A MODEL FOR A VIRTUAL UNIVERSITY IN COLOMBIA

by

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Submitted to the Alfred P. Sloan School of Management
in Partial Fulfillment of the Requirements for the Degree of

Master of Science in the Management of Technology
at the
Massachusetts Institute of Technology

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ABSTRACT

The Colombian government is working on solutions to widen the coverage of higher education which is currently around 21%. One of the solutions to handle this major problem in rural and remote areas, but also in some towns and cities where there is either not enough capacity in the current traditional higher institutions, or its quality is poor, or there is little to no supply is Virtual Education. The current stage of higher distance education in Colombia is characterized by a fragmented supply with weaknesses in defining and adopting a pedagogical model, the use of technology capabilities, the organizational structure to support virtual education, and the planning and quality assurance processes. Institutions offering distance services have opportunities for improvement and innovative developments but they lack the necessary resources. Based on this diagnosis, our challenge in coverage of higher education, and the elements identified from seven international experiences studied, a Virtual University is proposed with the purpose of being an ‘Open and distance learning university’ with “open” meaning access to everybody and “distance” including the appropriate technologies and pedagogical models to offer distance education. The Virtual University is set up primarily to serve young students and adults from the lowest income levels who have finished their high school education. Three alternatives are described to implement the virtual university: i) a new centralized and autonomous organization, ii) a network of universities under an umbrella of a Virtual University, and iii) free competition among institutions. Finally, the role of the Ministry of Education in higher distance education is developed. The Ministry plays the roles of policy maker, accreditation and funding in distance higher education and a leading role in helping in the development of a market of good quality distance programs and creating the conditions for the demand to get access to the new offering. In addition, the Ministry should strengthen institutions to face properly distance education and create the mechanisms for cooperation with international governments and organizations.

Thesis Advisor: Arnoldo Hax
Title: Professor of Management, Sloan School of Management
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INTRODUCTION

In 2001 coverage of higher education in Colombia was 21%, a very low percentage compared to other countries, including Latin American countries. In terms of income levels the proportion is dramatically inequitable: 9% of students from the two lowest income levels (out of six) attended an institution of higher education compared with 65% of those in the highest income levels.

The government is working on solutions to subsidize portions of the cost of enrollment in public and private institutions as a way to use the already installed capacity. However, there is either not enough capacity in the current traditional higher institutions, or its quality is poor, or there is little to no supply, most notably in rural and remote areas, but also in some towns and cities. The solution chosen to handle this major problem, and that has been implemented successfully in other developing countries, is that of the virtual education.

The objective of this thesis is to design a model for a virtual university in Colombia. Four topics will be developed:

1. Diagnosis of the higher education situation in Colombia, advances in on-line education, possibilities to access on-line education and potential demand for distance education.

2. Evaluation of seven experiences from Spain, Mexico, the United States and the United Kingdom with a broad experience in distance education which will contribute important elements to the model.

3. Definition of the model for the Virtual University, study of alternatives for its implementation and evaluation of some implementation issues to assure the success of the model. The reader will find some alternatives for the implementation of the model and the results from the first discussion with the Ministry about the best model for Colombia.

4. Role of the central government and the regulation needed to support the model and, in general, the distance education system. I suggest many action lines for the Ministry, but there is no conclusion on any aspect as the political implications of each decision transcend the scope of this thesis.
1 A DIAGNOSIS: CURRENT SITUATION IN HIGHER EDUCATION AND PROGRESSES IN ON-LINE EDUCATION IN COLOMBIA

Although the purpose of the thesis is to provide a model for a virtual university, I think is necessary to describe the general context of higher education in the country before entering fully into the topic.

This chapter is divided into five parts: the first one describes the situation of higher education; the second one presents the main characteristics of the current demand and tries to project the potential demand for on-line higher education; the third part summarizes the national experiences in distance and web-based programs in higher education, in order to understand our installed capacity to deliver this new service; the forth part, explains the projects that could solve problems related to the access to computers and Internet, essential inputs for on-line education; and finally, the fifth part, summarizes the central issues highlighted through the development of the chapter.

1.1 SITUATION OF HIGHER EDUCATION IN COLOMBIA

1.1.1 Diagnosis of higher education

Based on the strategic plan developed by the Ministry of Education of Colombia for the period 2002-2006 [1] and the study developed by the World Bank in the period 2000-2001 [11], which describes the demand, supply, governance, quality assurance, problems and potential solutions, here are the principle problems and solutions identified by experts in the higher education system.

Coverage

Our system of higher education is characterized by a very low coverage compared to other countries, including countries in Latin America. The number of enrolled students was 934,085 in 2002. Unfortunately, this demand corresponds only to 42% of the students who finish secondary education.

In spite of the growth achieved during the last decade (nearly 150%), the country continues below international levels. In 2002, Colombia reached 21% of average coverage, still below the average of Latin America and OCDE\(^2\) countries for 1997 (25% and 54% respectively).

Private educational institutions have showed the most remarkable growth answering to the demand for tertiary education. In 2000, 67% of the total enrollment was in private institutions, with 40% of that number in evening programs.

\(^2\) OCDE: Organization for Cooperation and Economic Development.
With respect to distribution of enrolled students in 2001, 94% were in undergraduate programs and 6% in postgraduate and doctoral studies. 86% of undergraduate students were enrolled in universities and technological schools or university-level institutions, and 14% in technological and technical institutions.

By the end of 1990s the country had the worst economic results (clarify meaning). The GDP decreased from an average between 3% and 4% during the first half of the decade, to -4.3% in 1999. This crisis impacted on the number of new students in tertiary education which decreased by 19% between 1997 and 1999: in 1997 there were 256,672 new students enrolled while there were only 207,246 in 1999.

**Access to education by levels of income**

The higher education system is unfair. In 1993 only 3.5% of the two lowest income levels attended an institution of higher education, compared with 36% in the highest levels. By 1997 the distance between these two groups increased: the poorest reached 9% while the richest 65%.

**Supply and demand**

The insufficient coverage described coexists with an estimated 40% of unused places in educational institutions. This imbalance between supply and demand is caused basically for three reasons: i) students from lower income levels require the improvement of financial aid and economic conditions to access the institutions; ii) the supply is not fulfilling completely the needs of the labor market both in content and swiftness; and iii) there is either not enough supply of higher institutions or the quality is poor, especially in rural and remote areas, but also in some towns and cities.

There are four types of tertiary education institutions: i) universities, ii) technological schools or university-level institutions, iii) technological institutions, iv) technical institutions. Universities offer advanced learning programs, cover the needs of their communities through extension courses (usually open enrolled courses), and conduct research projects in subjects relevant to their areas of interest and the country needs. The other types of institutions mentioned complement the universities, offering more flexible courses and programs to fulfill the needs of the labor market and a more affordable price for students.

Currently there are 326 institutions distributed in 108 universities, 97 university-level institutions, 57 technological institutions, 50 technical institutions and 14 special institutions which belong to governmental agencies or deliver non-formal education. In terms of ownership, 32.48% are public institutions and 67.48% privates. Appendix Tables 1 and 2 show the distribution of tertiary institutions per state in the country, according to the type of institution and ownership (public or private). Graph 1 presents the geopolitical map of the country.

**Quality**

The relevance of some programs of higher education is questionable as well as the preference of undergraduate careers over technique and technological education. But the key problem is
that the higher education system is not responding adequately to the productive and labor needs of the country. There are problems of relevance and consistency among the academic contents, the learning and the labor demand.

On the other side, the development of the country requires forming young people in relevant disciplines that let them enter the labor market under favorable conditions and, in consequence, elevate their quality of life. This means the expansion of the current base of technical professionals and technicians both in coverage – meaning a greater number of young people would have access to the system and relevance, to guarantee the competitiveness of the country and to assure the improvement of the quality of life of the population. In 2000, 14% of undergraduate students were enrolled in technological and technical institutions, a small number compared with international standards that are around 40%.

In this regard of quality, there is another international index to compare countries. It is the national research capacity of which Colombia is quite modest. In 2002, there were a total of 63,245 students registered in postgraduate programs, of which only 6,775 (11%) were registered in master studies and 350 (1%) in doctoral studies.

In administrative matter, the quality assurance system is fragmented. Colombia’s system has include three ways to evaluate institutions: i) inscription of programs, which follows a set of steps and paperwork, ii) the accreditation of a program or institution, which in addition to documentary revisions includes benchmarking with the best universities, and iii) national tests to evaluate last-semester students and is in charge of ICFES3.

There is deficient coordination among agencies responsible for the quality assurance system, where duplicity in functions and lack of an integrated information system are the main symptoms. This situation has contributed to the misalignment between the current offer in higher education and a clear regulation on the conditions of operation of institutions and programs. But also, it has caused deficiencies in the evaluation procedures, and deficiencies in the monitoring, control and supervisory system. All these consequences have been seen reflected in low labor and social relevance of higher education.

**Efficiency**

The productivity measures made by the Ministry and international agencies like the World Bank show that public universities are along way from the desirable levels of management and efficiency. Their cost structure indicates excess in personal payment expenses, at the detriment of the required investment and adequate operation, which in fact affects the quality of education and puts sustainability of the universities at risk.

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3 ICFES: Colombian Institute for the promotion of Higher Education. Until June of 2003 was in charge of: i) the national tests for students finishing their secondary studies, ii) promotion, monitoring and supervising of higher education institutions, iii) information system of the higher education system, and iv) development of quality assurance policies in higher education, for example accreditation of programs and institutions and tests for undergraduate students near to get their degree. After that date, ICFES is only responsible of the first and fourth item; it has converted in the national center of education tests.
As we mentioned in the coverage of the topic, there is an estimated 40% of installed capacity available for new students. Another point that demonstrates bad utilization of current infrastructure is the high number of small institutions: in 2000, close to 63% of institutions had less than 3,000 students in attendance. Of this group, 39% had less than 1,000 students in attendance.

The most important effect of the inefficiencies explained is the large distortion in average costs per student and in the distribution of financial resources from the National Government to public institutions, without any coherence between the financial effort and the results of the institutions in terms of coverage and educational quality.

Finally, the higher education system faces problems related to multiplicity of instances, duplicity of functions and scarce coordination between the agencies in charge of the sector. The Ministry has begun a reengineering project to clarify the purpose of each agency and their responsibilities in order to build an articulated and efficient high education system.

1.1.2 Solutions proposed by the Ministry

Coverage

The Government has created three programs for the creation of 400,000 new places: i) 100,000 with financial aid; ii) 150,000 through modernization of public higher education institutions; and iii) 150,000 via promotion of the technological and technical education.

i) Credit

ICETEX⁴ with resources originating from a credit of the World Bank has created mechanisms of financing facilitating the access of students to higher education programs in public and private institutions as a way to use the already installed capacity in those regions where the offer exists. These aids include some subsidies from the Government.

The alternatives of financing through educational credits are still insufficient. During 1995 - 1999 the percentage of students with credit from the ICETEX diminished from 7.5% to 4.5%. In 2000 this percentage enlarged to 6%, with 55,000 students benefiting with the goal aiming to benefit 100,000 new students between 2002 and 2006.

The financing is oriented to facilitate the enrolment and permanence in the higher education system and will benefit students from the lowest income levels and good academic performance, who must be admitted previously in a technological, technical or graduate program.

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⁴ ICETEX: Colombian Institute for financial aid in Education and Technical studies abroad. It is the governmental institution responsible for financial aid to students of low income and agreements with other countries to get scholarships for Colombian citizens.
Credits will be paid to ICETEX twice in the career-period, will have low rates of interest and there will be top limits in the percentage of the incomes of the graduate that would cover the payments. In addition ICETEX is designing a system of guarantees for the credits based on the projection of students’ future incomes instead of current assets; otherwise they will be prevented from accessing the financial aid.

**ii) Streamlining of resources and modernization of higher education institutions**

This program is directed to assist institutions in the development of sustainable policies to widen coverage and to improve their quality through the best use of its financial, physical, and human resources.

The Ministry and the public institutions that require this support will agree on plans for streamlining and modernization directed to improve management practices; enlargement of educational offering thus creating pertinent programs for the regions where the institution is located; implementation of new methodologies like virtual programs, and development of actions to diminish the number of students who fail or drop out from institutions.

**iii) Promotion of technological and technical education**

Considering the need of more people, especially youngsters, acquiring a technical and technological background, the fact that a technical program can cost less than a half of a university program, and the low supply of technical and technological programs, it seems very reasonable to foster the creation of new programs according to the needs of each region in the country.

The Ministry has proposed that conventional universities create technological and technical programs in cycles of education that could help narrow the gap between employees’ skills and the business and industry sector needs. These programs would also facilitate the traffic of students among different levels of higher education using the existing infrastructure more efficiently. But it won’t be easy, educational institutions must be prepared to react promptly to the fast changes in technology and skills required in each industry adjusting their supply and creating schemes that let students acquire and update new knowledge along their lives.

These programs would also allow the creation of more flexible learning-teaching methods, like on-line education, which will let students advance in tertiary education at the same time exploring and gaining experience in the labor market.

To complement the new programs, the Ministry has another project to create joint strategies with the SENA\(^5\) looking for the integration of some of its programs to the formal higher education system.

The pertinence of programs will be evaluated through the Labor Market Observatory, a project created by the Ministry. The Observatory will function as a bridge between the business, industry and the academic sectors by monitoring, analyzing and diffusing

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\(^5\) National Apprenticeship Service offers no formal technical education.
information about the labor market (both supply and demand) and monitoring graduates of higher education, their salaries, participation in the labor market, labor conditions, demographic and socio-economical participation.

**Quality**

The Ministry will build the Quality Assurance System in Higher Education in order to promote and improve the quality of higher education. Here are some of the projects:

- Definition and verification of the minimum quality conditions that all the programs should comply, and voluntary accreditation of high quality programs and institutions.
- Obligatory application of exams of quality of higher education ECAES. These exams constitute a state exam for last year undergraduate students.
- Design and implementation of the Labor Market Observatory as a mechanism to improve the relevance and convenience of programs of higher education. The Observatory will monitor, analyze and diffuse information about the labor market, and will follow graduates’ progress so as to create information for institutions and future students.
- Internationalization of higher education in order to promote and implement it in tune with the challenges that globalization and the new economy of the knowledge imposes.
- Promotion of research in the institutions of higher education and articulation with the National System of Science and Technology which includes financing of doctorate studies endowment of educational institutions with adequate infrastructure and technology.
- Regulation of non-formal education and of the extension education considering the importance these programs have in the labor market and the individual development of the citizens.
- Strengthening of the monitoring system the control of the higher education based on the development of a national system of information for higher education.

**Efficiency**

The Ministry will agree on management and performance plans with public institutions of higher education, in particular in the adjustment and improvement of the following aspects:

- Administrative Efficiency: ratio between faculty and staff with respect to student alignment with the size and complexity of the institution, in order to identify the optimum size of the organizational chart.
- Academic Efficiency: adjustment of the academic load, research and extension programs in institutions to optimize capacity, promote research projects and develop strategies to reduce failure and drop-out of students.
- Integration: to improve the efficiency in the use of the resources by public institutions of higher education, the Ministry will promote agreements between institutions to facilitate the flow of students and professors.
1.1.3 Current status of specific projects for virtual education

Currently, the execution of the projects related with virtual education is as follows:

- Design and implementation of the Labor Market Observatory: The process to hire an external consultancy firm to design and implement the Observatory must be completed in the next two months and the first results from the Observatory are expected by March 2005.

- Community Centers for Higher Education – CCES: The Ministry of Education has developed a strategy of community centers to bring good quality higher education to far-off zones of the country as well as places that do not enjoy adequate educational supply. This strategy pursues the optimal use of resources devoted to higher education from the higher education institutions, regional authorities and the central government. Both the private sector and non-profit organizations are invited to run these centers and collaborate in identifying labor market needs, potential technological and technical programs for covering those needs, possible institutions for meeting that demand in the region, and possible strategies for providing employment to students during their programs or after graduation. Since 2003 twelve community centers have been created, but they are working very slowly and have not yet shown results.

- Tutor training for virtual education: To those universities interested in the creation of virtual programs, the Ministry proposed financial aid for the training of 1,000 professors who would become tutors in virtual education. The Ministry will finance 30% and the universities the other 70%. The bidding process to hire the organizations that will provide the training must be opened in two months and the training will take six months after that.

- Digital objects bank (bank of on-line courses): Due to the lack of good quality on-line courses in the country, the Ministry will finance the development of 40 on-line courses which could be used by any university interested in creating virtual programs. The bidding process to hire the organizations that will design and develop the courses must be opened in two months and the courses will be available six months after that.

- University Committee: a committee with those universities which most represent virtual education. Their purpose is to review the current regulations for distance and virtual programs. The committee was created in November 2003 and for now they are working on the topic of quality standards for virtual programs.

1.2 THE POTENTIAL DEMAND FOR THE VIRTUAL UNIVERSITY

There are not prospective researches about potential demand for higher education discriminated by regions, kind of degree and career, least for virtual education. In consequence, to define with some level of accuracy the potential demand for the virtual university, I will describe the last official statistics about composition of the current educational demand and I will extrapolate the possible magnitude of the population to be covered with on-line education in each region of the country. However, the fact of the matter is that the demand for the virtual university is unknown and the following numbers could be totally unrealistic.
The distribution of young students in higher education, between 18 and 25 years old, with respect to the total population in the same range\(^6\) is shown in Table 1. As we can see, women are superior in number to men (54.2% vs. 45.8%) and more than 25% of students work while studying, with an average work load of 34 hours per week. This work load obviously affects the dedication to study and makes evident the effort to pay the costs of high education.

| Table 1: Characteristics of students in higher education (18 to 25 years old) |
|-----------------------------|--------|----------------|
|                             | Women  | Employed       |
| Students                    | 54.20% | 25.70%         |
| Others                      | 53.90% | 47.00%         |
| # Hours working per week    |        | 34             |
| National Home Survey 2000, DANE. |

With respect to income levels, Graph 1 shows the coverage in higher education by income levels. In 1997 while 40% of students came from the highest income bracket, only 9% came from the first and second lowest level brackets. In 1998 and 1999, during the economic crisis in Colombia, the coverage decreased by 0.5% and 0.8% for the first and second lowest income levels, respectively.

![Graph 1: Coverage by income levels in 1997](image)

Source: DANE, Household survey

There is a difference in the careers chosen by women and men (see Graph 2), with women behaving as in other parts of the world, where they prefer more traditional careers: 34% economics, business and accounting, 19% engineering, 15% social sciences and law, 16% education, 11% health sciences, and 5% other topics.

\(^6\) The source of information is DANE: National Department of Statistics.
Graph 2: Participation in careers by gender (1999)


It is notable that the rate at which women finish their studies is 10% higher than men’s: the last results available\(^7\) show that this rate is 53% for women and 43% for men.

The target population for the Ministry is the demand from the lowest income levels. The rest of students must be attended by private institutions and the projects to bring financial aid to students, described in the first part of this chapter.

In order to estimate the potential population to serve in the Virtual University per province in the country, I used the population projection for youths between 18 and 24 ages for year 2005, the estimated proportion of population in the lower income levels (38%), the percentage of students with finished secondary studies (49%) and the percentage of this population who is not getting access to tertiary education (91%)\(^8\).

Last year the Ministry defined a first goal of 40,000 students for the Virtual University by 2006 and 200,000 by 2010. I’m using that number as a limit, but as we’ll see in the fourth chapter, there will be so many variables and external factors that could affect the deployment of the new model, that surely this number will be less. For now, let’s work with that figure.

The projected demand for the Virtual University, discriminated by zone, is presented in Table 2. According with the distribution of population in the country and assuming the same distribution for the demand in education, it is expected that 24% of new students come from rural areas and 76% from urban zones.

---

\(^7\) ICFES, 2000.

