategy:**
  - Telmex buys controlling share in established multinational ISP (Prodigy)
  - Telmex transfers its Internet user accounts to Prodigy
  - Marketing strategies to increase Internet user base:
    - Cross-selling to existing client base (20% discount)
    - Low cost PC distribution
    - Integrated service billing (phone/Internet)

Case Study: Non-Profit

LaNeta A.C.

- **Objective:** to provide effective and trustworthy communication and information technology for NGOs, non-profits, and civil society.
- **Strategy:**
  - Early entry into IT service provision for NGOs
  - Market Niche: NGOs, non-profits, and civil society
  - Scope: Internet access, a portal, e-mail accounts, tech support, and web hosting at a minimal cost
  - Core Competence: established credibility; provides a common link between NGOs, non-profits, and civil society.
  - 1,300 users
  - Focuses on spreading information and awareness

Conclusion

- *Drive change*
- *Create Internet culture*
- *Build Market*

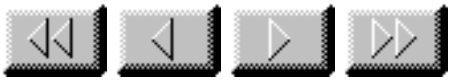
Stanford University

Cs377c : Inf Rev in Latin America

Dec 1st, 1999

México 1 Team

Meghann Zoe Tovar
Kristina Stevens
Raúl Escalante-Díaz Ceballos
Xavier Faz



Case Study: For-Profit Telmex/Prodigy

- **Objective:**
  - To position itself as the leader in the ISP market in Mexico
- **Positional Advantage:**
  - Owns telephony last-mile infrastructure.
  - Large capital funding (largest foreign traded shares in NYSE).
  - Market share large and growing
- **Strategy:**
  - Telmex buys controlling share in established multinational ISP (Prodigy)
  - Telmex transfers its Internet user accounts to Prodigy
  - Marketing strategies to increase Internet user base:
    - Cross-selling to existing client base (20% discount)
    - Low cost PC distribution
    - Integrated service billing (phone/Internet)

Previous slide Next slide Back to first slide View graphic version

Financing

- **Non-profit organization** (Asociación Civil)
- **Seed capital provided by:**
  - Strategic Partners
  - International Foundations
  - Venture Capital Partner
  - Government
  - Donations (individual and corporate)
- **Credit lines provided by:**
  - Multinational Organizations (IADB, WB, etc.)
  - National Banks with partner co-signers