\(^8\) These numbers and ratios were taken from DANE and the Ministry of Education.
Table 2. Projection of demand for Virtual Education in the next five years for students in the lower income levels

<table>
<thead>
<tr>
<th>Provinces (states)</th>
<th>People to cover with higher education (conventional and distant methods)</th>
<th>People to cover with virtual education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazonas</td>
<td>1,005</td>
<td>350</td>
</tr>
<tr>
<td>Antioquia</td>
<td>71,942</td>
<td>25,024</td>
</tr>
<tr>
<td>Arauca</td>
<td>3,514</td>
<td>1,222</td>
</tr>
<tr>
<td>Atlántico</td>
<td>29,605</td>
<td>10,298</td>
</tr>
<tr>
<td>Santafé de Bogotá D.C.</td>
<td>89,733</td>
<td>31,212</td>
</tr>
<tr>
<td>Bolívar</td>
<td>27,861</td>
<td>9,691</td>
</tr>
<tr>
<td>Boyacá</td>
<td>17,646</td>
<td>6,138</td>
</tr>
<tr>
<td>Caldas</td>
<td>14,642</td>
<td>5,093</td>
</tr>
<tr>
<td>Caquetá</td>
<td>5,808</td>
<td>2,020</td>
</tr>
<tr>
<td>Casanare</td>
<td>4,063</td>
<td>1,413</td>
</tr>
<tr>
<td>Cauca</td>
<td>17,076</td>
<td>5,940</td>
</tr>
<tr>
<td>Cesar</td>
<td>13,151</td>
<td>4,574</td>
</tr>
<tr>
<td>Chocó</td>
<td>5,199</td>
<td>1,808</td>
</tr>
<tr>
<td>Córdoba</td>
<td>17,442</td>
<td>6,067</td>
</tr>
<tr>
<td>Cundinamarca</td>
<td>29,232</td>
<td>10,168</td>
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<tr>
<td>Guainía</td>
<td>539</td>
<td>188</td>
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<tr>
<td>Guaviare</td>
<td>1,666</td>
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<tr>
<td>Huila</td>
<td>12,445</td>
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<tr>
<td>La Guajira</td>
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<td>2,285</td>
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<td>Magdalena</td>
<td>17,559</td>
<td>6,108</td>
</tr>
<tr>
<td>Meta</td>
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<td>3,357</td>
</tr>
<tr>
<td>Nariño</td>
<td>22,177</td>
<td>7,714</td>
</tr>
<tr>
<td>Norte de Santander</td>
<td>18,659</td>
<td>6,490</td>
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<td>Putumayo</td>
<td>4,730</td>
<td>1,645</td>
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<td>San Andrés</td>
<td>1,041</td>
<td>362</td>
</tr>
<tr>
<td>Santander</td>
<td>26,057</td>
<td>9,063</td>
</tr>
<tr>
<td>Sucre</td>
<td>10,867</td>
<td>3,780</td>
</tr>
<tr>
<td>Tolima</td>
<td>16,434</td>
<td>5,716</td>
</tr>
<tr>
<td>Valle</td>
<td>56,598</td>
<td>19,687</td>
</tr>
<tr>
<td>Vaupés</td>
<td>414</td>
<td>144</td>
</tr>
<tr>
<td>Vichada</td>
<td>1,201</td>
<td>418</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>574,984</strong></td>
<td><strong>200,000</strong></td>
</tr>
</tbody>
</table>
1.3 THE CURRENT SUPPLY OF VIRTUAL HIGHER EDUCATION

The beginnings of virtual education in Colombia go back to 1992, when the Instituto Tecnológico de Monterrey (Mexico) in agreement with the Universidad Autónoma de Bucaramanga (Colombia) and, later (1995/96) with the universities that make up the Red Universitaria Músis, offered distance master programs, by means of satellite classes transmitted from Mexico. Similarly, there were transmission of courses from Instituto Latinoamericano de Comunicación Educativa–ILCE⁹, Universidad de Nova (Portugal), Universidad de Salamanca (Spain), Universidad Oberta de Catalunya (Spain), and Calgary University (Canada), some of which still continue.

The year 1998 could be considered the beginning of virtual higher education in Colombia because two significant events happened in on-line education. The first event was that two institutions, Universidad Militar Nueva Granada (public) and Universidad Católica del Norte (private), began to offer undergraduate programs supported by information and communication technologies. The second event was that recognized institutions like Universidad Nacional (public) and Universidad de los Andes (private) started on-line services. The former began with the development of courses with great emphasis on content and not only on technology. The second initiated a pilot project of a virtual space where faculty and students shared information, accessed plans and contents of courses, faculty handled administrative issues, and students and faculty interacted via Web.

Colombia has been behind other countries in Latin America. For example, in Mexico the Instituto Tecnológico de Monterrey reported the initiation of virtual education in masters programs in 1989, extended education in 1990, doctoral programs in 1996, and undergraduate programs in 1997, and the Universidad Autónoma de Sinaloa reported virtual undergraduate and masters programs beginning in 1996. In Argentina, the Universidad Nacional de Mar del Plata reported virtual undergraduate programs beginning in 1994.

In the following I will explain the characteristics of virtual higher education in Colombia and the most critical problems and challenges perceived by educational institutions in order to boost the development of virtual higher education. I will end with a short description of representative examples of institutions that have been trying to use information and communication technologies in their distance programs to understand better how virtual education has evolved in the country.

1.3.1 Characteristics and problems of virtual higher education in Colombia

In 2003, UNESCO and IIESALC¹⁰ published research about the state of virtual higher education in Colombia [37]. The research did not cover a hundred per cent of institutions offering on-line

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⁹ The Institute was created by common agreement of the Latin American countries who attended the General Conference of the Organization of the United Nations, for Education, Science and Culture in Uruguay in 1954. Its headquarters are located in Mexico City.

¹⁰ Instituto Internacional para la Educación Superior en América Latina y el Caribe, IIESALC. International Institute for Higher Education in Latin America and the Caribbean.
courses; it surveyed only tertiary institutions offering complete virtual programs. Not all institutions responded to the survey (it was voluntary and it is suspected that there are more virtual programs but there is no official count). Even then the results could be taken as an approximation of the current situation. The most important points revealed by this research were:

**Results**

There were 130 virtual programs reported that showed that the development of virtual higher education was still incipient. This number looked very small when compared with 446 distance programs (both virtual and using other methodologies) or 6,048 programs (3,956 in postgraduate and 2,092 in undergraduate) officially reported for year 2001.

Ninety percent of programs were offered by private institutions (117 programs). The breakdown of programs was: 64.62% postgraduate programs, 21.5% undergraduate programs and 13.9% masters programs.

The distribution of postgraduate programs was as follows: 2.56% basic sciences, 1.28% agriculture sciences, 3.85% health sciences, 11.82% engineering, 12.82% economics, business and accounting, 5.13% law, philosophy and social sciences, and 14.10% education. The breakdown of undergraduate programs was: 7.14% natural and basic sciences, 3.57% agriculture sciences, 14.29% health sciences, 32.14% economics, business and accounting, 14.29% law, philosophy, theology and social sciences, and 25% education.

With respect to kinds of institutions, 52% of programs were offered by technological schools or university-level institutions, 40% by universities and 8% by technological institutions. Currently there is only one university which offers virtual education, The Universidad Católica del Norte. The rest offer simultaneously conventional and virtual programs, or a combination of both.

In terms of numbers of students enrolled in virtual programs, the research found that only 8,059 students were registered, which represented only 0.82% of the total enrollment in undergraduate and graduate programs in the country.

The survey also examined the degree of virtuality and face-to-face interaction in the programs classified as “virtual”. It found that only 26% of the programs were totally virtual, another 26% of programs included a minimum of face-to-face interaction (10% at most), and between these two extremes 48% of programs could have up to 80% of face-to-face interaction.

**Infrastructure**

The latest research\(^{11}\) about information and communications infrastructure in tertiary education institutions showed that in 2002:

- They had 71,732 computers with an average of 307 computers per institution. This is a very low number for a typical institution of 2,000 students, faculty and staff.

\(^{11}\) Source DANE, 2002.
➢ Only 76% of institutions had access to the Internet, and 48% of this group was still using dial-up service.
➢ The uses of computers and Internet were: 45% multimedia, 32.6% digital library, 25.7% virtual teaching-learning, 22.3% virtual classrooms, 8% robotics and 8% other.

From the survey in institutions with virtual programs, the results about technology were:

➢ Institutions used technology for the delivery of on-line courses (76%), access to the Internet (72%), establishment of virtual communities (56%), delivery of virtual libraries service (48%) and virtual classrooms (40%). Audio and video conferences technologies were barely used.
➢ WebCT\textsuperscript{12} seemed to be the most extended platform: 32% of institutions were using it as the platform to offer virtual programs.
➢ Only three electronic services were integrated: access to data bases with the content of courses and grades of the students, electronic mail and chat. Other services like administrative paperwork, registration, news, job postings and forums were beginning to be integrated by few institutions.

\textit{Organizational aspects}

Among the different ways of organizing faculty devoted to virtual education, teams of professors in charge of both conventional and virtual programs was found as the prevailing form (52%) over dual teams, one team for conventional programs and other for virtual education, which was found in 44% of the cases.

On average only 4% of faculty was dedicated to virtual education, discriminated as follows: 48% of the institutions had a team integrated by 10 or less professors, 28% a team between 11 and 30 professors, 12% a team between 31 and 100 professors, and only one institution had a team of more than 100 professors and they represented a small team compared with the total number of professors in each institution. These characteristics showed that there was little presence and consolidation of an organization to offer virtual education.

While these latest results may be disappointing, from a positive point of view, it was found that institutions enter virtual education with boldness and a lot of risk given that the government has not created special regulations or promotion policies regarding virtual education.

The research asked institutions for the reasons for which they entered the virtual education business. The answers were: i) advances in technology, internal development of on-line courses and advances in the access to the Internet across the country (43.48%), ii) progress in self-directed learning systems (21.74%), iii) new technologies to support learning processes (17.39%), iv) the required competitiveness of higher education in an age of knowledge and globalization (13%), and v) the possibility to respond to the demands of continuing education by an adult population (13%).

\textsuperscript{12} WebCT, Inc. is the world’s leading provider of e-Learning solutions for higher education.
Another key point related to organizational topics is the process followed to implement virtual programs. In principle it can be thought that the general process is relatively homogeneous between institutions; the research found that the process was more or less homogeneous in the steps but not in the order in which they were taken.

In general terms, the process included the following steps: feasibility studies to decide about the creation of virtual programs, construction of pedagogical models, qualification of faculty, deployment of technological infrastructure, design and development of courses, and pilot phases to test courses before official launching.

Even though, not all institutions gave the same value to each step. In fact, only 34.78% of institutions had placed initial emphasis in the development of viability studies and the design of pedagogical models before undertaking any another phase. Another 21.74% (all of private character) had placed major emphasis in the purchase of hardware and software. And a third group of 17.39% of institutions had initiated with processes of training faculty and creating work teams for some courses.

As was to be expected, all institutions had to train their faculty in pedagogy and new methods of learning-teaching supported by technology, pedagogy of self-learning and virtuality. However, the research showed that 26.9% of the courses given to faculty were on general pedagogy topics and 21.74% on general relationships between pedagogy and technology. Only 21.74% of institutions reported specific training in design and teaching of virtual courses, no more than 8.7% included qualification in philosophy of self-learning; and only 4.35% trained faculty in distance education. Important topics such as the change from printed to electronic materials, skills needed for students to manage a self-directed and virtual learning environment, new ways of interaction and collaboration, needed changes in the design and organization of study plans, design of interactive educational courses, exercises and materials that could be adapted to the needs of each student, and new forms of interaction between professor and students were totally ignored.

In terms of a pedagogical model for virtual education, the survey indicated that 39.13% of institutions had not adopted one; another 21.7% of institutions had adopted pedagogical models conceived before virtuality or whose fundamental core did not include distance or virtual education issues; only 30.43% had adopted a model, from which 13.04% had designed their own model.

With respect to the design and development of courses, the research stated that institutions were at a basic level characterized by on-line courses that did not include greater technological mediation. Courses were stored in data bases and were delivered through the Internet, with asynchronous interaction between professors and students via e-mail. Few institutions were ready to enter a more sophisticated level where courses and programs exploit powerful tools as multimedia, navigation software, interactive exercises, synchronous interaction (e.g. chat, videoconference) and virtual communities.
Quality assurance

The survey found that 63.64% of institutions designed and used instruments for internal evaluation of their virtual programs, which indicated a serious concern about offering quality and gaining social recognition for their virtual programs. Nevertheless, a not despicable number of institutions (13.64%) confessed to not having any instrument to evaluate their virtual activities.

Principle problems reported by institutions

The study asked the institutions about the main challenges they were facing with their virtual education strategy. In order of importance, the answers were:

1. To improve the quality of virtual education, to improve the pedagogical methodology, and to encourage the production of content.
2. To promote the access of students to virtual programs and to qualify faculty and staff.
3. To broaden the use of information and communication technologies.
4. To promote the creation of virtual communities.
5. To create alliances with the private sector.

Institutions perceived as their major problems the access to the Internet by students, a better technological infrastructure for the delivery of virtual courses, training for faculty and students to use web-based education and the low credibility of virtual education.

1.3.2 Red Universitaria Mutis (RUM)

Red Universitaria Mutis is a non-profit university association created in 1997 and composed by academic institutions with the goal of promoting the integral human and social development through the strengthening, development and channeling of inter-institutional and international relationships between their associates.

Currently RUM is composed by eight members, seven from Colombia and one from Mexico:

- Universidad Autónoma de Bucaramanga
- Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico)
- Corporación Universitaria Autónoma de Occidente (Cali)
- Corporación Universitaria Tecnológica de Bolívar
- Corporación Universitaria de Ibague
- Universidad Autónoma de Manizales
- Fundación Universitaria de Popayán
- Corporación Universitaria Minuto de Dios (Bogotá)
- Unidad de Conocimiento - Fundación Suramericana (Medellín)

RUM is leading the most ambitious projects in virtual education matters in the country. They are working on the first steps to develop their own model of virtual education, giving support to the governmental formulation of politics on the topic, working to create the mechanisms to become
a private quality certification organization for on-line education programs, and in the long-term, becoming a network accredited internationally to promote Colombian virtual programs abroad.

The institutions associated simultaneously are developing their own virtual educational models while adopting practices and technology products of the synergy created by the RUM.

In 2003, RUM began two research projects and one postgraduate program in virtual education:

- Creation of a virtual learning community: addressed to master students from RUM’s universities with the purpose for the elaboration, design and virtual development of contents.

- Design and development of virtual courses: First, it was created a methodology to design and develop an on-line course and it was proved making a prototype. Second and in progress, RUM universities identified 41 courses that would be virtualized. In charge of this project is a group of 126 professors from the RUM universities, where there are between 2 and 6 professors per course. Once ready, the courses will be customized to the different universities. RUM acquired the software and hardware needed to store and access these courses from the universities.

- Specialization program in “Virtual Education Basis” addressed to professors interested in the pedagogical model behind virtual courses.

The advances are few and are coming slowly because RUM universities don’t have enough resources to budget all the projects needed to get on-line programs ready to enroll students. But also they are confronting the most difficult part of the process which is the training of their professors for a virtual model, which requires a total change in the way they would interact with their students.

1.3.3 Efforts by individual universities

In this part of the thesis, we would see individual cases of efforts in virtual education. However it is not comprehensive, it illustrates many of the characteristics described in numeral 1.3.1.

*Universidad Católica del Norte (Medellín)*

This virtual University was created by the Catholic Church in 1997 to cover the farthest towns in one state of the country called Antioquia. However the results are amazing: its current coverage is 95% in Antioquia, 50 towns in adjacent states and a small group of Colombian citizens who are living abroad.

Antioquia is a particular zone in the country where the infrastructure to access Internet has been solved basically through community centers and a strong alliance with the local

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13 The information about Universidad Católica del Norte was found in internal documents, its website and interviews with its Rector, Pbro. Torres M Hugo Alberto.
telecommunication company. This was complemented by the university who financed the creation of new computer labs in zones where the infrastructure was poor.

The University offers undergraduate programs in informatics, business, environment management, psychology, veterinary medicine, philosophy and religious studies and education; postgraduate (masters and graduate degrees) programs in business and education; and seminars and open enrollment courses in administrative issues.

The number of students enrolled has been around 900 students per semester. The profile of students is a working person, with clear career definition and with access to a computer and Internet.

A minority of students repeats courses. In the first semester the drop-out rate is normally around 25%, but after the second semester it falls to 12%. Even though these numbers seem big, they are actually very positive because a 30% drop-out rate is common for on-line education.

The costs of enrollment are between $300 and $450 per semester, fees that fall in the low range of conventional private universities.

The University designs study plans based on web tools and with their own pedagogical methodology. Courses are designed by external experts and a permanent multidisciplinary team of professors. Courses are asynchronous and supported with complementary readings, bibliography and forums.

Each course is taught by a “tutor” who develops the plan of studies, teaches the content, follows up on the learning process, promotes collaborative tasks, interacts with the students, evaluates the process, and constantly motivates the students to guarantee continuity and pace during the course. Tutors are hired part-time and paid according to the number of students they are teaching.

The University has been implementing a pilot project called “students design their own content” where the student starts from a given initial bibliography and designs many exercises oriented by the course tutor. At the end he consolidates his results in a document with a structure similar to that of an on-line course. This experience, little by little, is showing a more creative, collaborative, inquiring and self-oriented student, but there have been complaints about the additional work load in comparison with the standard virtual courses.

Some courses include field practices (e.g. agriculture or veterinary medicine) that could be done by students in their places of residence guided by their “virtual” tutor; other times students must look for a professional local advisor who can certify their work; and other times students meet with their tutor for internships.

There are three mechanisms used to control drop-out rates: i) students interested in registering at the University must take and pass an initial course in the methodology and use of technical
tools; ii) first-semester students are given special consideration by tutors; iii) tutors make continuous telephone calls to students.

To assure quality, the University evaluates its tutors by analyzing their use of interactive tools (e-mail, chat, group discussions and forums), timeliness and quality of answers to students, timeliness of administrative matters (e.g. publishing of students’ grades), evaluation by his/her supervisor and evaluation by his/her students.

The most critical problems during the growth of the University have been:

- Purchase capacity of students: drop-out is caused mainly by this problem.
- The sustainability of the University: the costs of acquiring, maintaining and upgrading infrastructure are very high.
- The scepticism about distance education, and more about virtual education.
- The lack of discipline and fickleness of students from the lower and middle income levels (which are the University target group).
- Low investment capacity of the University.

For the near future, the challenges of Universidad Católica are the creation of new alternatives to student financing, reorganization and streamlining of administrative processes, widening the access to computers and the Internet, enrollment of new students markets (for example from the main cities of the country), improvement of structure and design of contents and materials, and development of its software to manage courses, programs, registration, payments and accounting (the dependence on external suppliers of software has become a disadvantage to the university).

**Universidad Militar Nueva Granada**

The Universidad Militar Nueva Granada was created in 1980. It is an autonomous public university focused on the needs of officials of the military forces and national police; however it is also open to regular citizens. It is regulated, as are the other universities in the country, by the Ministry of Education.

In the area of distance education, Universidad Militar may be the most advanced university in the country since it began to offer virtual education in 1998. At present, it offers undergraduate and graduate programs in international relations and political studies, civil engineering, public accounting, business administration, and non-degree programs in security administration; environmental planning and aeronautics administration. In 2000 the enrollment was 986 students.

Faculty design and develop CD-ROMs and didactic guides for students, leveraging on the content of the same subjects in the conventional Universidad Militar. A team of well selected tutors direct and teach students through the Internet. The University developed its virtual space to support the academic methodology and permit the link among students and faculty. Students

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14 The information about Universidad Militar Nueva Granada was found in its website.
can contact their tutors by Internet, telephone and a private microwave network, and it is also possible to ask for face-to-face individual sessions.

*Universidad Autónoma de Bucaramanga (UNAB)*

In 1999, UNAB created a special unit in charge of virtual education which was called “Virtual Education System”. This unit is composed of 24 professionals and six part-time students and offers different virtual and support programs, research projects and open courses in topics related with the integration of information and communication technologies to the educational environment.

Actually the programs in virtual education are public accounting and, soon, literature for undergraduates, graduate courses in the use of technologies of information and communication in education, masters in business and informatics, graduate degrees in virtual education, pedagogy, and law for non-lawyers; and seminars in law issues.

UNAB has offered academic programs in agreement with Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) since 1994, and with Universitat Oberta de Catalunya (Spain) since 2003, institutions with broad experience in virtual education as we will see in the next chapter. And recently UNAB signed an agreement with HETS\(^{16}\) to deliver its virtual programs and to jointly create courses for the Hispanic community in USA.

Since 1999, 1,945 students have studied in virtual programs and open courses. Thirty six percent of these students have come from the region where UNAB is located and 64% from other 18 states. The target population is adults who have defined their career paths, have some experience and can afford the access to a computer and the Internet.

The drop-out rate has varied between 0 and 25% depending on the stage in a program (the first course on the virtual methodology and use of the technological platform has the biggest drop-out rate, while the last course in programs has a drop-out rate near 0%). A similar behavior is found in the rate of failure which has ranged between 2% and 21%.

In UNAB Virtual there is not the normal division between professors and tutors that is found in foreign virtual universities (we will see that in next chapter). Professors design courses and teach and tutor students. Each professor is responsible for a group no larger than 30 students per course. Courses are sent to external experts, who are paid per course, for content review. At present there are 62 virtual courses and 12 more will be ready by next June.

Professors are, with very few exceptions, full-time faculty from UNAB. To train these “traditional” professors in the virtual pedagogical model, UNAB created a degree

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\(^{15}\) The information about Universidad Autónoma de Bucaramanga was collected from the web site and interviews with Maritza Rendón, Director UNAB Virtual, Claudia Salazar and Claudia Villafane in charge of the pedagogical aspects of virtual programs.

\(^{16}\) HETS is a telecommunications consortium of colleges and universities in the United States and Puerto Rico. Its mission is to widen the access of Hispanics to higher education and training opportunities through educational telecommunications and distance learning.
specialization in virtual education and the use of technological platform that each professor must take and pass before beginning to design and teach virtual courses. Currently, UNAB Virtual has 155 professors.

In general programs can be done completely virtual. The face-to-face sessions are restricted to few moments during courses, which usually coincides with the end of a term. These sessions are dedicated to final examinations or field practices.

UNAB has begun a study of the causes of drop-out and the first general results show that the main causes seem to be access to computer and the Internet, personal issues that diminish the time that a student could devote to his courses, and skills to manage a self-directed learning process. For the last two problems, UNAB believes that the professors’ role in accompanying students and monitoring their progress are the best ways to detect and possibly correct them on time.

The costs for a student are between 20 and 30% lower than conventional private universities. This savings is possible thanks to less infrastructure requirements (space), less administrative load and basically no welfare services for (distance) students. UNAB also takes into account that students are investing in their own computer and access to the Internet.

The technological infrastructure chosen for the management of contents was WebCT. This platform also permits both synchronous and asynchronous interaction between students and professors. To complement digital services, UNAB Virtual is developing the virtual library through a mix of alliances with Instituto Tecnológico y de Estudios Superiores de Monterrey and Universitat Oberta de Catalunya and their own efforts to digitalize texts and create links to other virtual libraries in Colombia. UNAB is working as well on the integration between WebCT and its academic and administrative information system to offer students a unique point of contact with the virtual university.

The mechanism of quality assurance is a process that begins with a student evaluation of courses and professors and follows with a supervisor of a group of professors who reviews the results of the survey, discusses the results with professors and defines the appropriate corrective actions. To improve this process, UNAB has begun the process to get certified in ISO 9001 at the end of the present year.

The principal problems faced during these four years of UNAB Virtual have been:

- Change students’ and professors’ roles and responsibilities from the conventional model to the virtual education model. Although UNAB designed a specific course to orient students in the virtual methodology and technology, and a degree program to train professors, it suggests that the national government promote changes in secondary schools to promote the skills needed for virtual education.
- Overload of academic work for students. At the beginning professors had difficulties in balancing the amount of assignments and, in some ways, ignored the personal conditions of students who chose distance education (normally they are working students). This was the main cause of drop-outs during the first year of UNAB Virtual.
- Adjustment of the conventional organization and processes of UNAB to a virtual environment where students are not required to come to the physical university for paperwork or academic matters.
- Costs of maintenance of the technological platform upgraded and operating. UNAB has invested a lot of human and financial resources to tackle security aspects and obsolescence of equipment and software.
- The time to get approval from the government for virtual programs. The first undergraduate program, accounting, took three years, and the latest one, literature, has waited a year and UNAB does not know how much longer it will take.

The university president’s leadership in the deployment and development of virtual education in UNAB is noteworthy. He is convinced that virtual education is the solution to put education in hands of people in distance zones of Colombia.

In the near future UNAB Virtual is planning to widen its coverage, get certified in ISO standards and form more alliances with foreign and national universities and organizations dedicated to distance virtual education.

**Universidad Minuto de Dios (Bogotá)**

A non-profit organization with social and community spirit which has the following achievements in on-line education:

- 160 virtual classrooms to support conventional programs
- 60 professors graduated in the RUM program “Virtual Education Basis”
- A virtual education model called “Virtus”
- Two virtual courses as pilot experiments, using their own development methodology.

The university is growing its virtual education project slowly because the effort to create courses requires resources that they are now focusing in their conventional programs. The first two experiments with virtual courses faced two problems they are now adjusting: no access for students to computer and Internet facilities and distrust with the model both from students and professors.

**Universidad Nacional Abierta y a Distancia (UNAD)**

Created in 1983, UNAD is a public institution which designs and develops pertinent academic programs for people who have finished their secondary studies, according to national, regional, and local needs, and leads open and democratic educational processes through distance programs with innovative methodologies. UNAD has presence in every region of Colombia and is the only public university devoted exclusively to distance education.

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17 The information about Universidad Minuto de Dios was found in documentary sources provided by the University, its website and an interview with Dr. Manuel Dávila, Director of the Informatics Faculty.
18 The first course took 170 man-hours and the second 80, it was made by professors and staff from the University.
19 The information about UNAD was found in documentary sources available in the Ministry of Education and the University's website.
UNAD has four faculties, 43 regional centers and one central center currently in operation, which offer 29 programs broken down as follows: ten of technological level, two degrees, nine college degrees, and four postgraduate degrees. The areas in which those programs are offered are agricultural sciences, administrative sciences, basic and engineering sciences, and educational, human, and social sciences.

Currently, the University has approximately 25,000 students residing in 900 towns. The price per student for a semester is about $150, but the cost can reach $350.

In terms of on-line education, UNAD is beginning actions to incorporate information and communication technologies as complementary tools to their programs. Examples of projects in this area are:

- Production of electronic and multimedia material
- Electronic services to communicate students and faculty
- Modernization of administrative processes.
- Virtual library

The key point to remember about UNAD is that being a public agency dedicated exclusively to distance education, it could become a great actor in virtual education considering its methodology, its presence in 43 of the biggest towns of the country, and the evolution of open universities in other parts of the world as Open University of UK (that we’ll see in detail in next chapter).

However, UNAD is behind the best experiences in the country in adoption of technology and actually the Ministry has poor governance over their direction and supervision to make the necessary adjustments to integrate UNAD to the virtual university. In addition, the University’s reputation is not the best. So, UNAD is not very likely to become an important actor in the Virtual University.

1.4 EXISTING INFRASTRUCTURE TO ACCESS ON-LINE EDUCATION

Colombia has invested enormous resources in information and communication technology projects. Nowadays the country is one of the leaders in Latin America in terms of investment and is approaching the level of the G7 countries. However, in 2002 the penetration of Internet was scarcely 4.5%, very low compared with 20.1% in Chile. The same situation is found analyzing the percentage of personal computers, in Colombia this index is only 4.2% compared with 18% in Costa Rica.

The last official reports\(^\text{20}\) show that by June 2003, 2.7 million people were using the Internet (Colombia’s total population is around 43 million) divided into 73% using commuted lines and 27% dedicated access. The customers’ increase in dedicated access was 310% with respect to 2000, as a direct consequence of better communication fares.

If these indexes are calculated for the lowest income citizens and the poorest and distant zones of the country the situation becomes dramatic. But, following the trend in the world to solve this inequity, the government has created 940 community centers\textsuperscript{21} that bring Internet and telephonic services to their local citizens. These 940 centers located in 84\% of the towns in the country.

Complementary to these centers, the Ministry of Education, the Ministry of Telecommunications and many regional authorities have joined forces to endow public schools with computer labs and access to the Internet. By the end of the present year the coverage will be approximately 3,800 schools in 90\% of the towns in the country, distributed by zones as presented in Appendix Table 3. On the average, schools offer one shift from 7 a.m. to 2 p.m.\textsuperscript{22} leaving periods during the week and on weekends where the computer labs are unused.

The network of community centers and public schools with computer labs is covering 90\% of the country. It seems that our Virtual University could have at least two points where students could access their courses in 90\% of the towns (except 6\% where only a community center is available). Both programs are managed by the government, so it would be possible to create an agreement where the Virtual University pays the network for its services. In the case of the community centers, that is the way they are operating. In the case of schools, it would be necessary to create the mechanisms, but schools will be glad to receive some extra money to maintain their labs and buy new educational software for their students. But even with this possibility, computer labs do not offer enough bandwidth for videoconference services and many computers could not support multimedia capabilities.

1.5 CONCLUSION

On-line education appears as a possible solution to the need to extend the coverage of higher education for the low income population and those located in far off zones or where the current supply of higher education is poor. On-line education seems to be an appropriate educational model for the development and delivery of technical and technological programs, necessary to narrow the gap between the needs of the labor market, the skills of citizens, especially the youngest, and the existing supply of higher education. And lastly, on-line education offers the flexibility for working students to acquire education throughout their lives without restrictions of time and space.

In brief, the Minister wants to enroll approximately 40,000 students in two years and 200,000 students in the next six years in on-line programs, giving priority to young students and to technical and technological programs. There is still no identification or localization of the demand, there is a poor supply of on-line education in terms of quality and coverage, technical and technological programs still need to be identified, and there is no an explicit strategy or plan to tackle the challenge pursued by the Ministry.

\textsuperscript{21} The project is known as “Programa Compartel” and is in charge of the Ministry of Telecommunications.

\textsuperscript{22} The exception is schools in main cities where they are organized to offer two shifts, the first from 7 a.m. to 1 p.m. and the second, from 1 p.m. to 6 p.m., and a small group also offers an evening shift.
To this point, I can summarize the situation of virtual education in Colombia as follows:

**Identification of Supply**

The Ministry of Education is developing the strategy of “Community Centers for Higher Education – CCES” but they are working very slowly and there are not yet showing results in terms of identification of relevant technical and technological programs to be created. On the other hand, the Labor Market Observatory will deliver its first results in March 2005. Thus it is expected that the first requirements of new technical and technological virtual programs will appear at the end of the year and there is not a clear schedule to get that information. In other words, for the present year we will not have a clear identification of the academic programs needed.

**Current situation of virtual higher education**

It can be said that the impact of virtual higher education in the country has been very low compared with traditional education: in 2001 only 2% of all higher education programs were virtual programs and only 0.82% of total students enrolled in undergraduate and graduate programs were in virtual programs. There is no supply of technical and technological programs (our first priority) and the supply for undergraduate programs is scarce (28 programs over a total of 130 virtual programs).

Academic

With respect to the use of technology, institutions are in an intermediate state characterized by on-line courses that do not include greater technological mediation, and really represent a use of technology to support traditional courses, not a use of technology to support on-line methodologies to deliver education. Few institutions such as UNAB have entered a more sophisticated level where courses and programs exploit powerful tools like multimedia, Internet capabilities, software simulations, etc., even though they still lack of digital services like virtual libraries and virtual communities.

Near half of the virtual programs included more than 10% of face-to-face interaction, so they can better be defined as more conventional programs supported by technology rather than true virtual education programs.

From the organizational point of view, it was found that on the average only 4% of faculty in the universities which offered virtual education were dedicated to on-line education, that 65% of institutions did not develop viability studies to decide on the delivery of virtual education, and that 60% did not adopt a pedagogical model for virtual education. In other words, there was little presence and consolidation of an organization to plan and offer virtual education.

The weaknesses found in defining and adopting a virtual pedagogical model, the poor use of technology capabilities, the organizational structure to support virtual education, and the planning and quality assurance processes demonstrate that, with few exceptions, virtual education is not truly a strategic issue for universities and they are not prepared to tackle that challenge.
A final issue that will come back in next chapter is that experiences in virtual education are more focused on the adult population than on the youngsters who represent the initial focus of the Ministry. This point deserves major attention in the conceptualization of the model for the virtual university because even though it will eventually offer life-long education, the main market at the beginning will be young students who have completed their secondary education.

**Identification of the Demand**

The demand for the Virtual University is unknown. The projections I made for the potential demand are not truly reliable because they are based on global population forecasts per region, not per town, and the numbers could be completely unrealistic. I also gave the distribution of current conventional demand by areas of study and gender as a possible basis for virtual education, but that could be unrealistic too.

All we know is that there is potential demand for virtual higher education, but we do not know where it is and which specific skills the labor market is demanding per region.

The Ministry has proposed to conventional universities the design of pertinent technological and technical programs in cycles. But, as we saw earlier, the areas in which those programs must be created and the mechanisms to capture the potential demand for them are unknown.

**Access to technology by students**

With regards to the access of computer and Internet facilities, considered basic inputs for any student interested in virtual education, the network of community centers and public schools with computer labs and Internet is covering 90% of the country and has capacity to respond to new customers, in particular, schools could open the labs during the shifts when they are not teaching.

It seems that our Virtual University could have at least two points per town where students could access their courses. How good the service would be, in terms of open hours and coverage per town, is a matter of future study because the access would be necessary where the demand is, which, as we saw, is still unknown.

Another key issue to think about is what would be the organization and mechanisms to coordinate with community centers and schools the delivery and billing of services.

**Challenges of virtual higher education**

From the UNESCO/IIESALC\(^\text{23}\) study on the state of virtual higher education in Colombia, [37] and the universities reviewed, the key challenges are:

a) To improve the quality of virtual education, to improve (I would rephrase it as “to create”) the pedagogical model, and to encourage the production of content (I would

\(^{23}\) Instituto Internacional para la Educación Superior en América Latina y el Caribe, IIESALC. International Institute for Higher Education in Latin America and the Caribbean.
rephrase it as “to identify which content must be produced and which content must be acquired and adjusted, and to design the appropriate organization to do that in an efficient way for the country”).

b) To promote and create the mechanisms for students to access virtual programs.
c) To qualify faculty and staff in virtual education methodologies.
d) To broaden the use of information and communication technologies.
e) To promote the creation of virtual communities.
f) To improve the credibility of distance education and especially of virtual education.
g) To create policies, specific regulations and procedures for virtual education.
h) To create alliances and identify sources of financial aid for universities to support the high level of investment needed for virtual education.
i) To help universities to create a system that could be sustainable.
j) To develop the skills of students for virtual education, ideally starting during secondary education.

The experience in virtual education in Colombia is more a product of individual efforts of a group of courageous universities than a result of a virtual education system conceived and fostered by the Ministry responding to a national strategy.

This government is trying to solve that deficiency, but it is still not clear what the complete strategy would be. We have the CCEDs, the Labor Market Observatory and, recently, the Ministry’s plan to help interested public institutions expand their educational offering by creating pertinent programs for the regions and implementing new methodologies such as virtual programs. But the projects have not been implemented and we are reaching the midpoint of this administration’s period.

The diagnosis of virtual higher education in Colombia and the Ministry’s plans to foster higher education are so distant from the main goal that to be realistic a high-quality virtual university with 200,000 students enrolled in the next six years seems very unlikely. Even 40,000 students enrolled in two years, if we are looking for good quality education, sounds unwise. If I cannot completely solve this challenge in this thesis, I hope to at least provide the elements required to redesign the project and define an implementation plan.

In next chapter I will describe some international experiences in virtual education which will highlight important elements to be taken into account in the model for our Virtual University.
2 EVALUATION OF EXPERIENCES IN ON-LINE EDUCATION FOR HIGHER EDUCATION

Boyd-Barret [2] identifies six models of distance education based on a classification scheme which distinguishes three primary contextual dimensions: private/public, dedicated/incorporated and strategic/non-strategic. I chose four of the six models to classify and explain the experiences selected for this thesis (see Table 3). The selection was made based on the worldwide recognition of the university or its original design.

Due to the significant differences between developed and developing countries and our particular political and socio-economic context, it is fundamentally impossible to select a foreign model and adopt it in Colombia but from the presented experiences it is possible to identify the components that the new model must include, the alternatives to implement it, and the steps and potential risks for the implementation stage.

Table 3: Models of distance education

<table>
<thead>
<tr>
<th>Model</th>
<th>Contextual dimensions</th>
<th>Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public, dedicated, strategic</td>
<td>UK Open University (OU), Universitat Oberta de Catalunya (UOC) (Spain), Universitat de Barcelona Virtual (UBV) (Spain)</td>
</tr>
<tr>
<td>2</td>
<td>Public, incorporated, non-strategic</td>
<td>California State Polytechnic University, Pomona (USA)</td>
</tr>
<tr>
<td>3</td>
<td>Private, incorporated, strategic</td>
<td>ITEC Monterrey (Mexico), University of Phoenix (USA)</td>
</tr>
<tr>
<td>4</td>
<td>Public/private, dedicated, strategic</td>
<td>Clearing house brokers (USA)</td>
</tr>
</tbody>
</table>

Because of their characteristics, the first model gives strong elements to design the initial model for the Virtual University in Colombia and therefore was studied in depth. However, the other models will give many insights about organizational aspects as we would see during the development of this chapter.

2.1 MODEL 1 - PUBLIC, DEDICATED, STRATEGIC: UK OPEN UNIVERSITY (OU)

Many articles have been written about the OU which have been used as documentary resources for this thesis [2, 3, 7, 16, 33]. In summary the OU is as follows.

Objectives:

Open access on a ‘first come, first served’ basis, regardless of previous qualifications, and with affordable prices for modest income students.
Services:

In 2001, the OU offered 360 undergraduate and postgraduate courses in arts, modern languages, social sciences, health and social welfare, science, mathematics and computing, technology, business and management, education and law. Students can enter at the age of 18.

Develop specific programs for governmental institutions in fields as health, social welfare and education, and offer consulting services to other countries interested in the deployment of distance education projects.

Development and delivery of courses:

Students can achieve degrees entirely at a distance, throughout a wide variety of technologies employed by the OU: print, audio-visual programming, face-to-face tutorials, computers, Internet and CDs. In 2001, 275 courses use information technology but only fourteen were delivered via the Internet. As the OU states in its document “The Learning and Teaching Strategy”:

“Open University courses are delivered as an integrated combination of media and methods, each chosen for its unique contribution to the learning experience. It is essential to provide the appropriate balance of media – text, audio, video, interactive simulations, database resources, IT tools and communication environments.”

OU offers bachelor, licentiate and research degrees, postgraduate qualification and open-enrollment courses. The degree system uses a credit structure where eight credits are needed for an honorable degree and six for a pass degree. The average time to achieve a degree is six years for a student that is employed while studying, but for a full time student, it could take as few as three years.

The university produces its own courses with full-time faculty in collaboration with professional broadcasters and consultants. Courses are typically comprised of especially well prepared course units, course readings and practical exercises, books, audio and video cassettes. The British Broadcasting Corporation (BBC) is subcontracted to produce and broadcast radio and TV programs as supplemental course material and independent media companies assist in producing audio-visual content.

Course development requires at least two years and the investment is about $1.75 million for a full-credit course. Courses are produced by multi-disciplinary groups of academic experts on the specific area, pedagogical advisers, designers, audio-visual production personnel, developmental, testers and other experts. Once a course is introduced, its maintenance is managed by a much smaller team.

Internal organization:

In 2001, 7,000 part-time associate lecturers were responsible for the local face-to-face contact and tutorial of students. They were also responsible for marking and central academic staff
monitors them. The majority of part-time staff works as full-time lecturers for other institutions. Faculty staff is required to be productive in research as well as teaching.

Its headquarters was built in central England and include thirteen regional centers and 300 study centers through UK and 30 study centers in the rest of Europe. The regional centers organize sites for the taking of examinations, which are designed, distributed and marked by the national center.

Printed course units and CDs are delivered through the nationwide postal service and through the Internet.

Costs to operate the OU:

Central government funding, tuition fees and supplemental sponsorship by foundations industries and other organizations all support OU. Its total budget in 1999 was $310 million, where $150 million were government subsidy.

John Daniel [4, 39], vice-chancellor of the OU, claims that the basic economic approach of distance learning is to replace labor with technology, or to replace fixed costs with variable costs, with the second one producing big savings. The cost per unit can be cut by adding more students to existing courses. To reduce labor costs, basically OU has divided the faculty role into three functions: preparation, presentation and interaction/assessment. Preparation and presentation are done by design teams and interaction/assessment by part-time tutors.

Tuition fees per student:

The average cost for a credited degree is about $6,000, which represents 40% to 60% of a degree in a traditional university.

Results and impact:

Established in 1969 OU began operations in 1971 and at that time it contended with misconceptions about the quality of distance education and the institutions dedicated to it. The OU has since overcome its early controversy, has grown to reach approximately 200,000 enrolled students with a total of over two million graduates. OU represents 22% of all part-time higher education students in the UK and has expanded through over forty countries. It has consistently won a high ranking in official league tables of teaching, research and funding which include conventional universities. Of the 23 subjects assessed by the Quality Assurance Agency in UK, 17 have been placed in the top 'Excellent' category.

The distribution of enrolled students was as follows in 2001: 158,000 were studying undergraduate programs, 25,000 postgraduate programs, 5,000 open courses, and 29,838 ‘study packs’ for people interested in courses without a formal enrolment. About 80% of students were employed, 66% of students were aged between 25 and 44, and 26,000 (13%) students were studying OU courses outside the UK. One remarkable point is OU’s commitment to people with disabilities: 7,653 of its students were in this category in 2001.
The open-entry policy is one of the fundamental achievements. By the 1990s approximately one-third of its graduates had entered with less than the minimum entry requirements of conventional university. Despite this, around 70% of OU students successfully complete their courses each year.

The model of UK Open University enabled the government to expand the coverage of higher education for less money than conventional universities, and it created the conditions for education throughout life, allowing adults to maintain jobs and support families as they acquire university education.

The OU is the pioneer in the concept of open access regardless of previous qualifications, giving people, especially adults of modest income with family and job commitments, the opportunity to achieve higher education. The OU weights factors such as world experience and motivation, not normally taken into account at conventional universities.