PPT Slide

Cs377c: Inf Rev in Latin America

Dec 1st,1999

- Drive change
- Create Internet culture
- Build Market

México 1 Team

Meghann Zoe Tovar

Kristina Stevens

Raúl Escalante-Díaz Ceballos

Xavier Faz

Stanford University

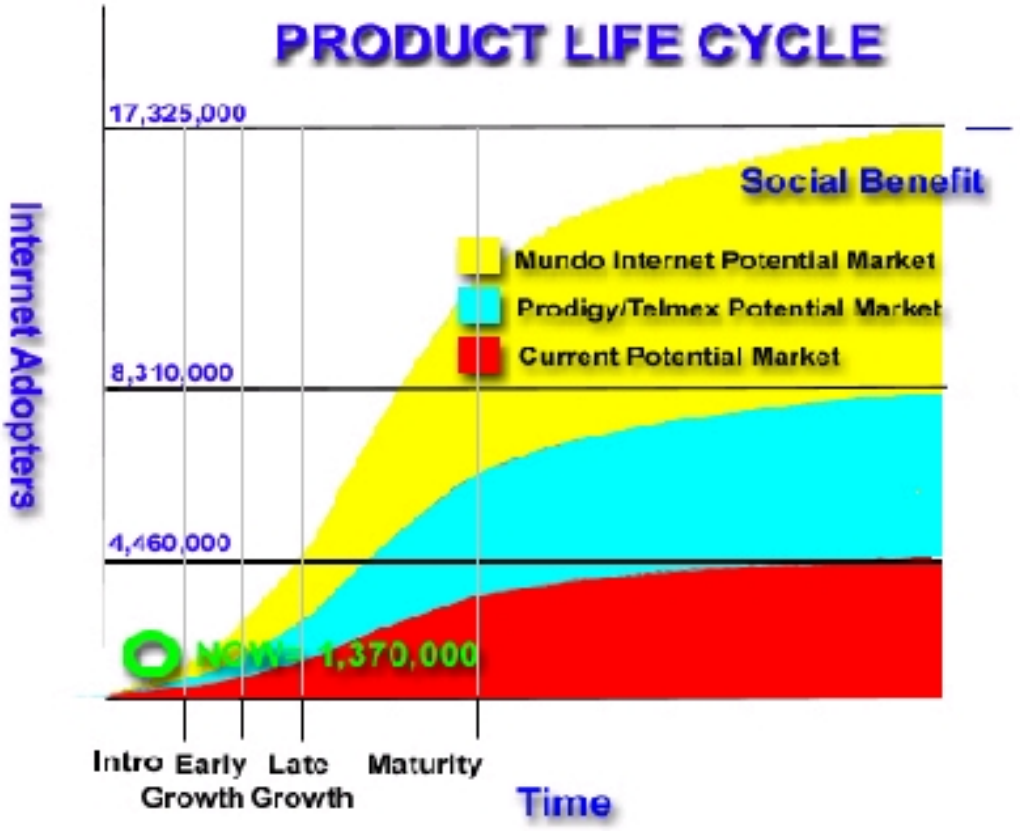
Conclusion

Previous slide Back to first slide View graphic version

Market Analysis

Product:

Internet Access



Proposal

Mundo Internet is a centralized location where you can surf the web, access your e-mail, gain technical skills, and discover the possibilities that the Internet holds for you!

A non-profit organization dedicated to providing the general public with low cost access to the **Internet.**

Proposition

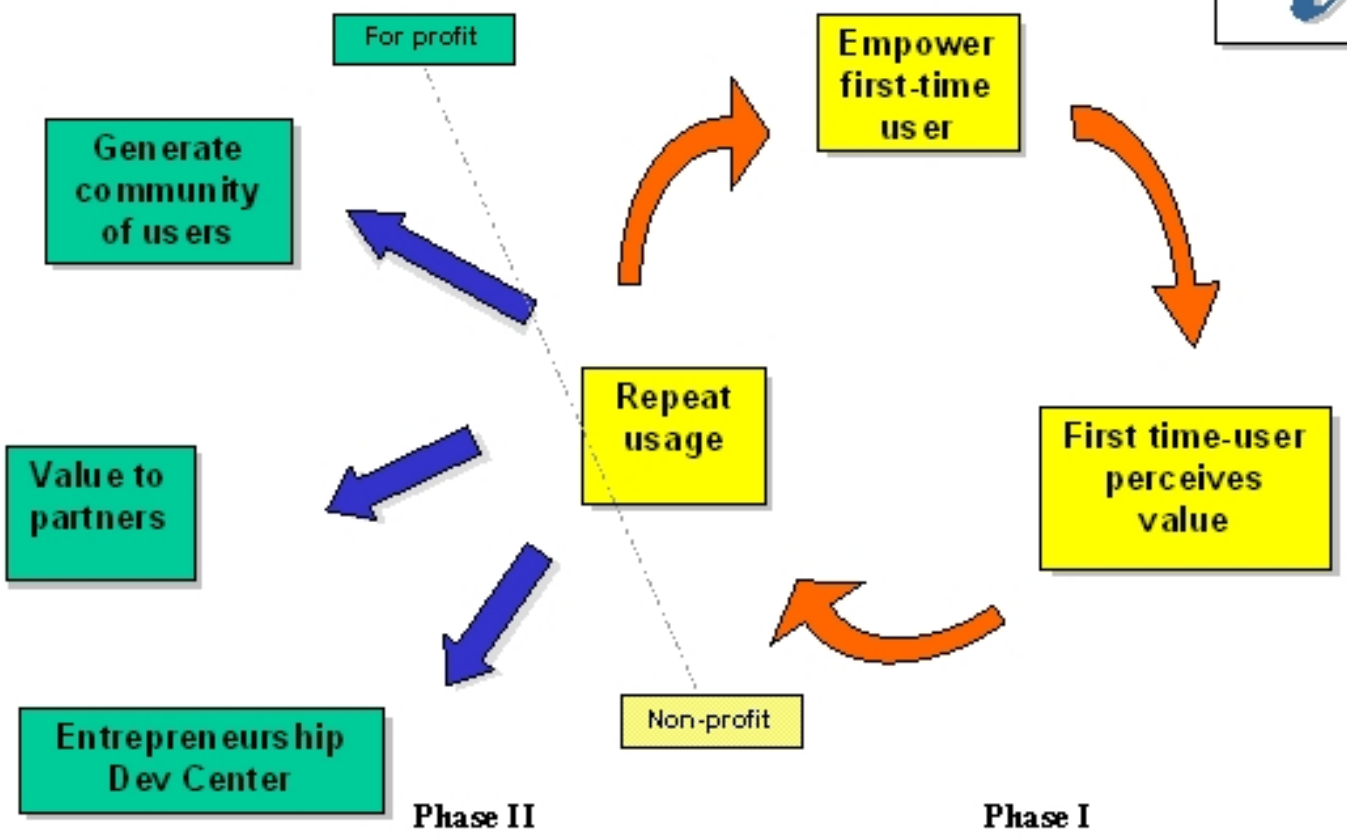
- Strategy
  - Logic
- Core Competence
- Competitive Forces
- Market Strategy
- Financing