The OU experience and efforts in production and delivery of e-learning courses in 2001 [33] is as follows,

- About 160,000 students and their tutors are on-line. They use the email conferencing system developed by the university.
- Ten per cent of all assignments are submitted electronically;
- 178 courses require the student to have online access for delivery of course materials, study support, etc.; and other 97 allow the student to use online services if they wish.
- 773,000 CD-ROM, 30,000 floppy disks and 3,000 DVDs were produced.
- Two applications for IT learning: a virtual field trip for science students, and a virtual stadium where 100,000 persons can be hosted simultaneously.

**Reasons for success:**

- Consistent government sponsorship.
- The open-entry policy and the regional model support the OU commitment to the UK as a whole.
- The use of the BBC as a broadcast channel provides promotion and publicity, reinforced by the high-quality image of the BBC.
- In 2001 most students had access to video players and television and 75% of students had access to computers and Internet, so online tutoring was possible.
- The part-time tutors from higher education institutions established a basis of collaboration rather than competition between the OU and universities.
- The model of course development even though its high cost, may has convinced skeptical public that distance education was not a third-class education for the poor.
- The obligation of faculty staff to undertake research activities has emphasized the OU’s commitment to excellence and is a way to undermine attempts to dismiss them as inferior.
Challenges:

- In 1997, the educational policy in UK promoted self-sustainability for all universities through entrepreneurship, causing the government funding in the OU to fall from 80% to 60%. The first challenge is to sustain the University with same quality standards and breadth of choice.
- Steady incremental yearly growth between 3% and 5%.
- Recruitment and retention of greater numbers of minority ethnics, disabled students, those from lower income levels and students with low previous qualifications.
- A higher profile for research.

Opportunities for Colombia:

The OU provides consultant support to distance learning ventures around the world. Due to its governmental origin, it would be possible to negotiate an agreement between the two countries to get that support and the rights to use and adapt courses to our needs.

2.2 MODEL 1 - PUBLIC, DEDicated, STRATEGIC: UNIVERSITAT OBERTA DE CATALUNYA (UOC) - SPAIN

Apart from the articles studied about UOC’s experience [6, 17, 31] it was necessary to conduct some interviews to complement specific aspects24. Here is the summary for UOC.

Objectives:

To open up the possibility of higher education at a cost all Catalans could afford, by offering distance learning that maximizes the use of ICTs.

Services:

UOC offers approximately 360 undergraduate and postgraduate courses in computing and multimedia, philology, economics, business and management, education, law and documentary and bibliography science. As complementary services to students, UOC offers sixteen support centers, a virtual library, employment bureau, a cooperative store (stationery, books, music, trips, etc.) and technical support for the technological platform.

UOC has designed academic programs for adults interested in tertiary education who did or did not finish their secondary education. Additionally, it has created open enrollment courses in administrative topics and professional competencies for the labor market (languages, informatics, etc.). As part of the development of new businesses, UOC has created its own publishing and multimedia production materials companies.

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24 Interviews with Dr. Josep Duart, International Projects Office Director, UOC.
With respect to corporations, UOC offers tailored academic programs and consultancy services in the development of virtual communities, knowledge management and e-business.

The commitment to the community led UOC to open space in its virtual campus to non-profit organizations and peace programs like the International Committee of the Red Cross and Economists Without Borders.

Finally, UOC offers its academic and technical advice, technical platform and materials to other campuses interested in its developments.

**Development and delivery of courses:**

UOC’s pedagogical model, consistent with its academic philosophy of no restrictions of time and space, is student-centered and completely virtual. The methodology is based on the ability of the student to acquire information, analyze it and transform it into knowledge suitable for continuous updating and assessment. The model relays into three aspects: teaching materials, tutorial actions and continuous evaluation.

Almost all course materials are designed by full-time professors and are developed in multimedia and paper or web-based depending on what is more suitable for the specific content. In many cases it is necessary to sub-contract an expert as the author of the course content, but copyrights always belong to UOC. Even in such cases the entire responsibility for a course falls on a full-time professor. The development of a course takes between six and twelve months.

Students can take some courses from other universities with whom UOC has previously established an agreement, but they are elective courses and they follow the same academic principles of virtuality as UOC’s courses.

The tutorial aspect involves three profiles: tutors who are responsible for student guidance and coaching and serve as the administrative link with UOC; consultants who are specialists on a specific topic and provide support to students in the study and evaluation of a course; and, professors who develop academic programs, define and design courses, and coordinate tutors and consultants.

The tutors are in charge of the initial phase for a new student. This phase includes administrative procedures, a course on how to use the Virtual Campus, organization of studies, and presentation of additional services.

Finally, the third aspect of evaluation is a continuous process and is essential to measure how students are progressing and keeping pace with the program for each course. Students can choose between continuous or final evaluation. Both methods require a final exam and most courses require that exam to be taken in person.

On the issue of evaluation, there are many concerns about deficiencies of on-line courses to prevent fraud in exams. UOC has attacked this problem in three ways: i) most courses include a final exam to be taken in person; ii) linked contents between courses, so in many moments in this
chain there will be exams required to be taken in person (it may be that the student is not going to be “discovered” in the course where the fraud was committed, but later); and iii) students are working adults who are not going to play with their future. Either way there have been very few cases of fraud and they have been resolved individually.

University programs follow the rules defined by the Ministry of Education of Spain and are divided in two cycles: the first one takes three years and the second, two years. Postgraduate programs have three versions: specialization programs which last six months, postgraduate programs which last one year, and master programs which last two years. Doctoral programs take five years.

For masters programs it is possible to obtain degrees progressively. Students design their own study itinerary in modular courses that would give them first a specialization degree, then a graduate degree and finally a master’s degree. Each intermediate degree has some kind of recognized degree or accreditation facilitating the student’s progress in the labor market.

Because it would impose restrictions on time and space on busy students, UOC does not include synchronous activities like chat or video-conferences, or teamwork which requires physical meetings between students in their courses. Along the same lines, the field practices required in programs are done virtually. For example, in informatics they use virtual labs for programming texts, and in law they use a virtual legal office where recognized expert lawyers work with students.

Education is totally asynchronous and on-line. This ‘virtuality’ is possible because of the Virtual Campus platform, a web-based space designed by UOC. This space is for teaching and is the way to connect students and faculty. It allows students access to information resources like databases, libraries and bulletin boards and to administrative activities (enrollment, grades, etc.).

To fulfill the requirement for some undergraduate programs as pedagogy, UOC has established agreements with schools and prisons where students can do their professional field training before graduation.

Regarding access to computer and Internet, the student is required to solve this issue. But it has not been a problem because the target market has been working adults who can afford a computer and access to the Internet. In fact, to date, around 90% of students take their courses from home. When UOC began, they worked with telecommunications companies in the creation of attractive packages for students to access Internet with favorable prices.

**Internal organization:**

UOC applies the model of a private university with a public mission. UOC is part of a private foundation, established in 1994, with strong participation from the Catalan government, the Chamber of Commerce and the Bank Federation, among others.

UOC currently has 160 full-time professors and 2,000 part-time consultants and tutors (around 1,500 and 500 respectively). Of this part-time group 50% comes from other universities where
they are enrolled full time and the other 50% are professionals with experience in specific areas. For the first group, UOC pays a fee to the universities for the services of their professors; for the second, the UOC pays each professor directly.

The selection process for new professors, consultants and tutors has been designed as very demanding, but is a key point to assure quality. New faculty members go through an intensive one-year orientation program and are also coached by senior faculty. UOC has developed methodologies and materials for the faculty to create effective software-based courses. The turnover of full-time professors has been very low: only 15 professors in eight years.

UOC has sixteen support centers, nine of them are regional, four are national, and three international. The formal structure of the University is divided into groups or branches, each in charge of a specific business (e.g. corporative services, open-enrollment courses, complementary materials, etc.). This structure gives flexibility in scope of students and businesses, but it makes knowledge transfer between groups more difficult and requires a management style that controls the corporation yet provides enough autonomy to each group.

To assess the quality of their processes and programs, UOC periodically follows coverage, drop-out, tutor-student interaction indices$^{25}$, as well as exam results, and tutor/ consultant evaluations of their students. In addition, UOC hired an external agency to conduct surveys with students and faculty following the guidelines of the European Foundation for Quality Management.

Unfortunately, there is not a national service to evaluate the quality of programs, and less a specific evaluation of web-based education. For undergraduate programs, UOC follows the traditional education regulations. For graduate programs there is a European project to standardize masters programs in the next five years that would help to improve their quality.

**Costs to operate the UOC:**

Knowing that the development of a course takes between six and twelve months and consultants and tutors must be prepared before the course is opened for registration, almost all the investment for a web-based course is made before the university has its first student effectively registered. In other words, you first create all the conditions to deliver the course, and then you open it to students.

Thus, investment decisions in UOC about a new program begin with complete market research to identify the program’s potential demand and are followed by an academic evaluation to define the program’s suitability to be delivered as a virtual program. UOC approves the investment only when it determines that the program could achieve significant economies of scale, that is there would be a sufficient potential demand to surpass the break-even point, and that the program could be delivered completely through a virtual environment.

The estimations made by people external to UOC say that costs could be 60% of traditional education. It was not possible to get those numbers from UOC.

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$^{25}$ Interaction is measure as number and frequency of e-mails between students and tutors, and average time taken by a tutor to respond to his students.


**Tuition fees per student:**

UOC charges the same prices as those of conventional universities. It does not want to position its courses as “low price” because that could be associated with low quality, and that is not the case. The prices for foreign students are as three times more expensive than for residents of Catalonia, depending on the kind of program.

**Results and impact:**

UOC was created in 1993, a time when there were few successful examples of online education and no organizational models to follow. In 1995 it accepted its first students. By now, around 30,000 students are enrolled in fourteen degree courses, from which 18,000 are in university-level programs, 12,000 in postgraduate programs, and 300 in doctoral programs. Eighty-five percent of these students are from Catalonia, all of them are adults, and 98% are fully or partially employed.

The academic results of students are amazing considering that UOC’s model is completely virtual; the drop-out rate is below 30% and the average course approval is above 70%. The main reasons for abandoning programs are lack of time to combine work and study and a false assumption that e-learning is easier than conventional programs.

UOC created the Internet Interdisciplinary Institute and EduLab as the major sources of research on the topics of information society and e-learning.

To date, UOC has created approximately one hundred alliances with universities in Europe, Asia and Latin America, widening the boundaries of the students it can serve. These alliances are designed to offer the student a combined degree between UOC and its local partner and require transfer of the experience and courses developed by UOC, fitting of UOC’s courses to the local needs and training in the pedagogical model.

UOC has received many awards as the best initiative in distance education and is catalogued as the one of the best virtual universities in the world.

**Reasons for success:**

- The charismatic leadership role of UOC’s President has been fundamental in building a virtual university from scratch.
- Its model of a private university with a public mission gives UOC flexibility in their operation and freedom for the required pedagogical and technological initiatives and adjustments.
- The strong participation of the Catalan government has assured full accountability for the appropriate use of public funds.
- The scheme of part-time professors gives UOC flexibility to grow without incurring huge fixed-costs associated with wages and benefits. Also the hiring of professors through
alliances with other universities led to synergies and good relationships between institutions.

- The recruitment of high-quality, full-time academic staff and continuous evaluation of students, faculty and programs as a way to assure high-quality education.
- The progressive acquisition of degrees and the wide range of courses and possibilities of enrollment give flexibility to students to organize their studies and grow gradually in the labor market. It also means that students can acquire life-long education, so the relationship with the university could extend over many years.
- The very amazing academic results of students (retaining and approval) are the product of the evaluation process and the active role of tutors and consultant professors.
- The network of companies and organizations built to help students with their field practices is at the same time the best mechanism to assure a labor market for UOC’s graduates and to show that they are as competent as students from conventional universities. These companies and organizations are part of the formation of those students but at the same time represent a big portion of the labor market.

**Challenges:**

- Achieve excellence as a knowledge-building university where the Internet Interdisciplinary Institute is the principal executor, the key points are the long-term investment it needs and the focus on the projects it would develop.
- Control over growth: UOC has the highest growth rate in Spain while conventional universities are contracting due to the diminishing population growth. This growth demands decisions about future sustainability, efficient use of resources and continuous growth in academic excellence.

**Opportunities for Colombia:**

- The use of the Virtual Campus platform would accelerate the implementation of our Virtual University. In fact, since 2001 various campuses in Ibero-America have started their online programs using UOC’s platform.
- The adoption and adaptation of courses would be easier than courses from English-universities because the language, history and cultural roots are similar.
- Due to UOC’s governmental support, it would be possible to negotiate an agreement between Colombia and the Catalunya Government to get technical, pedagogical and organizational support and the rights to use and adapt courses for our Virtual University.
- UOC signed and agreement with the Organization of American States (OEA) to offer distance education to people of low income levels or living in far off zones in countries of Latin America, including Colombia. This program is designed to bring the model of education in UOC and give joint-degrees between UOC and local universities to students.
2.3 MODEL 1 - PUBLIC, DEDICATED, STRATEGIC: UNIVERSITAT DE BARCELONA VIRTUAL (UBV) – SPAIN

The following information about the UBV is based on documentary sources [32] and some interviews with staff from the UBV.

**Objectives:**

Give answer to the needs of continuous formation of professionals, graduates and undergraduates as of businesses and institutions. Virtual education complements the one of the conventional Universitat de Barcelona.

**Services:**

For the period 2003-2004 the UBV is offering 325 courses organized in postgraduate programs (specializations/degree and masters)27 in areas such as business and management, education, health, sports, pharmacy, nutrition, hotel and tourism, public administration and culture and national heritage.

UBV also offers a wide range of open courses for college students, professionals and corporations, and customized programs for corporations.

As complementary services, students receive a course to use the technological platform for online courses, technical support, digital library and virtual communities in many areas.

**Development and delivery of courses:**

The pedagogical model is based on an individual and active assessment of the teaching-learning process of each student by means of the figure of the tutor. The tutor is the key piece, since acts as the guide and support of the student during a course, facilitating the contact with his classmates (collaborative learning) and guaranteeing the systematic follow up of the program.

In order to get a degree in a postgraduate or master program, the student must fulfill certain number of credits in modular courses and he is required to execute a specific module which will guarantee the student is able to analyze and apply to reality the content he has studied so far. This modular structure also permits that some open courses, for which UBV gives certificates, form part of a regular graduate program.

UBV courses have a variable duration depending on the specific topic. An experienced academic team determines the student’s workload load during a specific period (for example, a course of

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26 Interviews with Dr. Agustí Ten, Director General UBV, Alicia Segura, Departamento Gestión Académico Docente, Mª José Séculi, Directora de Proyectos, Anna Rubio, Directora de Materiales Formativos, Elena Ripollés, Administradora.

27 UBV does not offer undergraduate education because UOC was created with that purpose and is currently covering almost a hundred per cent of the demand in Catalunya.
20 hours would be able to be carried out during a month), proposing a reference calendar to help the student to organize his time.

Postgraduate programs last over 150 hours that must be carried out in one year. Master and other long-lasting programs are between 300 and 400 hours long to be carried out in one year. Master and postgraduate programs that can be studied in modules have a maximum period of three years.

There are combined distance education and face-to-face sessions when that is convenient for a course or program. Programs include the development and face-to-face presentation of a final project by students. Many times, these sessions are accompanied by visits to companies and additional workshops.

Apart from final project presentations and final exams at the end of each semester, there are no other scheduled face-to-face meetings between students and faculty. However students could ask for them on a voluntary basis or tutors could suggest a conference to meet his/her students and for the students to meet each other. UBV does not encourage face-to-face meetings; it encourages communication to take place through the virtual campus and works with their students to gain their trust on this methodology.

A multidisciplinary team composed of expert authors and pedagogues supervise the amount of content, methodologies and materials for each course. The content is produced by an “author”, who may be a faculty member or an external expert, under the specific guidelines of UBV faculty. All courses are designed and developed internally and authors sign a contract which transfers the property of the materials to UBV.

Some programs include courses offered by other universities. In these cases, and as would be expected, UBV assures the same quality as for their own courses. If the course is co-produced between UBV and another institution, quality assurance is a consensual process for the design, development and delivery (teaching) of the course. If the institution is only teaching the course, UBV establishes the minimum standards of quality for the tutor, materials and evaluations.

For courses which include field training, UBV has designed different methods such as simulation applications (software); agreements or alliances with foreign universities which contribute their tutors who are trained by UBV; or for big groups, UBV displaces a group of professors to the country/province where the practice is needed. In some programs such as health sciences, in which practical training would require deployment of excessive resources, courses include many real clinical cases and a high component of video.

The strategies at UBV to achieve a high retention rate in programs are a continuous, personalized, flexible, kind, nearby and organized tutoring, as well as timeliness (less than 48 hours) in attention and response to all student inquiries.

The UBV developed a virtual campus, using WebCT, where students can find content of courses, complementary materials, activities of learning and evaluation, chats and forums, tutoring, electronic mail, and agenda.
In general students have access to a computer and the Internet. There have been special agreements between UBV and certain public organizations such as autonomous communities in which they take care of supplying spaces, classrooms, computers and access to the Internet to be able to offer the courses contracted with UBV to their associates.

Nonetheless, UBV is still offering distance education based on “paper” for a group of students who have low quality or no easy access to the Internet. For that group UBV has designed and developed materials which are sent to their residences. The materials are self-directed guides with theoretical content and activities of learning and evaluation. The interaction among tutor and students is done by telephone calls or postal mail.

**Internal organization:**

UBV is the initiative of a group composed by Universitat de Barcelona\textsuperscript{28}, the Caixa Catalonia group and the Santander Central Hispano group to consolidate and promote complementary distance education to the current Universitat de Barcelona’s supply.

Professors from (traditional) Universitat de Barcelona collaborate on the elaboration of content for on-line courses according to their areas of specialty. Because they are full-time faculty, they are permanently involved in research and teaching activities bringing up-to-date knowledge to on-line courses.

The conformation of the UBV group of tutors is very different from that of UOC and the reason is that UBV is focused in postgraduate education. In some cases UBV hires tutors who are not university professors but instead recognized experts or active professionals. In other cases, directors of programs or tutors are staff of Universitat de Barcelona or other universities. UBV trains the new tutors in the virtual teaching methodology and technological platform, and makes that expert faculty (full-time professors) accompany and support them.

When UBV works with professors from other universities, it is under an agreement between institutions. The agreement is not signed only for purposes of filling the need for tutors, but as alliances for commercialization of programs, join investment for the creation of new programs, scholarships, etc.

As we saw for UOC, there is no national service to evaluate quality, accredit or certify programs in Spain, at least for web-based education. Additionally, postgraduate education is unregulated in Spain. Thus, UBV is governed by the regulation, orientation and management practices of Universitat de Barcelona. It assesses quality through evaluation of internal processes, student satisfaction evaluations, and comparison of academic results of each program with its twin conventional program in Universitat de Barcelona, when it exists.

\textsuperscript{28} The University of Barcelona (UB) is a public university founded in 1450. It has 76,000 students – more than half of the total student population of the region of Catalonia – and is the second largest in Spain by number of students.
Costs to operate the UBV:

With respect to university operating costs, in the phase of production of courses it has been possible to create economies of scale, but normally at some expense of the “personalization” of courses. A course created from scratch could cost around $90,000. Other sources of economies of scale have been in administrative processes and technological infrastructure.

UBV was born from the Universitat de Barcelona and its first faculty came basically from full-time professors with many years in the University. Thus, UBV began its operation with high fixed salary costs.

Another factor that affects the profitability of virtual universities is the decision about amortization of investments and depreciation of assets. Normal accounting rules do not include the depreciation of “courses” or “methodologies”, assuming that these concepts can be classified as assets. So each university defines many of their accounting procedures. At this point, and with its accounting decisions and initial fixed costs, UBV has not yet met the breakeven point.

Last, in the first year UBV created an infrastructure to serve 17,000 students but it took three years to reach that enrollment. Thus, the lesson is to be very wary about the investment and pace of growth required to maintain costs controlled.

Tuition fees per student:

UBV charges competitive (not cheaper) prices to similar programs in the market, because it does not want students to associate low prices with less quality. Additionally, companies have become an important source of revenues and they are willing to pay fair prices if the education they received is good.

Results and impact:

Since 2001, 37,782 students have participated in UBV courses reaching this year an enrollment of close to 18,000 students. Forty percent of students are residents in Catalunya and 50% come from customized programs for companies or are in programs paid for by their companies.

The average completion rate for masters programs is 80%, for other postgraduate programs, 70%, and for open-enrollment courses, around 90%. Comparing the academic results of twin programs in Universitat Barcelona and UBV, UBV has achieved at least the same results and its best students are better than the best students in UB. To get the same drop-out levels as those in traditional education, UBV has focused all its efforts on the tutoring aspect.

Reasons for success:

- The leverage of Universitat de Barcelona’s prestige and expertise in many subjects.
- The growth of UBV has been based on the establishment of agreements and collaboration with recognized institutions and companies in different sectors. These partners have contributed to the knowledge of the sector and the analysis of the labor market needs.
Courses and programs of high quality.
UBV brand is recognized in Spain and Latin America.
With almost 50% of students from the companies that are paying for their studies, UBV has been required to guarantee the results of their programs. This dynamic forces UBV to improve its quality all the time and adjust their offering to the needs of their students. It is not unusual that some programs for corporations have a higher degree of face-to-face interaction if the group of students is not able to manage the virtual methodology.

Challenges:

The most important goals are to maintain quality and pace of growth. About costs (cost?), UBV is looking for a rational production of new courses knowing that there are many courses of good quality already in the market.

Opportunities for Colombia:

From the interviews conducted with contacts at UBV, it seems possible to negotiate an agreement between Colombia and UBV to get technical, pedagogical and organizational support. The supply of UBV is for postgraduate programs but many of the organizational developments and pedagogical model can be adopted for undergraduate level programs.

With respect to courses, our Virtual University eventually could grow to offer some open courses or advanced topics for undergraduates. Then in the future, it might be appropriate to acquire the rights to use and adapt UBV’s courses.

2.4 MODEL 2 - PUBLIC, INCORPORATED, NON-STRATEGIC: CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA (USA)

Pomona is one of the 23 campuses of California State University (CSU) and is considered by Boyd-Barret [2] as a common example of public universities in USA that are evolving in the way they are using information and communications technologies in their traditional campuses.

In 2001, Pomona didn’t offer an entirely on-line program; only a small portion of courses were delivered web-based and for on-campus students. The situation has improved a lot, which doesn’t mean that CSU was incautious. The CSU has created a number of degree programs that can be earned away from the campus. Some of these programs are available through distance learning technologies, and others may be available at remote sites and campus centers, or even in foreign states and countries.

CSU has developed a growing inventory of courses, certificates, and degree programs in areas related with informatics, business and social sciences, offered via on-line technologies [34].

On-line courses are web-based and require the interaction between instructors and students, and among students. Textbooks, complementary readings, workbooks and some face-to-face
orientation and examinations sessions support courses. However, most of these courses and programs do not require campus attendance.

Mainly faculty develops the material and instructors teach courses. The Faculty Center for Professional Development and the Instructional Technology Advisory Center are responsible for technical and academic support.

Pomona began incorporating distance learning without a strategic vision or purpose. Interested faculty, mainly from courses they were teaching, developed online courses. Now, on-line courses and programs are a fundamental part of their offering, migrating steadily to the characteristics we saw for Model 2.

2.5 MODEL 3 - PRIVATE, INCORPORATED, STRATEGIC: INSTITUTO TECNOLOGICO DE MONTERREY- MEXICO (ITEM)

The Instituto Tecnologico de Monterrey (ITEM) was created in 1943 by a group of Mexican visionaries. It has 27 campuses in 26 Mexican cities, 1,450 learning centers in different regions and extends its educational services to Latin America through 116 centers and its virtual university.

In 2002, the ITEM had 80,970 students (24,389 in undergraduate studies and 56,581 in extended programs), taught by 5,800 lecturers. It offers 31 undergraduate, 37 masters and nine doctoral degree programs in the areas of engineering, computer sciences and business. The ITEM offers literacy courses for marginal communities and training for teachers and public employees.

In its strategic plan for the period 1995-2005, the ITEM established four objectives which integrate the new technologies and virtual education as tools: i) full implementation of the virtual university, ii) reorganization of the teaching-learning process, iii) orientation of research and continuing education towards the development of Mexico, and iv) promotion of internationalization.

The ITEM has always recognized the importance of information and communications technologies to support learning. Since 1990 it has been applying these technologies to educational processes, with recognition and incentives for faculties who developed the projects. In 1989 distance courses were supported by a satellite which made it easier to broadcast courses with a conventional teaching plan, where lectures were transmitted from the ITEM campus [30].

In 1992, the satellite system became interactive allowing students to contribute to the lectures by sending replies, asking questions, etc. Lectures could be enriched with videos, images, graphics and animations, but students were unsatisfied because of their anonymity, impersonal interaction and delayed feedback. The consequence was a high dropout rate.

Learning from the past experience, the ITEM redesigned its distance education system and created in 1996 the virtual university. It was defined as “a higher education institution that offers distance courses with an international scope, based on an interactive teaching-learning system
that operates through a wide variety of telecommunications and electronic network technologies” [36].

The virtual university is focused in graduate, postgraduate and doctoral programs, continuing education programs, faculty development and education at work, serving people widely dispersed across Mexico and Latin America. It supports ITEM undergraduate courses too.

In general, the programs are developed through agreements between ITEM and other universities. Many of them give the students a co-joint degree. ITEM supports their associates with its programs, faculty development and business training programs. In 2001, the ITEM had around 47,000 students taking at least one course in its virtual university.

The ITEM distributes its programs using satellite and teleconference technology, which form a network to transmit and receive from its associated sites across America. Currently it has 17 transmitting sites, 15 teleconference centers (ten in ITEM campuses and five in other countries), and 873 receiving sites (17 in Latin America). Additionally, the sites have interaction capabilities for students and professors using the Internet and its services. Education activities are carried out individually and in teams, and interaction is generally asynchronous.

One important issue is that courses developed by the virtual university can cost 90% less than traditional ones. This allows the ITEM to develop high quality courses that can be distributed to a large number of students. The fares for students are around 60% of traditional programs.

The most visible problem tackled by the University has been technology. Students complain about technical failures, insufficiency of computers and network capacity. However, the most difficult challenges have been educational problems. Students and faculty are not completely satisfied with the teaching-learning process. Technology is something that could be solved with enough resources, but academic methodologies and human behaviors require many redesigns, new tries and a lot of time.

2.6 MODEL 3 - PRIVATE, INCORPORATED, STRATEGIC: UNIVERSITY OF PHOENIX

May be the best example in USA of a private university, which has incorporated online distance learning as a significant strategic complement to its provision of degree programs, is the University of Phoenix (UP) [2].

Founded in 1976, UP adopted a flexible learning and student-oriented provision of courses based on traditional methods before the existence of on-line teaching. What UP did was to locate classrooms as near as possible to students and faculty traveled to teach the programs. UP has been very successful with this model reaching economies of scales by means of an extended coverage and the use of part-time faculty.

Now a student can earn his bachelor’s, master’s or doctoral degree in any way he wants to – on campus, on-line, or in certain areas using a combination of both, which UP calls FlexNet. UP
offers its students over 100 campuses and learning centers in the United States, Puerto Rico, Canada and via the Internet.

Starting online courses in 1989, UP was one of the first accredited universities to offer online college education with complete degree programs via the Internet. The web-based delivery system created has proven to be effective for thousands of successful graduates.

UP has become the one who offers one of the most up-to-date and relevant curriculums. The development of courses is in charge of the faculty working in collaboration with technicians, with investments as high as the cases of UK Open University and Universitat Oberta de Catalunya. UP also incorporates materials from external sources.

On-line education programs are created in cooperation with business and industry, guaranteeing the development of skills and expertise that are in high demand. The curriculum is continually updated to reflect the latest proven concepts, methods and practices.

Some advantages of UP programs for their students are the following [35]:

- Attend class at times and places that fit their schedule.
- Complete 100% of their education via the Internet, including all administration, registration, and book buying.
- Earn their degree in two or three years.
- Take classes one at a time for 5 to 6 weeks (5 for undergraduates and 6 for graduate students) each, so they can focus on each subject.
- All faculties hold a master's or doctoral degree and work in the fields they teach.
- Learn with other experienced professionals from various corporations and organizations across the country, and around the world.
- Apply your coursework immediately in your work environment.
- Professional training and previous education can be used to fulfill some credit requirements.

UP offers programs for working adults with an average age between thirty-five and thirty-nine who want to earn their professional degree-level quickly. To be considered for admission to an undergraduate program, applicants must hold a high school diploma or its equivalent, must be at least 21 years old upon enrollment and must be employed at the time of enrollment, or have access to an organizational environment that allows application of the concepts he will learn in class.

While the cost of attending a private college in USA is over $20,000 a year at many schools, the cost of attending online college courses at UP Online is less than half that.

The UP had 50,000 students in 1997, rising to 68,000 by 2000, from which 16,000 students were taking on-line courses. There were 5,200 instructors, all but 150 of whom where part-time.
2.7 MODEL 4: PUBLIC/PRIVATE, DEDICATED, STRATEGIC: THE CLEARING HOUSE (USA)

A distance model denominated clearing-house and developed in USA consists of an organization or group of them that acquire programs from a variety of providers, and then add value through flexible entry and credit-transfer policies between programs and institutions [2]. The model integrates the educational market by pooling distance courses, support, marketing, infrastructure and training efforts through a consortium.

Examples of clearing-houses are the following:

- The National Technological University offers for-credit and non-credit courses delivered on-line. Courses are produced by an alliance of 52 universities and training organizations that include top 25 graduate engineering programs. In 1997, the course portfolio was 1,400 graduate-level courses and there were 1,800 students enrolled.

- The Adult Learning Services offers distance degree programs. It coordinates a network of 190 public television stations and 2,000 professors. In 1999 it had 470,000 students enrolled and over 80 tele-courses.

- The Western Governors University was founded in 1995 by governors of 19 western states and is based on partnerships with many higher education institutions and corporations. The main role of the University is to grants degrees based completely on competencies. The programs are not based upon required courses instead they are competency-based. The student works with a faculty mentor to develop a personalized Plan and schedule it for completing his degree program. The University received its accreditation in 2001.

- The Kentucky Commonwealth Virtual University started in 1999 with 160 students but in the next five semesters it enrolled 6,100 students. The University does not have professors, does not deliver their own courses, nor grants degrees. It offers a directory of online courses, a central online library and support services (both technical and academic) for students. All courses use a standard interface and technology to give the same ‘look and feel’ to students.

- Caliber Learning Network Inc. links five American universities with a European network of IT training centers. It offers courses through satellite television and the Internet.

Finally, before leaving this topic of clearing-houses, it is important to mention the Connecticut Distance Learning Consortium, a special case of association [20]. It provides to its 36 members IT services, including a Web site, course management software, course hosting, course development, faculty training, technical support, online assessment and marketing. In the academic year 2000-2001 the Consortium offered 13 online programs, with 400 courses, to more than 6,000 students.

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29 Competency evaluations measure the student’s ability to demonstrate skills and knowledge on a series of assessments carefully designed to assess his knowledge of a field of study.
2.8 CONCLUSION

Main issues from the examples studied

This chapter was intended to show different examples of universities and organizations delivering on-line education. Each model highlights important issues and problems faced in growing and becoming successful in web-based and distance education supported by information and communication technologies.

The universities studied for the first model demonstrate the magnitude of a project to implement a virtual university and the different courses of development for virtual education. The Open University (OU) began as a successful traditional distance university and has evolved to appropriate a mix of technologies to support it. The Universitat Oberta de Catalunya (UOC) was born as a virtual university from scratch and was designed from the technological, organizational and business model aspects to respond to that purpose. It has the great advantage of not having suffered transitions from older educational models. And the Universitat de Barcelona Virtual (UBV) began as a traditional university, the oldest in Spain, as an autonomous organization which would provide virtual education. It has lived through all the difficulties of creating a model with a faculty used to the old traditions in education and high initial fixed costs, but is now positioned as a respectable virtual university.

The OU has comparable characteristics to those we want to address in Colombia. The OU is a mega-university\(^{30}\), enrolls over 200,000 students each year (our goal is 200,000 in six years); is open to anyone seeking higher education, even without previous qualifications; it has pursued scalable growth; it has decades of experience in distance education moving from traditional methods (correspondence, local centers, TV and radio education) to Internet-based courses (the same situation we currently have); and its emphasis is on high-quality interaction between students and tutors with proper use of on-line learning and electronic media with face-to-face assessment. The current state of OU in virtual education is a mix of a few courses delivered totally on-line and all courses supported by technology, which could be a transitional model for many Colombian universities.

The UOC offers courses and a pedagogical model that would be easily adaptable to Latin America. It enrolls around 30,000 students per year (a size near our goal per year) and offers undergraduate programs and open courses, among others, in professional competencies for the labor market, our current priority. Even though its students market is working adults not youths, which is our initial main concern, UOC’s model of no restrictions of time, space or content could be adapted and adjusted to Colombia’s needs, maybe not for very young people, but as a future offering for adult working students.

The UBV does not serve students at undergraduate levels, but being born from a traditional university it provides us with important warnings about the difficulties of the transition from

\(^{30}\) Term used for universities which recruit large numbers of students (about 100,000 annually), whose size yields significant economies of scale.
old methods and skills to the requirements of virtual education. It also warns us about how difficult is to manage this service as a business to achieve a sustainable university.

The OU and UOC are good examples of the seriousness of a governmental project. They show how policy makers can enhance the quality of distance education programs, the respect with which they can be considered by general citizens, the extent to which they contribute to options for students who do not have access to conventional education, and the improvement of pedagogy and new methodologies in distance education.

Pomona University (Model 2) illustrates the normal beginning and progress of on-line education in a conventional university: incorporation of distance learning as a complementary tool in their current courses and programs. After some time, and with the required resources allocated from the conventional programs, on-line courses and programs become an important part of the university’s offering, tending to spin-off independent institution as we saw for Universitat Barcelonada Virtual (Model 1).

From the example of University of Phoenix (Model 3) the most important lesson is that its success comes from the relevance, flexibility, duration and quality of their programs for a working adult population. The distance education service has been designed to cover basically all needs of their students both in time and space, and involve different businesses and industries to guarantee the relevance of programs.

The Instituto Tecnológico de Monterrey taught us how a university could use the complete potential of a broad range of information and communication technologies to support their distance programs, and a strategy to expand its services abroad through alliances with local universities.

The model of clearing-houses (Model 4) is a good idea for potential collaboration between institutions and organizations dedicated to the development and delivery of on-line courses and programs. This joint effort gives advantages as low individual start-up costs, low fixed and variable costs, economies of scales, specialization, targeting of both on- and off-campus students, and the possibility of the development of a strong branding. However, the organization playing the role of inter-connection point and point of contact with students is responsible for the quality of the overall system.

From the six models identified by Boyd-Barret [2], two were not studied. The first one was the ‘public, strategic, incorporated’ where Leicester University (UK) is a good example. This case behaved in its beginnings as Model 1, but instead of being split-off from the conventional university or being transformed in a university devoted only to distance education, it has been increasingly subject to central strategic planning and continuous innovation in the faculties.

The second model was the ‘private, dedicated, strategic’ with Jones International University (USA) as the first Internet-only private university to be fully accredited to grant college degrees. The institutions in this model are profit-driven and many have commercial roots in publishing and entertainment industries. They are managed as private companies and technology is used for content delivery and interaction between instructors and students.
Courses tend to concentrate on areas of high potential revenue such as management and computing. Little information has been published about investment, production of contents, quality assurance systems and pedagogical models developed.

About technology

Regarding the evolution in the use of technology in distance education, in general it can be said that before 1970 it was characterized by correspondence courses in which the course was delivered through printed materials, study guides and assignments sent by mail. The 1980s were the years of open universities which systematized the design and implementation of distance courses using printed material and transmission through television, radio and audio/videotapes. For the 1990s distance education was enriched with teleconference networks by computer and satellite television, multimedia and first uses of the Internet services like e-mail and web sites. Finally, the 2000s are showing an integrated model of distance education fully using the capabilities of the Internet and the creation of research teams in the universities to evaluate and develop new tools to support virtual education.

Cost effectiveness

One key point is that online education of good quality could be cost effective (e.g. see the costs for UOC, OU and UBV). The successful examples appear to be mega-universities like OU, which can achieve economies of scale and position their educational offering in mass-markets differentiating on the basis of high-quality and customized services to the targeted students market, and smaller universities like ITEM and at least other twenty universities [40] (e.g. Athabasca University and the Télé-université in Canada), which are often well integrated with national conventional universities.

The smaller distance universities do not enjoy the same cost advantage of mega-universities, but they organize their production of courses and programs like an industrial process, making themselves cost-competitive with campus universities and with enrollments of less than 10,000 full-time equivalent students. Their size gives them two advantages over mega-universities: first more flexibility to adjust their offerings, and second, they can afford to take somewhat bigger risks trying new approaches (method, technologies).

J. Daniel [4, 39] has estimated that the annual cost per student in a ‘mega-university’ like OU averages $400 compared to over $10,000 in conventional universities in the UK and the USA. He proposes that the per unit cost can be cut by adding more students to existing courses or by making instruction more efficient. For example, OU has gained most of their efficiency through the use of technology, alliances with other universities, part-time tutors (less fixed costs), a balanced offering that satisfies its students’ needs but at the same time uses near-full capacity, careful planning of their resources (faculty, staff, assets, etc.) and strict control of costs. But at the same time OU has improved the quality of its programs to the point of being recognized as the best distance university and classified ahead many recognized conventional universities in the UK.
UOC follows a similar pattern, and only approves the investment in a new program after a complete feasibility study and when it determines that it would be possible to achieve significant economies of scale. In OUC a course could cost 60% of a traditional course. The case of ITEM is very similar with high quality courses that could cost 90% less than in traditional education and programs distributed to a large number of students.

**Quality of distance education**

An uncertain aspect is the governmental mechanism for quality assurance of virtual programs. At least in Europe, United States, Latin America and Mexico, there is not an international organization that evaluates, certifies and accredits programs and institutions in virtual education. My preliminary research for the US shows that there are efforts in some states but no national organization and standards to compare and rank programs and institutions. As a consequence each institution has implemented its own quality assurance system, some more sophisticated than others, some more focused on tools and content than on the learning process, and others evaluating the complete delivery of the service. The ranking has been made against traditional programs and other virtual programs in the market.

From the interviews made for this thesis, there is a huge controversy on what the government must evaluate: the process and infrastructure to deliver programs and courses, the outcomes, or both. On one side, in the range of definitions of what is understood as virtual education (e-learning), it is perfectly normal to find some institutions putting a lot of emphasis on creating a completely virtual methodology, others using ITC to support more and more conventional education, and others focusing on designing a learning method that could manage the new restrictions of time and space of students, but also their skills, or lack thereof, to face a virtual environment. With such a variety in methodologies and resources, how can standards be defined to measure all institutions with the same rule?

On the other side, many people say if such variety exists and the outcomes are comparable or even better that traditional education, what would be the benefit of spending a lot of resources to create assessment methods and organizational infrastructure to evaluate the educational process? It would seem more reasonable to evaluate the students at the end of their programs and the market will take care of the programs that must disappear.

The scope of this thesis does not cover the solution to this issue, I would suggest some possible ways to decide on the topic in the next chapter, but the Ministry of Education must have this in mind and decide what the government’s position would be.

**Main lessons for the Virtual University model**

To finish these conclusions and after evaluating the seven experiences described in this chapter, I have identified the following issues as the most important for the model of the Virtual University:

- In general, when distance programs are part of a conventional university they are more restricted in the range of subjects, media mix, target students, and, most important, pace
of growth. The case of Pomona University could be an exception, but there the difference is that virtual education is part of the strategy of the institution.

➢ A virtual initiative seems to be more successful when there is consistent government sponsorship or a traditional university backing the creation and management of the virtual education branch.

➢ The topics of costs and quality in virtual education can be summarized as: the goal is to improve quality of learning while increasing cost-effectiveness. Quality can not be sacrificed in order to cut costs; doing that the university simply would fail.

➢ One strategy to control fixed costs while growing can be through alliances with other institutions which can offer immediate physical facilities in other regions or countries and part-time tutors for the tutoring service. These alliances also led to synergies and good relationships between institutions to widen services to new students markets. These part-time tutors can also be hired individually as UBV does.

➢ The ‘clearing house’ model is another idea of joint efforts to low individual start-up costs, fixed and variable costs, gain economies of scales, specialization of each associate, and the possibility of the development of a strong branding. Knowing the poor development of virtual education in Colombia, this could be a good beginning.

➢ Technology and development of content are the major costs in virtual education. As UBV has learned, with so many courses of good quality in the market, that it is irrational to insist in the development of the same courses. The strategy is to choose the best ones and adapt them, and design only the content that cannot be found in the market. The same happens for technology; at this point there are enough commercial applications (software) to manage virtual courses and programs that it is unnecessary to think of the development of new ones. Even if there are not enough resources for a commercial solution, Colombia could sign an agreement with UOC to get access to its platform.

➢ One of the weaknesses found in Colombian universities was a general lack of a pedagogical model for virtual education. The international experiences evaluated have devoted a lot of effort designing the learning process, training their professors to deliver properly on-line and distance education services, developing the right content and choosing the right technologies to support the model. Technology and courses, being an important part of the model, cannot overlook a weak learning process. And talking about differentiation in the market, if technology and content can be “bought” in the market, the success in this business is the quality and ‘customization’ of the educational services. That is the importance of the design and deployment of the learning process.

➢ It is fundamental to position virtual programs in the market. The concept of “brand building” is fundamental to creating the desired image in the general public about the quality of distance education.