Strategy

- **Mission:** to promote social mobility by empowering marginal sectors to participate in the Information Revolution.
- **Objectives:**
  - Phase I: to become the prime generator of Internet adopters in Mexico by facilitating access.
  - Phase II: to become the premier entrepreneurship development center in Mexico.
- **Scope:** partner with corporate sponsors to solve logistic, financial, and educational constraints to Internet adoption.

Strategy

Logic



Core Competence

To provide low-cost Internet access and high-quality services to sectors with limited economic and technological resources.

- **Enablers:**
  - First mover advantage
  - Critical mass of corporate partners
  - Strategic management of human resources

Competitive Forces

Customers	Students; Small Businesses; Non-Profits; Low Income Sector. Very limited bargaining power. However, price sensitive
Suppliers/Corporate Partners	ISP's; Computer Industry (Multi-National); Government; Universities; Development Agencies. Strong individually but not cohesive.
Competitors	Cybercafes-expensive and catering to a different audience. Schools/Universities-free but limited resources.
Substitutes	ISP's-expensive and requires PC purchase. Open standard "appliance" technologies-potential medium-term threat.
Entry Barriers	Low immediate profitability of market segment. Uncertainty of market size and medium- to long-term profitability.

Market Strategy

Phase I

- **Consumer:**
  - **University Students**: academic tool
  - **Small Businesses:** improve efficiency (electronic transactions, e-mail, promotion/distribution channel)
  - **Non-Profit Organizations:** publicity and information channel
- **Product:** High speed Internet access with supporting services (basic computer training, e-mail, personal homepages, etc.)

Market Strategy

Phase I

- **Pricing:** Minimal charges for Internet access; free support services.
- **Publicity:**
  - **Advertising:** Target market niches (students, non-profits, small businesses, etc).
  - **Branding:** Build partnerships that highlight non-profit status.
- **Location:** In Mexico City in the proximity of a large public university such as UNAM.

Research Overview

Previous slide Next slide Back to first slide View graphic version

Promoviendo la Revolución de Internet

Contents

Research Overview

Case Studies

Market Analysis

Proposition

-

“Promoting the Internet Revolution”

Previous slide Next slide Back to first slide View graphic version

PPT Slide

México

México

The Information Revolution in Latin America

Next slide Back to first slide View graphic version

Market Analysis

Product:

Internet Access

Previous slide Next slide Back to first slide View graphic version

Case Study: Non-Profit LaNeta A.C.