➢ The participation of private companies and industry is essential. It permits the validation of relevance of courses, offers the perfect ground for field practices and potential job offers for students, and may become another market for the university.

➢ The pace of growth of the university depends on who is the driver. The best examples are the OU or UOC where governments have boosted their growth via direct intervention and the UBV whose growth has been market driven. In the Colombian case the variable to
decide which model could fit better is the goal of 200,000 students in six years in a
country with poor supply of distance education. And an important caveat is that size and
pace of growth could not conflict with the sustainability of high quality standards.

- Institutions interested in virtual education must reach self-sustainable programs and it
  seems that the only way is managing them as a business with a long-term strategy,
  organization, services and technology (understood in a wide sense, even including printed
  material when necessary), differentiating themselves on the basis of high-quality and
  customized offerings to the targeted students market. This customization is in space, time,
  relevance and flexibility to acquire degrees in a wide range of courses and throughout life.
  As we saw neither of Colombian experiences have a clear “business model” to reach such
  sustainability while differentiating. It appears that the strategy followed by Colombian
  universities will not be sustainable.

- It seems that achieving economies of scale while maintaining good quality are possible
  when the educational offering follows the model of a mega-university (mass-markets) or
  a smaller distance university which is well-integrated to a conventional university.
  Neither of the Colombian experiences in virtual education achieves the size in number of
  students and the design of the educational service explained through this chapter
  (organization, technology, alliances, etc.). Both models take care of quality by first
  designing the teaching-learning process and then choosing particular technologies and
  media to support it. The key element to conceive the learning process is to center it on the
  needs of the student and create an effective learning environment. In the case of
  Colombian universities, with few exceptions, the process has been developed without a
  pedagogical model and more focused in technology and training of instructors.

- There is not an immediate conclusion about the quality assurance system. The Ministry of
  Education must define the government’s position which would govern all virtual
  programs in the country, being aware that there are many initiatives in the world but not a
  single unique successful model to imitate.

- One issue that continues to reappear is that the experiences studied are more focused on
  the adult population rather than on youths. University of Phoenix and Pomona University
  can give us more elements to understand the differences to serve this population, but
  separate research, that the Ministry could undertake, would be required. This point
  deserves major attention in the conceptualization of the model for the Virtual University
  knowing that the youth population is the first priority.

- One idea to speed up the implementation of the Virtual University is an alliance between
  UOC or UBV and Colombian universities. We could take advantage of courses
  developed in our own language and methodologies for a student market with some
  cultural similarities.

At this point we have the necessary elements to face the design of the model for the Virtual
University in Colombia. In the next chapter I will describe the strategic issues that the university
must accomplish and the possible scenarios for its organization and implementation.
3 DEFINITION OF THE MODEL FOR THE VIRTUAL UNIVERSITY

Before going further, it is important to clarify the definition of distance learning because the examples presented in chapters one and two used different terms like distance, on-line, non conventional, non traditional, open learning, virtual and off-campus education. On the other hand, with the exception of UOC, the rest of examples involved a minimum portion of face-to-face interaction with the distance methodology. So a word like ‘on-line’ or ‘virtual’ does not mean no face-to-face interaction between students and instructors. The term ‘open learning’ also could have two meanings: open to everybody (access) or open program where the student defines the courses he/she is interested in.

To clarify the term I would use the definition made by G. Berg [39] which avoids a definition that depends on specific technologies and emphasizes that technology is less important than the approaches and management patterns for distance learning:

‘Distance learning’ is a generic term that includes the range of teaching/learning strategies variously referred to as correspondence education, correspondence study, home study, independent study, distance learning, online learning, computer-assisted learning and distance education. It emphasizes the re-centering on the nontraditional learner.”

“The main elements of distance learning are:

- physical separation (complete or more than 50% reduced contact time) between teacher and learner;
- administration by an educational organization;
- frequent use of various media, including print, video, film, computer and audio;
- communication between student and teacher, synchronous or asynchronous”.

To be precise in the kind of virtual university I would like to propose for Colombia, I would say that it would be an ‘Open and distance learning university’ with open access and distance in the broad definition made before, that includes the appropriate technologies and pedagogical models to offer distance education.

This chapter will cover three topics: the strategy of the virtual university, the legal and organizational structure that best fits the purpose of the Virtual University, and a recommended position for crucial aspects of the service.

The strategy for the Virtual University is presented for a period of ten years, time necessary to create the university, consolidate its offering and position its ‘brand’. It also represents a long enough period to clarify the long-term position of the University with respect to the private supply in distance learning in the country.
3.1 MISSION STATEMENT

3.1.1 Mission

The Virtual University would be an open and distance learning university which provides high quality higher education to everyone, on demand, with affordable prices for modest income youngsters and adults, with teaching and learning approaches which are less time- and place-dependent, relevant to the needs of the labor market, and with better or at least comparable results with respect to the best universities in the country.

3.1.2 Justification

- The need to improve equity and access to tertiary education in every region of the country, even if the traditional spare capacity is taken into account.
- Recognition of the wide range of student learning styles and needs (flexible learning both in courses and possibilities of access).
- The growth of ‘credentialism’, that is, the need for formal education credentials for entry into the labor market.
- Recognition of the need to develop students as lifelong learners.
- The necessity to create the conditions to access tertiary education for working and non-working youngsters and adults.
- The necessity of developing and maintaining a highly trained and flexible labor force.
- Potential offered by various technologies and media developments.
- Potential offered by new pedagogical (learning) methodologies for distance education supported in ITCs.
- Successful experiences in the world proving that it is possible to offer high quality distance education.
- Potential of distance education supported by a mix of technologies to permit a faster and cheaper deployment of new educational offer across the country.
- The ability of distance education systems to enroll new students with lower marginal costs than conventional education, however this advantage is only achieved with mass-markets where economies of scale are feasible.
- Efforts made by Colombian universities in distance education meet neither worldclass standards (understanding that for the most successful universities) nor the capacity necessary to attend the potential demand for virtual higher education.

3.1.3 Objectives

1. To enable the government to expand higher education through cost-effective distance education of good quality.
2. To enable open access regardless of previous qualifications and offered in a more convenient ways to go beyond restrictions of time and space.
3. To enable education throughout life and facilitate the traffic of students among different levels of higher education.
4. To create a relevant and flexible tertiary distance education supply adjusted to the needs of the labor market.
5. To choose the appropriate technologies to help achieve the aims listed before.

3.1.4 Services/products

As we have seen, the Ministry has the priority of providing technical and technological education to young students who have finished their secondary education. Additionally, the Virtual University must offer education throughout life directly or through transfer of students to other distance universities, as we will see next in this chapter. But in this same line of thinking, there are many working adults and for sure they will push for access to the services of the Virtual University.

Based on the diagnosis of virtual education in Colombia, is clear that the current supply can serve postgraduate studies, very few undergrads, and no technical or technological professions. Thus, the Virtual University must focus on filling the gap for technical and technological professions and undergraduate programs, and create the conditions for a smooth transfer to postgraduate studies for a lifelong education.

As we saw in the first chapter, there is no identification of the relevant programs that the Virtual University must create. If the initiatives of Community Centers of Higher Education and the Observatory of the Labor Market produce results soon, that would provide a framework for the start-up programs, otherwise and following the example of UOC, it would be necessary to conduct specialized market studies to identify the supply of new programs.

3.1.5 Customer segmentation (Student markets)

We are trying to reach two groups: a) young and adult students who have completed their secondary education, may be participating in the labor force, and may have started families; and b) adult students who have partially coursed tertiary education, are participating in the labor force and may have started families. I will call the first group ‘young learners’ and the second group ‘adult learners’. In the future and after the consolidation of the Virtual University, the university should include adults with no secondary studies finished, which is what OU did with unquestionable success.

In contrast to conventional students, distance students do not have the possibility of devoting themselves solely to their studies. Distance students have constraints of time, place and pace. So, they would need flexibility and convenience. In the case of non-working ‘young learners’ the expected trend is that they would be enrolled in the labor market soon, so at the beginning they would be able to dedicate a lot of time to their studies but sooner or later they will behave as the group of working students.
Distance students have to rely more on their own resources or their employers support to finance their studies. In the case of low income students, a priority for the Ministry, they rely more on external resources like employers and government financial aid.

‘Adult learners’ have had more experience in the world, know more about their interests, are more concerned about what the instructor knows, are seeking additional credits for a pay raise or career development, are in general mature, are usually self-directed and will want to share their past experiences with others in a learning situation [25].

‘Young learners’, being less mature than ‘adult learners’, need special treatment. In general these individuals have had little or no experience in the world, know little about their future career and life plans, have poor understanding and management of interpersonal relationships, do not have skills for self-directed studies, but have a high motivation to learn. They are concerned about degrees as a means of entering the labor market and could possibly not be prepared for a direct and permanent relationship with a tutor and sharing with classmates.

For students with previous job experience or non-formal education, the Virtual University must grant the recognition of this learning. That could be done by qualifications tests made at the entry of the program in order to adjust the program for each student. Ignoring prior learning obviously makes programs more expensive and time consuming both for the University and the students.

Last, as we saw in first chapter there is no characterization of the demand for virtual education. So we do not have the breakdown of our potential customers by region, area of study and profile between ‘student learners’ and ‘adult learners’. We only have a global goal of enrolled students for the next ten years.

A study about the disaggregated demand has not been conducted for Colombia, but the Ministry must create a specific project to develop it very soon in order to establish the specific markets that the Virtual University will serve. This study will complement the study about the relevant programs that the labor market requires and the Virtual University must create.

Last, the group composed of adults with completed formal education is often not able to rely on a single educational provider but organize their studies through a variety of providers in both formal and non-formal (open courses) education. This group will not be covered by the Virtual University, but would be served by the current market of distance education.

3.1.6 Geographical scope

Coherent with the Ministry’s priorities, students to be served must reside in Colombia and there will be preference for non-working students, from small towns or towns with poor tertiary education supply, and from the lowest income levels.
3.1.7 Goals for the next 10 years

The goals for the Ministry are: 40,000 students enrolled in two years; 200,000 in six years; and, being conservative, 400,000 in ten years. The first group of 40,000 is distributed as 7,000 for 2004, 13,000 for 2005 and 20,000 for 2006.

At this time, the Ministry has not established dropout, failure and quality goals, but I propose to follow the results of the best universities as presented in chapter two: UOC and OU.

3.2 ALTERNATIVES FOR THE IMPLEMENTATION OF THE VIRTUAL UNIVERSITY

Based on the current situation of Colombian institutions offering distance learning education, the goals of the Ministry in terms of coverage and the lesson learned from international experiences, I see three preliminary approaches for the organization of the University that could succeed:

1. A new centralized and autonomous organization.
2. Network of universities under an umbrella of a Virtual University.
3. Free competition among institutions.

The description and analysis for each approach is presented next.

3.2.1 A new centralized and autonomous organization

My first proposal is to create a new university with the best practices learned from mega-universities and other successful universities reviewed in chapter two, with the participation of the best national universities, traditional and non-traditional, and the government. Each member must bring financial resources and may bring, after a careful evaluation, some technology, content and regional centers. The role of the government is as associate of this organization, it would not be an active actor inside the organization so it would not interfere with its autonomy and management.

The advantages of this approach are:

- Cost-effectiveness with good quality could be reached with a potential market of 200,000 students in six years (our goal) following the best practices of the mega-universities or smaller effective universities we studied in the second chapter (OU, UOC, UBV, ITEM, etc.).
- Pool the limited resources of institutions interested in distance learning so as to form a bigger organization capable of delivery of good distance education, and reducing the risks of experimenting with new methodologies and technologies. This sum of resources includes the organization of a network of physical centers to offer face-to-face interaction and field practices with broad coverage across the country since the University could use any of the physical facilities belonging to its associate institutions.
Beginning from scratch, it would be feasible to design the distance learning university that the country needs without our past burden of traditional and distance universities, and following the correct steps to design and decide on the three components of the service: learning process (the most important), content and technologies.

The pace of growth can be driven by the government as was the case of OU and UOC which can then guarantee to mobilize whatever is needed to reach the goal of 200,000 students.

With the government as an associate, the accountability for the results of the Virtual University will be granted to the general public.

The direct participation of the government in the success of the University should push it to take very seriously and play very well its role as coordinator with the Ministry of Labor and private companies to assure the relevance of distance programs and improve the flow of students to the labor market.

In the same way, the direct participation of the government should assure the focus of the new university in the two markets defined, ‘student learners’ and ‘adult learners’, and the preference for students from small towns or towns with poor tertiary education supply, and from the lowest income levels.

And also, the direct participation of the government should facilitate the financial aid and access to computers and to the Internet by students with restrictions in these aspects.

With no initial competition in the market, this model would quickly position the Virtual University as a new brand. What would be important to sustain the brand is to differentiate the educational service in quality and coverage at the same time that pricing is made affordable for the students markets identified.

The disadvantages of this approach are:

At the beginning, while the new university is being designed and consolidated, the University would depend a lot on the role of the Ministry. This governmental period ends in two years, thus the threat of a policy change in higher education is something that must be taken into account. But also the process to conform the new university must be led by the Ministry and it is not clear if the current educational plan would leave enough resources to do that.

With the current governmental policy of streamlining public agencies, with a distance university like UNAD operating, and with an estimated 40% of useless capacity in traditional universities, the approval of this new organization, even with the solid benefit of widen coverage to distance zones, will not be an easy process. It could be thought to use an existing university as the base for the Virtual University. A natural candidate would be UNAD but its reputation is not the best and the technological investment would be huge. Another option could be the Universidad Nacional, the best traditional public university in the country, but it is not interested in distance learning education.

With the individual approach followed by our universities to enter the distance education business, it will not be easy to convince them to participate in this new University. Even with the government as part of the organization, there is the evident risk that it plays its role very poorly or very slowly. That could be a sure cause for the failure of this model and a potential risk that many universities would not want to face.
There is the evident risk that students could receive poor quality education if the new organization does not correctly design the Virtual University. However, it would be expected that with the great involvement of the government (the most interested and at the same time responsible for the success of the model) and a monopoly of the market, at least at the beginning, the new organization would work really hard for the delivery of good quality distance learning services.

3.2.2 Network of universities under an umbrella of a Virtual University

Networks are useful structures for institutions which wish to pool their limited resources in order to form a bigger organization, or to reduce the risks of huge investments, or to complement their services and products to gain economies of scope and scale. For the case of distance learning the figure could be an ‘umbrella distance learning university’ where courses are produced and delivered by different universities, technology can be managed by one or a few of them, digital libraries are built based on the individual libraries, and the point of contact with the student is the umbrella university, which is usually a small new organization, who is responsible for administrative services and keeping the integrity of courses, programs and services. Each institution offers the courses in which it is most recognized and has developed unique or remarkable competencies. The organization playing the role of “umbrella” is responsible for the quality of the overall system. In this model the government would play the role of regulator and provider of financial aid for students of low income levels.

The advantages of this approach are:

- Pool the limited resources of institutions interested in distance learning to form a bigger organization capable of delivering quality distance education and reducing the risks for the individual members of the network. As with the first model the network could use any of the physical facilities belonging to its associate institutions to offer face-to-face interaction and field practices.
- The network gives the opportunity to each member to offer what it is best at and to measure how involved it wants to be in the network. In other words, the model lets each member organization pace its own involvement in distance learning.
- Similar to the first model, cost-effectiveness with good quality could be reached by adjusting the offerings of the member institutions to the best practices of the mega-universities or smaller effective universities. The umbrella university will meet the economies of scale that the first model generates while keeping the quality of the educational services.
- The network could give advantages such as low individual start-up costs, low fixed and variable costs, economies of scales and scope, and specialization.
- As in the case of the first model, with no initial competition the network could position its brand very quickly. Of course, the sustainability of that brand would depend on the quality and coverage of the educational services delivered.
The disadvantages of this approach are:

- Institutions interested in being part of the network must be aware of the internal adjustments that involve such integration: interfaces and interoperability with other institutions in terms of systems (processes, information and software applications) and infrastructure (hardware and communications), social interfaces (communication, relations, and culture) between students and faculty across the network. Additionally, institutions must be open to accept the standards defined by the network for distance learning education even if that means drastic changes in their current organizations. As we saw the development of our institutions in distance education is very low, so the changes would be major if the network would offer services similar to the best universities in the world. Unless there is a real commitment of institutions to enter in distance learning (that is, distance learning as a strategic issue) the network would fail.

- Even with the conditions for the demand to access (financial aid, access to computer and Internet for students and good regulations) the supply of distance learning, institutions do not have immediate resources to adjust their systems and infrastructure to the standards defined by the network. I fear that if there were not financial aid from the government, institutions would not be interested in this uncertain ‘adventure’.

- In general Colombian institutions are not very used to working together; they have entered in distance learning individually, as we saw in first chapter, with the exception of the Red Mutis, with poor results and a few alliances that are still very immature. I fear that they would tend to work more individualistically than through alliances and then the process to convince them to be part of the network could take a very long time.

- With sustainability being a key issue, if the network does not reach enough demand it would naturally focus its offering to markets different from the government’s priorities. In other words the pace of growth would be driven by the market, not by the priorities and needs of the Ministry.

- The reliance on the government to identify relevant programs and to guarantee the conditions for the demand to get access (financial aid and connectivity) to distance learning, for a government who is normally slow, can be a huge risk that could discourage many institutions from entering the network.

- As for the first model, there is the risk that students would receive education of poor quality if the network does not follow the best practices to design the Virtual University. However, it would be expected that with a potential demand and a monopoly of the market, at least at the beginning, the network would work toward building good distance learning services.

- The creation of the network should be the initiative of the group of universities with the best programs and courses in distance learning in the country. If this is not the case, there is the additional danger that the network would include the less experienced universities in the matter with a high likelihood of slow growth and poor quality programs.

### 3.2.3 Free competition among institutions

This organizational model is simply a market of distance learning services where convenience, quality and price would be the differentiators among institutions. Such a market could be characterized by alliances between institutions, some kind of educational brokers and individual
institutions competing in the same market or positioning themselves in different niches. Each university decides about programs and courses, technology, pedagogical model, geographical presence, and administrative processes. Students decide which university best fits his/her needs. In this model the government would play the role of regulator and provider of financial aid for students of low income levels.

The advantages of this approach are:

- Competition would improve efficiency and stimulate innovation, specialization and quality. It is expected that competition would boost alliances between institutions to share expensive resources as technology and content, offer joint programs, and develop common projects.
- Unlike the network scheme, each institution decides on systems, infrastructure, and services, so the adjustments would be oriented by the level of quality that each institution would want.
- Each member organization paces its own involvement in distance learning education. So they can be more cautious in their investments and market targets.
- Because of their size, but principally because of their autonomy, universities would have two advantages over the first two models: first more flexibility to adjust their offerings, and second, they can afford to take somewhat bigger risks trying new pedagogical models and technologies.

The disadvantages of this approach are:

- If the financial aid for students who are less able to pay is not easily available, institutions would not see potential demand for their services and would reorient their services to other students market or would delay the creation of new programs. This would not meet the goals of the government, especially for ‘young learners’ and ‘adult learners’ from the lowest income levels. As in the network model, the pace of growth would be driven by the market.
- The weaknesses found in adopting a virtual pedagogical model, the use of technology, the organizational structure and the planning and quality assurance processes for virtual education show that they are not prepared to deliver distance learning at international standards. This model of “free competition” is very similar to the way in which Colombian institutions have worked in distance learning during the past eight years and the results, as we saw, have been scarce.
- Even with the conditions to capture the demand, institutions do not have enough resources to adjust their distance learning educational services to international standards. As with the network model, I fear that if there is no financial aid from the government, institutions would not improve their offerings and would maintain the same kinds of programs and services as they currently have, not meeting the Ministry’s goals.
- The costs of acquiring, maintaining and upgrading infrastructure are very high. Similarly, course design and the hiring and training of professors and tutors can be expensive. If each university tries to manage these processes individually, it would be impossible to achieve cost-effectiveness in the distance learning business. As an example, the acquisition, operation and maintenance of the technological platform for one university
with 40,000 students is nearly three times cheaper with respect to acquiring individual platforms by 40 institutions, each with 1,000 students (this is the biggest number of enrollments in our current virtual universities).

- In contrast to the other two models, each university would need to create a network of physical centers to offer face-to-face interaction and field practices across the country. This could be easily solved by traditional universities with presence in many cities, but even in these cases they would need to broaden their presence to more medium-sized towns if they wanted to capture more student market. For universities with less presence in the country, I suppose the decision would be to focus on few niches. In either case, the cost-effectiveness of the physical network would be less than that obtained in the other models.

- In other words, and summarizing the previous points about costs, this free market model would not be able to guarantee the sustainability of distance programs because no university would be able to achieve cost-effectiveness (efficient management of costs and mass markets to reach economies of scale) with good quality education when it is competing with many other universities. With some luck, the market forces would transform this model in one or many instances of the umbrella model discussed before, and maybe then we would have a successful model.

- There would be no one brand but rather, multiple brands. From the beginning the market would take care of which institutions would succeed or fail. For a fragmented market, such as the one we have now, and with institutions with weak distance learning services and limited resources to improve them, it would be a shame to lose time and resources in this competition with the enormous cost of many students getting distance education of poor quality during the ‘purge’ process.

- Institutions will position themselves in the more profitable market niches, those that demand less face-to-face interaction as a way to reduce staff and physical infrastructure costs and those which attract more students. Thus the academic offering for young students will be more distance oriented than face-to-face and that would threaten their academic success and achievement.

### 3.2.4 Recommended model to implement the Virtual University

After the analysis of alternatives for the implementation of the Virtual University, I think the best option is the new centralized and autonomous organization because it could guarantee the goals in coverage, priority student markets, and quality that the Ministry has stated for distance learning in the next years. This model breaks with the past practices of distance and traditional universities and because it will not need to coordinate its decisions with others (as in the network model), it could design a distance learning university appropriate for our country in a short time. Additionally, this model could take advantage of economies of scale with high quality services. The huge caveats here are not only that the government must be part of that new organization and it must play its role very well, but that it will not be easy to get the necessary approval to create the new university.

In any case, the potential creation of the new university in no way means that the market would be closed to other initiatives. What I foresee is that there should be a progressive evolution from
the new organization proposed to many networks competing as the free market model described. The networks would be created by groups of universities that did not initially want to participate in the new organization but began to see that the high quality distance learning business could work. Or maybe some associates from the new organization would retire after learning the business to create an independent network. I do not really believe that any individual institution should decide to compete by itself.

For a while the new organization would monopolize the market of technical, technological and undergraduate programs, and current institutions with distance learning services would maintain their current supply, maybe canceling undergraduate programs if the competition from the new organization becomes really stiff. The final step to a free market would come naturally as institutions specialize, alliances consolidate and other parts of the value chain (e.g. media producers, ISP, ASP, software producers, etc.) or even private companies become interested in this new market. In terms of time, I see that networks could appear in three to five years, and the free market model would operate fully in five to ten years.

All three models depend on the identification of the programs to be created and the time to get the first results from the government initiatives (Community Centers for Higher Education – CCES and the Labor Market Observatory) would take at least to the end of the year. An alternative is to hire a market research firm to identify the program’s potential demand by industry and business sectors, at least for the first programs, so then the Virtual University would have elements to organize its offering, operational plan and budget for the first years before the end of the year.

Finally, independently of which model the Ministry finally chooses, it would be aware of its responsibilities and role in the development of distance learning services in the country. This will be developed fully in the fourth chapter.

3.2.5 The model chosen by the Ministry

The three models described before were discussed with the Vice Minister of Higher Education, and after an analysis of the advantages and disadvantages of each one, and being realistic in that the current presidential administration is reaching the midpoint of its term, a fourth model appeared as a transitory solution for the Virtual University. This model will be named as “Network of distance educational services”.

In this model the education would be totally virtual and each university would decide about programs and courses, technology, pedagogical model, geographical presence, and administrative processes. There would be a network of regional centers managed by “Operators” where students would have access to computer labs and to the Internet and there would be tutors to help them with the technology and the virtual methodology.

Each university would have its tutors to teach the courses and each university would decide the alliances with other universities to create joint programs, the transfer of credits, the administrative procedures to enroll students, the production of courses and complementary materials, and the use of regional centers. Students could register in any university and there will
not be priority in the enrollment, that is, every university will decide on the admission of students (e.g. the priority for low income students is being relaxed).

As in the network and free market models, the government would play the role of regulator and provider of financial aid for students from low income levels, but would also foster the following actions:

- Develop of 40 on-line courses that could be used by any university.
- Co-finance the training of 1,000 tutors.
- Coordinate the access of all students to its 43 regional centers with UNAD (this would begin with the significant improvement of the technological infrastructure of the centers).

After the detailed description of the needs of our students markets (‘young learners’ and ‘adult learners’), the best strategic, pedagogical and administrative practices to design the new university, the national goals in coverage and quality proposed for the Virtual University, and the need to create a sustainable organization, personally I cannot share the model chosen by the Ministry because it ignores so many elements required for improving the supply and quality of distance learning in the country for the young and adult population who need tertiary education.

For the rest of the chapter and being aware that this thesis would not match the model and immediate plan of the Ministry, I will work out the details for the implementation of the first model, the one that I think best fits the goals for the Virtual University. Some of them will apply to the Ministry’s strategy.

3.3 IMPLEMENTATION ISSUES

3.3.1 Characteristics of distance education students

Based on studies made by Barry [25], Dillinger [26] and Szczypula, Tschang and Vikas [27], in brief, the skills that students would have to have to function effectively in a virtual university can be divided in three categories: a) planning: which refers to skills for formulating problems and defining projects; b) management: which refers to skills for navigating learning environments, self-directing learning and solving problems; and c) communication: which refers to skills for communicating about learning environment problems. And I would add one more for our students markets, it is computer literacy. Even though high schools have been working on the development of students’ skills to properly use computers and the Internet, the computer literacy level of young students is not optimal and for adult students is worse or null.

For ‘young learners’ these skills must come from high school; for ‘adult learners’ it is expected that, to some degree, these skills come from their experience in life and work. In our case, the Virtual University would work with ‘young learners’ with poor planning, management and communicational skills. For ‘adult learners’ the University would need to assess the degree of development of such skills and create the mechanisms to improve the weaknesses of each student.
In the short-term our Virtual University would need to include specific courses and accompaniment from professors and tutors to develop or complement such skills. It seems that ‘young learners’ would need a high degree of face-to-face interaction at the beginning and gradually move to a more distance environment. In other words, they would need a more conventional education which progressively becomes distance. But the long-term solution is that the Ministry review and adjust high school policies to ensure that they develop the skills needed to confront distance education.

From the experiences evaluated in chapter two and the studies mentioned [25, 26, 27], it can be said that students require an enjoyable, efficient and trusting learning environment to maintain their interest throughout their studies. Students who are less concerned about social interaction, those who appear more independent, well-organized and are self-starters are most likely to complete a course in distance education. Students who are successful are permanently motivated and goal-oriented. Students who complete one distance education course are more likely to take another. Students who have difficulty at first but receive support from professors and tutors are more likely to complete a course and continue a distance program.

Unfortunately Colombian universities with experience in distance education have not developed detailed studies of their students’ profile. And the Ministry does not make specific evaluations of skills needed for distance education, so we do not have a clear picture of the ‘customers’ we are going to serve. Thus, the international experience about the background of students and the attributes that make them more likely to be successful in distance education would serve as a guide for now in the design of the Virtual University learning model.

3.3.2 The value chain

Value chain analysis enables organizations to accomplish their goal or mission through cost effectiveness or differentiation. The value chain activity structure in a distance education institution has its primary activities divided into course development and production, admission, course registration and materials distribution, course delivery, marketing and student’s support [9]. Table 5 summarizes the value chain. The functions shown in italics are those that I propose to be handled by third parties.

Just as it is common for traditional academic institutions to try to control the entire value chain; we saw that same trend in our virtual universities. Distance learning permits the unbundling of the traditional faculty role of both course designer and teacher, and uses different professionals for the two functions. Content experts together with instructional designers create the courses, while a separate teaching staff does the instruction and interacts with students.

Knowing that is possible to separate the course design and teaching processes, and that cost-effectiveness of the Virtual University is fundamental for its survival, what the new university must do is hire third parties to supply the content and technological platform, yet maintain control over quality, design of the learning model, and the delivery of the service (teaching, evaluation and student support).
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<tr>
<th><strong>Table 5: Value chain for the Virtual University</strong></th>
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<tr>
<td><strong>Firm infrastructure</strong></td>
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<tr>
<td>- Management (planning, finance, accounting, legal, government affairs)</td>
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<tr>
<td>- Quality assurance</td>
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<td>- Administrative services (billing, tuition collection)</td>
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<td>- Public and international affairs</td>
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<tr>
<td><strong>Human resources</strong></td>
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<tr>
<td>- Management of full-time faculty (responsible for acquisition/development of courses, organization of programs and coordination and evaluation of tutors).</td>
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<tr>
<td>- Management of part-time tutors (responsible for the teaching process)</td>
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<tr>
<td><strong>Technological development</strong></td>
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<tr>
<td>- Technological platform to support administrative and distance educational services: connectivity, hardware, administrative information systems (admissions, enrollment, payments and administrative paperwork) and on-line platform for management and delivery of courses.</td>
</tr>
<tr>
<td>- Learning distance model: design of the learning process that would guide all educational services</td>
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<tr>
<td><strong>Procurement</strong></td>
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<tr>
<td>- Internet services 7x24</td>
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<tr>
<td>- Maintenance and technical support of the technological infrastructure 7x24</td>
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<tr>
<td>- Complementary materials (CDs, printed documents, videos)</td>
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<tr>
<td>- Complementary services (digital library, bookstore, clubs, news, bulletin boards, job postings, financial aid)</td>
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<tr>
<td>- Regional centers for face-to-face interaction, access to on-line courses and to broadcast facilities</td>
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<tr>
<td><strong>Inbound logistics</strong></td>
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<tr>
<td>- Program design</td>
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<tr>
<td>- <strong>Course development and production</strong></td>
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<tr>
<td>- Assessment of initial knowledge</td>
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<tr>
<td>- Admissions</td>
</tr>
<tr>
<td>- Student orientation</td>
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<tr>
<td>- Course registration</td>
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<tr>
<td>- Materials distribution</td>
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<tr>
<td><strong>Operations</strong></td>
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<tr>
<td>- Assessment of delivery: teaching, face-to-face and distance interaction, evaluation and awarding of credits</td>
</tr>
<tr>
<td>- National campaigns to position distance education</td>
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<tr>
<td><strong>Outbound logistics</strong></td>
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<tr>
<td><strong>Marketing and sales</strong></td>
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<tr>
<td>- Direct sales</td>
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<tr>
<td>- National campaigns to position distance education</td>
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<tr>
<td><strong>Service</strong></td>
</tr>
<tr>
<td>- Student’s profile: on-line history for each course.</td>
</tr>
<tr>
<td>- Continuous follow-up of the student by tutors</td>
</tr>
<tr>
<td>- Students self-service via web site and technical assistance</td>
</tr>
<tr>
<td>- Academic advising/career counseling</td>
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</table>
The learning model design must be made conscientiously by the University; it can take advantage of the best ideas from international models, but it must create a model which satisfies the needs of our specific students markets. This design would, as well, define the appropriate mix of technologies to serve our students (all available technologies if needed: print and digital media, broadcast, telephone and Internet).

The delivery of the educational services is the step in the value chain where clients (the students) use the distance learning environment and hope to receive what they are paying for. The interaction with students is key because it comprises every moment to help them progress in their learning, to get feedback to improve the services, to keep their motivation levels high and to correct potential mistakes in the process that otherwise would lead to dropout or failure.

If we are interested in good quality content, as we are, course production would be laborious, time-consuming and expensive (e.g. see the costs for OU and UOC). The University must look for ways to reduce the burden of course production and acquire quality content developed by public universities as OU, UOC and UBV, or from non-profit organizations or from free public courses as the MIT OpenCourseWare that could fit into our academic programs (technical, technological and undergraduate). Being riskier, I would also propose that some courses for technicians and engineers in semiconductors, electronics and computers fields do not be translated considering that those students must get used to material in the English language. The University should develop only the content that could not be adapted or found, and even in these cases it could hire third parties to take care of the production while the University provides the content and participates in the design of the courses.

With respect to technology, the University could acquire hardware and software for providing distance learning. As for software, for-profit firms (e.g. WebCT, Blackboard.com, Cenquest, click2learn.com, convene.com, eCollege.com and IBM) have developed sophisticated technology platforms that we could buy, or public virtual universities, such as UOC, could transfer its technology to us. These platforms include the functionality for both management of distance learning courses and programs and for administrative functions. The alternative of getting software from a public university has the great advantage of minimal initial costs compared with a commercial solution, but in the long-term could lead us to an obsolete platform or a poor support service. So the decision would depend on the conditions of the agreement with the university.

Broadcast technologies as teleconference or videoconference imply the set-up of classrooms in regional centers where students would attend the lectures or meet their tutors, and special locations where professors and tutors would teach. The installation and operation of these classrooms could be handled by third parties.

Regional centers will play a key role in the distance learning model. Those places will permit access to on-line courses, to broadcast facilities and to face-to-face interaction. The University could design different kinds of centers to rationalize the investment: a small, full-equipped group of centers strategically distributed across the country to minimize the displacement of students and a large number of small computer labs with access to the Internet to take on-line courses and use multimedia material (CDs, digital library).
Faculty staff in the new University must be hired following the successful examples we saw in the second chapter. A small group will be full-time faculty and will be responsible for acquisition and development of courses, organization of programs and coordination and evaluation of tutors; and a larger group of part-time tutors will be in charge of the teaching process. With the goals established by the Ministry and following the ratios of UOC, I estimate that we will need the following faculty staff:

**Table 6: Faculty staff for the new University**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Enrollment (1)</th>
<th>Full-time staff (2)</th>
<th>Part-time staff (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>7,000</td>
<td>37</td>
<td>700</td>
</tr>
<tr>
<td>2005</td>
<td>20,000</td>
<td>107</td>
<td>2,000</td>
</tr>
<tr>
<td>2006</td>
<td>33,700</td>
<td>180</td>
<td>3,370</td>
</tr>
<tr>
<td>2010 (4)</td>
<td>200,000</td>
<td>~800</td>
<td>7,000</td>
</tr>
</tbody>
</table>

(1) Total enrollment includes new students projected by the Ministry, old students as we will be offering two-year technical programs, and assuming an optimistic 10% failure rate.

(2) The full-time staff is calculated following UOC ratios, except for the year 2010.

(3) The part-time staff is calculated following UOC ratios, except for the year 2010, and an average of three courses per student.

(4) For an enrollment of 200,000 students we must achieve the same efficiency as OU.

Along the same line of thinking, the University could outsource other functions such as:

- Quality assurance: this function must be shared between the University and an external firm to get unbiased evaluations and recommendations about quality of the overall organization.
- Technical support and maintenance for hardware and communications platform.
- Production of complementary materials: CDs, videos, printed material.
- Complementary services: digital library, bookstore, clubs, news, bulletin boards, job posting and financial aid (information about grants and loans).
- Marketing and sales.
- Material distribution.
- Administrative service: billing and tuition collection.

The new organization could take advantage of having the government as an associate. The Ministry has valuable negotiation power with other governments and private universities to be able to acquire technology and content at better prices. It could also promote the new University as one of its main strategies to widen coverage in tertiary education as part of its communications plan for the present government.
The model of a new organization is, in and of itself, an strategic alliance to join the efforts and resources of the best universities and the government. I do not anticipate alliances with the new University for awhile; rather I suspect there would be a split-off of new business units and the departure of some associates to create new distance universities.

Either way, if the new University performs well it is possible that it would consider alliances with international universities to create joint degrees as a way to “export” some of its services. The essential issue remains that of upholding its academic identity and reputation for quality when partnering with other universities. It is too soon to know how it would evolve. Let’s wait and see.

### 3.3.3 Risks and potential mistakes

**Cost control**

As we have studied, distance learning has a huge dependence on economy of scales to recover start-up costs and earn enough profits to maintain quality and growth. High initial costs make small-market courses or courses in subject areas undergoing rapid transition excessively expensive to offer. That is why my recommendation of developing the minimum of courses and focus in the identification of the best content in the world and adapt them to Colombian needs. This issue of cost control, if poorly managed, could also generate a delay in the update of courses and materials, leading to out-of-date or pedagogically old-fashioned courses.

Technology provides great support for distance education; however it has at least two threats. First, the costs of high technology are difficult to manage and could run out of control. It is not only the rapid depreciation of hardware and software (usually three years), but the recurrent costs of maintenance, upgrades, faculty and tutors re-training and restructuring of work processes to the new technologies adopted. Secondly, the attractiveness of new technology could tend to outshine the principal factor of success in distance education, a sound learning process. The challenge of the University is to avoid the pressure of new technologies and choose carefully the mix of technologies that best supports its pedagogical model to achieve its goals of coverage and quality.

Last, the best strategy to control costs is plan growth based on well made decisions. The creation of new courses and programs must be based on market and feasibility studies. UBV, from the beginning, created an infrastructure to serve 17,000 students, but it took three years to reach that enrollment. Thus, the lesson is to be very wary about the investment and pace of growth required to maintain costs controlled and make correct decisions about scalable technologies, human resources and courses.

**Misuse and misunderstanding of technology**

Besides the cost of the technology, there is the possibility of not utilizing all its potential. Some of these problems arise from a lack of training, some from the instructor’s attitudes about using the technology, and still others from hardware problems. Advancement
in technology does not lead to effective distance education by itself. Tutors and professors must be properly trained and motivated to be effective with the technology.

_Tutors’ attitudes towards distance learning_

As in conventional education, the tutor can set the tone for learning in the educational environment. A tutor must have both the technological skills and the confidence to use all of the various electronic devices in order to be truly effective in the virtual classroom. The best distance education practices depend on creative, well-informed and well-trained tutors, who must be trained not only to use technology, but also to shift the way in which they organize, teach and deliver content, and the way they will interact with their students.

.Never lose focus_

The most important thing is to build a Virtual University working effectively in order to meet the different students’ needs in learning and knowledge. This could differentiate this new university from the current supply in the country and could captivate the number of students needed to achieve economies of scale without sacrificing quality of education.

But focus is also to build an organizational structure coherent with the “distance” environment of the University. If educational services would be distance, administrative procedures as enrollment, billing and payment must be “distance” too. If we are creating an environment to diminish or eliminate the displacement of students, so then must be the administrative procedures.

_Students’ profile_

The typical on-line student is around 25, employed, and has some previous college experience. This is not our goal; in particular our young population target is still immature. Distance students have to have discipline, since they do not have a regular schedule or interactions that reinforce deadlines.

Distance education has a limited ability to offer social opportunities for professor-to-student and student-to-student interaction. Especially for ‘young learners’ this could result in isolation and low development of communication and relationship management skills.

Thus, the distance learning model must take care of these needs in order to serve properly our young market. The new virtual university must include carefully planned pilot programs to measure acceptability by our students markets, and to determine the required elements for adjusting the distance learning model before the official launching of courses and programs.

_Quantification is a key_

One strength of the virtual educational environment is that everything can be measured. Virtual campus platforms provide reports for each course about student participation, tutor performance, course evaluations, etc., all customized for the educational organization and up-
to-date all the time. But the University would need the mechanisms to use the information to follow-up the progress of students and decide on corrective measures.

**Lessons from abroad: failures**

There are so many failures of distance universities that we must learn from the international experience and think about the ways to avoid possible mistakes from the first steps of the design of the Virtual University.

Many experiences [19, 23] have shown that large-scale distance education efforts could fail, especially because of lack of student acceptance resulting in low enrollment and higher costs. For students (and I guess this could be very critical with our young students) the decrease in enthusiasm and responsibility could be the result of a poor performance in a distance environment due to lack of necessary skills. Other institutions failed because of bad planning, a poor business strategy or low quality of services offered.

Among many exemplifying failures we have:

- OU was not successful in the US because it lacked traditional accreditation and name recognition, and employers did not reimburse students for tuition. In addition, many of the candidates could not get access to public financial aid sources.
- NYU Online lacked the solid business plan, marketing and operations required for a distance learning business. They are far different from those of an academic institution. NYU Online did not sufficiently survey the market before creating courses, and had trouble marketing some courses.
- UBV began by using a part of the faculty of the traditional UB generating huge fixed costs from the beginning and a costly and lengthy process to change their conventional academic methods.