- **Objective: to provide effective and trustworthy communication and information technology for NGOs, non-profits, and civil society.**
- **Strategy:**
  - Early entry into IT service provision for NGOs
  - Market Niche: NGOs, non-profits, and civil society
  - Scope: Internet access, a portal, e-mail accounts, tech support, and web hosting at a minimal cost
  - Core Competence: established credibility; provides a common link between NGOs, non-profits, and civil society.
  - 1,300 users
  - Focuses on spreading information and awareness

Previous slide Next slide Back to first slide View graphic version

Financing

- **Non-profit organization (Asociación Civil)**
- **Seed capital provided by:**
  - Strategic Partners
  - International Foundations
  - Venture Capital Partner
  - Government
  - Donations (individual and corporate)
- **Credit lines provided by:**
  - Multinational Organizations (IADB, WB, etc.)
  - National Banks with partner co-signers

Previous slide Next slide Back to first slide View graphic version

Proposal

Mundo Internet is a centralized location where you can surf the web, access your e-mail, gain technical skills, and discover the possibilities that the Internet holds for you!

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **Strategy**
  - Logic
- **Core Competence**
- **Competitive Forces**
- **Market Strategy**
- **Financing**

Proposition

Previous slide Next slide Back to first slide View graphic version

Strategy

- **Mission: to promote social mobility by empowering marginal sectors to participate in the Information Revolution.**
- **Objectives:**
  - Phase I: to become the prime generator of Internet adopters in Mexico by facilitating access.
  - Phase II: to become the premier entrepreneurship development center in Mexico.
- **Scope: partner with corporate sponsors to solve logistic, financial, and educational constraints to Internet adoption.**

Previous slide Next slide Back to first slide View graphic version

PPT Slide

Phase I
Strategy Logic
Non-profit
For profit
Phase II

Previous slide Next slide Back to first slide View graphic version

PPT Slide

- **To provide low-cost Internet access and high-quality services to sectors with limited economic and technological resources.**
- **Enablers:**
  - First mover advantage
  - Critical mass of corporate partners
  - Strategic management of human resources

  Core Competence

Previous slide Next slide Back to first slide View graphic version

Competitive Forces

Customers

Suppliers/Corporate

Partners

Competitors

Substitutes

Entry Barriers

Students; Small Businesses; Non-Profits; Low Income Sector. Very limited bargaining power. However, price sensitive

ISP's; Computer Industry (Multi-National); Government; Universities; Development Agencies.

Strong individually but not cohesive.

Cybercafes-expensive and catering to a different audience.

Schools/Universities-free but limited resources.

ISP's-expensive and requires PC purchase.

Open standard "appliance" technologies-potential medium-term threat.

Low immediate profitability of market segment. Uncertainty of market size and medium- to long-term profitability.

Previous slide Next slide Back to first slide View graphic version

Market Strategy Phase I

- **Consumer:**
  - University Students: academic tool
  - Small Businesses: improve efficiency (electronic transactions, e-mail, promotion/distribution channel)
  - Non-Profit Organizations: publicity and information channel
- **Product: High speed Internet access with supporting services (basic computer training, e-mail, personal homepages, etc.)**

Previous slide Next slide Back to first slide View graphic version

Market Strategy Phase I

- **Pricing: Minimal charges for Internet access; free support services.**
- **Publicity:**
  - Advertising: Target market niches (students, non-profits, small businesses, etc).
  - Branding: Build partnerships that highlight non-profit status.
- **Location: In Mexico City in the proximity of a large public university such as UNAM.**

Previous slide Next slide Back to first slide View graphic version

Stanford University

The Information Revolution in Latin America

México

Comments, Suggestions & Information Exchange

The purpose of this page is to promote the exchange of information related to the Information Revolution in México. In the spirit of this objective, we encourage you to contribute your comments and/or specific information that could help develop this project.

View

Information Database:

Information Registry

Enter Information

Information may be entered in English or Spanish.

1. Name
2. Affiliation
3. E-mail address:
4. Choose one or several of

   ☐ Give Comment
   ☐ Provide Info
   ☐ Request Info
   ☐ Question
5. Please write in the following area. If you are working in Windows environment, you can copy and paste text from other applications.

Submit Form Clear Form

Back to Top

Back to Main Page

Revised: October 16, 1999.
xfaz@cs.stanford.edu

Date: Mon Oct 25 03:07:39 1999
by: , ""
e-mail:
Subject:

Date: Mon Oct 18 20:04:43 1999
by: , ""
e-mail:
Subject:

Created Oct 15th, 1999