### 3.4 CONCLUSION

The best way to conclude this extensive chapter is to summarize the strategic proposal for the new Virtual University:

<table>
<thead>
<tr>
<th>Table 4: Summary of the Virtual University Strategic Proposal</th>
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<tr>
<td><strong>Mission statement</strong></td>
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<tr>
<td><strong>Services</strong></td>
</tr>
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</table>
| **Student markets** | • ‘young learners’: young and adult students who have completed their secondary education, may be participating in the labor force, and may have started families;  
• ‘adult learners’: adult students who have partially coursed tertiary education, are participating in the labor force and may have started families  
• In the future adults with no completed secondary studies |
| **Geographical scope** | Students who reside in Colombia, with preference for non-working students, from small towns or towns with poor tertiary education supply, and from the lowest income levels. |
| **Goals** | By 2006, 40,000 students enrolled; by 2010, 200,000 and by 2014, 400,000.  
Dropout, failure and quality goals comparable to the best international virtual universities |
| **Unique competencies** | Cost-effectiveness and high quality educational services customized for the different (needs of) student markets |
| **Business segmentation** | 1. Technical and technological programs  
2. Undergraduate programs as the continuation of technical and technological programs  
*Pending for definition the programs to be offered.* |
| **Objectives** | 1. To enable the government to expand higher education through cost-effective distance education of good quality.  
2. To enable open access regardless of previous qualifications and offered in a more convenient ways to go beyond restrictions of time and space.  
3. To enable education throughout life and facilitate the traffic of students among different levels of higher education.  
4. To create a relevant and flexible tertiary distance education supply adjusted to the needs of the labor market.  
5. To choose the appropriate technologies to help achieve the aims listed before. |
| **Horizontal strategy** | Both businesses share:  
- Technology platform, administrative support, marketing and promotion, firm infrastructure (legal, accounting, government relations), management of human resources, regional centers, operations (admissions, registration, material distribution) and quality assurance.  
- Brand name  
- Some courses could possibly be shared |
| **Vertical strategy** | Outsource production of content, technology platform operation and maintenance, production of complementary materials and services, regional centers, some administrative functions. |
| **Proposed organizational** | A new university with the best practices learned from mega-universities and other successful universities, with the participation
| **structure** | of the best national universities, traditional and non-traditional, and the government. A very lean organization, outsourcing any secondary functions, designing the learning environment and operating the teaching process and maintaining overall quality control. |
| **Human resources** | - Full-time faculty responsible for the acquisition/development of courses, organization of programs and coordination and evaluation of tutors.  
- Part-time tutors responsible for the teaching process and paid per course. |
| **Technological resources** | - Technological platform to support administrative and distance educational services: connectivity, hardware, administrative information systems (admissions, enrollment, payments and administrative paperwork) and on-line platform for management and delivery of courses.  
- Learning distance model: design of the learning process that would direct the educational services. |
| **Pricing position** | To achieve a real impact on the education market and attract the low income level population, the price will be around 70% of conventional education (OU is between 40% and 60%, ITEM and UOC around 60%). |
| **Corporate culture** | - The VU will be student-oriented, that means all services will be designed to fulfill students’ needs.  
- The VU will work with the best teachers and researchers in key aspects of distance education: course design, delivery and evaluation. It will ensure that courses benefit from the participation of a wide array of experts both in content and design.  
- The VU will design and operate a distance learning model which will guide decisions about technology and infrastructure.  
- The VU will not invent what already exists and has demonstrated good quality (e.g. courses, materials and technology).  
- The VU’s statement of open access means that it will serve students with disabilities and from marginal socioeconomic conditions. |

As I said before, the potential creation of the new university in no way means that the market would be closed to other initiatives. In the next chapter I will work on the Ministry’s responsibilities and role in the development of distance learning services in the country.
4 ROLE OF THE GOVERNMENT AND REGULATION NEEDED TO SUPPORT DISTANCE EDUCATION

The roles of policy making, accreditation and funding in higher education are the responsibilities of the Ministry of Education. For distance education we also need the Ministry to play a leading role in order to develop a market of good quality distance programs.

In distance education what I think the Ministry must do is:

a) clarify what would be considered as distance education in the country (as we saw in chapters one and three it is not always clear whether or not a particular offering can be labeled as distance learning) and adjust and improve the administrative procedures and legislative issues to approve current and future programs and institutions offering distance learning;

b) help to identify the demand for technical, technological and undergraduate distance learning and promote the creation of a market of distance learning services;

c) improve the relevance and flexibility of tertiary education to adapt its offerings to the needs of the labor market, help institutions to be prepared for the continuous adjustment of their offerings, and help students to move through the distance system by creating the mechanisms necessary to transfer credits smoothly between institutions;

d) facilitate the coordination with the Ministry of Labor and the business sector to assure the relevance of distance programs and improve the flow of students to the labor market;

e) strengthen institutions producing guidelines about organization of the delivery of good quality and sustainable distance education services, creating networks to foster specialization and knowledge sharing, and identifying sources of funding for institutions which need support for the high level of investment required in distance education;

f) ensure the convergence of fragmented regional initiatives to maximize results in higher distance education;

g) work with other government agencies to clarify economic issues related to copyrights and ownership of content and courses, taxation, rights of universities to expand the scope of their economic activity (e.g. sell access to digital libraries, consultancy services, etc.) and other topics to properly regulate the market of higher distance education;

h) promote and create the mechanisms for students to access distance learning programs (e.g. financial aid for students, effective access to information and communication technologies, development of skills for distance education);

i) improve the credibility of distance education and educate the public in the different modalities of distance learning;

j) define the efficiency and effectiveness indexes to monitor the public institutions which will be receiving public funds for distance education programs (currently there is a monitoring system but for traditional education);

k) create links and alliances with other governments and international agencies to get access to new distance learning technologies and methodologies, resources, information and research as a means to improve our national distance education system; and lastly,

31 In contrast for example in the US there are three different players in higher education: government, grant foundations and accreditation associations.
n) based on the elements developed in this thesis, especially the strategic part of chapter three and the topics discussed in this chapter, include or clarify in the current national development plan, the policies and projects related to coverage, quality and efficiency for distance education, the role of private institutions in providing distance learning services, the indicators and measures of performance for public institutions, market principles, and the role of the government and other organizations in supporting distance education.

In the following pages I will develop some of these issues, proposing possible lines of action for the Ministry.

4.1 ABOUT CONDITIONS FOR THE DEMAND TO ACCESS DISTANCE LEARNING SERVICES

4.1.1 Effective financial aid for students

The Ministry’s current financing strategy, under the responsibility of the ICETEX, is facilitating the enrollment and permanence in the higher education system of students from the lowest income levels and with good academic performance. The condition for a student to get access to financial aid is to be admitted previously in a technological, technical or graduate program.

With the poor development of good quality distance learning programs and the lack of technological and technical degrees in distance education, it will not be possible to effectively use this financial aid, at least in the short term while the distance education market develops.

I think a fast way to help close the gap between the demand and supply is that the Ministry creates a separate line of financial aid for students interested in distance education in the current financing strategy. If institutions see that an effective demand could be captured, they will make the necessary efforts to create or improve their current distance learning offerings.

4.1.2 Access for marginalized population

The definition of students markets made in chapter three could be very broad and hide the barriers for specific populations to get access to the distance learning programs. I am talking particularly of female heads of households who, even with the flexibility and convenience of distance education, cannot find the time to study; or disabled people who could not use the normal materials and technologies; or people living in extreme poverty with not even the minimum conditions of space to study at home; or illiterate adults; or students who lack the skills required for distance learning environments.

The Ministry can do little for female heads of households and people living in extreme poverty because their socio-economic problems transcend its responsibility. But disabled people, illiterate adults and skill-less students can benefit from distance education if the learning models take into account their particular needs.
Particularly for disabled students, the Ministry could help in the identification of successful technologies and methodologies for each kind of disability developed in other parts of the world. Institutions could create agreements with the international experts to acquire and adopt those technologies and methodologies to their educational distance services.

Illiterate adult students can be attended through the literacy campaigns that already exist in regional education departments. It can also identify successful programs developed in other parts of the world to solve the same problem and define the ways to adopt those solutions in the country.

Finally, institutions could include orientation courses at the beginning of their distance learning programs for skill-less students. But the effective solution is that the Ministry review and adjust high school policies to assure that they develop the necessary competencies for students to confront distance education. These competencies are in planning, management, communication and computer management skills as was described in numeral 3.3.1.

4.1.3 Effective access to distance education for students

The government’s programs of computer labs in community centers and public schools cover 90% of the country. Thus, the Virtual University could have at least two access centers in almost 90% of the towns where students could navigate the Internet and work with software and multimedia applications.

Both programs are managed by the government, so it would be possible to create an agreement where the Virtual University pays the network for its services. In the case of community centers the agreement must be made with the firms hired to operate these centers, who have defined fees since they signed the contract with the Ministry of Communications. If distance learning would have an attractive demand for the center’s services, the Ministry could negotiate better fees, not only for the Virtual University, but also for all universities offering distance services.

With respect to public schools, the negotiation could be easier in the sense that public schools depend on the regional education departments and the Ministry has strong relationships with them. The main advantage of such an agreement (to open their computer labs to distance learning program students) for the regional departments is that schools would receive some additional money to maintain their labs and buy new educational software for their students. The potential barrier is that schools’ principals have some autonomy in the administration of their resources and, in fact, they control the access and maintenance of computer labs. If they are not convinced of participating in the project, they could block the access or simply not maintain the equipment.

Another key issue about computer labs is that they do not offer enough bandwidth for videoconference services and many computers do not support multimedia capabilities. So then the Ministry would need to identify those computer labs that must be renovated and upgrade them.
However there is a wider perspective to this issue of access to on-line education which is the research and adoption of new technologies that offer new possibilities for delivering distance education. In this matter the Ministry can fund and look for international funds for research in technical solutions such as software to navigate the Internet under low bandwidth access (for example WiderNet from MIT which deploys educational resources in local networks), new devices (e.g. handhelds, cellular phones with more multimedia capabilities, thin computers) and new wireless possibilities (e.g. WiFi, BlueTooth), among others. The faculties of computer science and electronic engineering should become a great ally in this research.

4.2 BUSINESS SECTOR ALLIANCES

The business sector could help the Ministry in the development of distance education in three ways:

- Being part of the formation process of students by means of participating in the design of programs and providing their locations for students’ field practices and internships. This joint development of programs would guarantee the development of skills and expertise that are in high demand in the labor market.
- Helping the government in the effective enrollment of the graduated students in the labor market. Field practices and internships could be a good hotbed to identify new employees for companies.
- Helping the government in creating the financial conditions for institutions which need funds to improve or offer distance education services (discussed in detail in numeral 4.4.4).

The participation of private companies and industry is essential. It permits the validation of relevance of programs and courses, offers the perfect ground for field practices and potential job offers for students, and in the future may become another market for institutions which can train workers in new skills or offer technical and undergraduate programs to current employees.

4.3 TRANSFER OF CREDITS BETWEEN INSTITUTIONS

The granting of credentials has traditionally been an institutional issue. But in distance education where there is an increasing availability of courses from several sources, both national and international, a growing movement toward granting credit for assessed experiential learning (open access and recognition of past experience) and a proper environment to get credentials from many institutions, the Ministry needs to tackle the problem of transferring credits across institutional and even national boundaries. This issue is not even resolved for traditional education (see the study of higher education in Colombia made by the World Bank [11]).

In response to that need in other countries, several national and international agencies have been established to facilitate credit transfers. Examples of proposed and established agencies, which could be a starting point for the Ministry in building its solution, are:
• The CAT scheme operated by the former United Kingdom Council for National Academic Awards.
• The Commonwealth credit bank proposed by the Commonwealth of Learning (COL).
• The Global Alliance for Transnational Education (GATE), based in Washington, DC.

4.4 STRENGTHENING INSTITUTIONS TO DELIVER DISTANCE EDUCATION

In the current stage of development of distance education in our country, the Ministry could foster the creation of good quality and relevant programs by strengthening the capacity of the institutions currently providing those services and the new institutions interested in this kind of services.

I see five components of that support:

➢ to implement the necessary technical infrastructure to connect institutions;
➢ to elaborate the guidelines for institutions interested in offering distance education or improving their current services;
➢ to create a virtual center of resources in distance education to support institutions;
➢ to identify potential funding sources for institutions; and
➢ to develop formal agreements of cooperation with other countries and non-profit organizations who support distance learning and education development.

4.4.1 Connectivity between universities

Thinking about the future system of distance education, universities would need a high-speed network that interconnects their platforms so universities could share technology capabilities and resources (e.g. content, digital material, digital library) and students and faculty could access digital services and content from any point of access in the country.

The project “The Connectivity Agenda”, directed by the Ministry of Communications, has been working on this issue since 2001, but there is still not an approved and financed plan to build the network. Knowing the importance of this network for the future of distance educational services, I think the Ministry must directly lead the execution of the project.

The Ministry could fund part of the deployment of the network through donations obtained from international non-profit organizations (e.g. Organization of American States – OEA, Organization of Ibero American States – OEI, etc.) or private companies, and from its own resources. Institutions must fund the rest of the initial costs and must pay local equipment maintenance and operation, connectivity subscriptions and other related services.

The responsibility for the execution of the project (i.e. preparation of the terms for the bidding process to choose the firm or pool of firms, negotiation of services level agreements, monitoring of the execution of the contract(s), collection of funds, payments, solution of conflicts with the contractor, etc.) must not be on the Ministry’s shoulders as that is not its role. I suggest hiring
any of the international or national organizations who offers the service of management of projects\footnote{We have many organizations in Colombia who offer the service of management of projects. For example OEL, SECAB, CERLALC and FONADE. They receive the resources and the parameters of the project and they execute it.}.

4.4.2 Guidelines for institutions facing distance education

The delivery of on-line education is forcing many traditional institutions interested in distance learning to review and update their existing policies, methodologies and structures. The Ministry could help in this evolution developing guidelines with the issues that an institution will confront as it plans to integrate, implement, and harmonize distance education and on-line technologies into its traditional institutions, and the quality aspects that it must address to succeed in the accreditation system. Also these guidelines will help the existing institutions which offer distance learning to check their current stage and identify needed improvements.

Many countries have developed guidelines for distance learning, so we do not need to begin from scratch. The principal issues in those guidelines include:

- Intellectual property policies, which means definition, management and control of patent, copyright, software, multimedia and videotaping policies, and for some institutions, use of their trademark. The statement of these policies will require the institution to evaluate property policies in the light of its many purposes, for example, research, dissemination of knowledge, commercialization (licensing issues) of content and technology and public service.

- Ownership of on-line courses and materials, which includes legal bases for ownership (e.g. the employee-employer relationship, government laws related to intellectual property, research contract requirements when made with external funds, etc.), ownership schemes (e.g., the author is the owner, the institution is the owner, the institution vests copyright for a finite period of time, the institution is the owner but the author is given a license to use the material in courses taught outside the institution, joint ownership when many faculties/departments are involved in the creation of a course or material, etc.) and ownership when there is a third party involved (e.g.an institution is hired by another to develop on-line courses or a third-party funds the development of courses).

- Faculty rights and responsibilities, which include concerns about ownership (discussed above), faculty compensation, teaching workload, support for designing and producing on-line courses, support for teaching delivery, selection, organization, training and evaluation of faculty and tutors; and training of traditional teachers in distance methodologies and technologies.

- Student issues, which include means to increase access to educational opportunities for poor and less educated students, decisions about serving disabled students, instruments to measure and control drop-out and failure, support for learning, equilibrium between distance and face-to-face interaction, and privacy issues (e.g. use of on-line contribution and assignments by the University, policies for free speech and use of information from digital sources).
> Limiting liability associated with distance education courses including copyright infringement (e.g. policies that cover the types of materials and authorized ways to incorporate them in distance education courses) and warranty to third parties when delivering joint programs that the institution owns or has permission to use the content.

> Alternatives to structure an institution to deliver distance educational services which covers topics as outsourcing and contractual terms of third-party services (providers of course tools, groupware, administrative support, technology, etc.), collaboration with other institutions to expand the course offering and deliver distance educational services, administrative and academic processes, rules and models of organization.

> Accreditation and quality assurance which includes accreditation of programs and institutions for purposes of validation of quality, acquiring the right to sell educational services and, possibly, participating in government funding plans for institutions; and quality control assurance systems to maintain academic quality for courses and programs (which must include the participation of both students and faculty) and cost-effectiveness measurements (cost per student, drop-out and failure rates, etc.).

> Funding aid information about the mechanisms for getting financial aid from the government or other organizations interested in fostering higher distance education.

> Appropriate use of technology which includes guides to take advantage of the different technologies to improve the learning environment for diverse learning needs and styles.

> Technical guides with criteria for selecting and acquiring technology, management of contract/vendor relations and maintenance of hardware, communications and software infrastructure;

> Cross-cultural aspects of adopting foreign materials and delivery methods, which include length and form of courses, use of language, use of inappropriate delivery mechanisms and support techniques, and cultural specificity of materials;

> Creation of virtual communities of students and educators as a means of sharing knowledge, working collaboratively and enjoying some social interaction.

> Standards for excellence in faculty work, use of resources (technology and infrastructure), minimum of complementary services that must be offered to students and faculty (e.g. digital library, bulletin board, news, etc.), integration of different technologies, course development, delivery systems and management of the institution.

> Standards for learning software and content.

> Ethical guidelines for students: developing policies on ethical issues, defining strategies to minimize academic dishonesty in on-line assessment and assignments, and incorporating technology ethics issues in the curriculum.

There is a lot of literature on the topic that could facilitate the development of the guidelines. To begin we have: the American Council on Education (ACE) with its “Developing a Distance Education Policy for 21st Century Learning” [13]; Dutton [8], who worked on the topics of university coordination, standards for excellence, role of educators and management of copyrights and intellectual property rights; Baer [9], who studied forms of collaboration between universities and changes needed in infrastructure and structure to face distance education; Mason

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33 ACE, founded in 1918, is the major coordinating body for all the US's higher education institutions. It seeks to provide leadership and a unifying voice on key higher education issues and to influence public policy through advocacy, research, and program initiatives. Its members include approximately 1,800 accredited, degree-granting colleges and universities and higher education-related associations, organizations, and corporations.
[29], who studied six institutional operational models to respond to on-line education needs; and guidelines developed by the Commonwealth of Learning\textsuperscript{34} [45] and The Quality Assurance Agency for Higher Education (UK) [48].

On the specific topic of standards for software and content, some progress has been made by organizations such as the IMS Global Consortium, Aviation Industry CBT Committee (AICC) and Advanced Distributed Learning (ADL), network sponsored by the US Office of the Secretary of Defense, and committees of international standards such as the IEEE.

4.4.3 Creation of a virtual center of digital resources

As was described in the third chapter, distance universities require other services for their primary educational distance services such as digital library, job-posting, events for students and faculty and financial aid for students, among others. These four services are common to all institutions and can be developed as part of a national project, which I call “virtual resource center”, in order to rationalize the resources needed to create and maintain them.

The digital library, specifically, could be very expensive due to the digitalization of material and copyright payments to the authors, but other universities in the world (e.g. UOC, OU, Phoenix and ITEM) have been working on these services and we can take advantage of these advancements though agreements and payment of rights to get access to their materials and, maybe, to subcontract with any of them the management of the service.

This project can be enriched with information resources for the institutions in topics such as specialized library in distance education (databases, journals, textbooks, videos, etc.), directory of institutions offering distance educational services, international and national research organizations, suppliers of technology and content, best practices in Colombia and the world, regulation for distance education, guidelines, public free courseware such as MIT’s OpenCourseWare, links to related and qualified sites such as Universia, etc. In brief, the Ministry can develop a portal in distance education with reliable and comprehensive digital resources and information on the topic, relevant to institutions delivering distance learning services in the country.

The Ministry could help create the project, getting the resources from institutions, private companies and non-profit organizations, and executing the project following a scheme similar to the one presented for connectivity between institutions.

4.4.4 Funding for educational institutions

As I have explained in this thesis, Colombia is behind in its development of good distance learning services. The improvement of that offering will force many educational institutions to review and update their existing policies, methodologies, technologies and structures, all of

\textsuperscript{34} The Commonwealth of Learning is an intergovernmental organization created by Commonwealth Heads of Government to encourage the development and sharing of open learning/distance education knowledge, resources and technologies. COL is helping developing nations improve access to quality education and training. The Commonwealth is a voluntary association of more than 50 independent sovereign states; Colombia is not part of it.
which will demand enormous investments. The Ministry must prevent that institutions slip towards providing courses of a low standard because of the pressure from lack of funding.

One option is that institutions look for credits in the banking network, but the payment conditions discourage them. Another alternative is get access to non-profit organizations that finance projects in education as is the case in the U.S. where many foundations which support traditional and nontraditional post-secondary education are focused on increasing both access and quality of distance education[^35]. But we have very few organizations financing projects in education and most of them are directed to research issues, not for funding investment or operation of institutions.

Maybe one path to a solution is that “Empresarios por la Educación” (Business Leaders for Education), a non-profit organization of private companies helping in the development of the education sector in Colombia, and the Ministry study the ways to work with the banking network to create the proper conditions for a “soft” credit for institutions entering distance learning initiatives. They can also create national contests to recognize the best efforts in distance education, granting monetary prizes to those institutions which can invest the money in new investments or operations. But I am not very optimistic about the banking solution and the prizing solution would be a minimum contribution that could not solve at all the budgeting problem that institutions have.

As real solutions I only see three possibilities: assurance of a certain demand (discussed in numeral 4.1.1), fund the creation of an initial pool of distance programs (to be discussed in numeral 4.7), or, negotiation of credits with international banks devoted to helping developing countries, such as the World Bank and the Inter-American Development Bank, to fund universities (This option is not yet developed in depth in this thesis, but I am waiting to discuss it with the Ministry).

A final consideration: Public educational institutions currently receive public funds to finance in great proportion their costs. The Ministry has defined a monitoring system to measure the efficiency of those institutions and part of its annual budget depends on the results of that measurement. Considering that good quality distance education could cost around 60% of traditional education, it is then necessary that the Ministry adjust the system to reflect and evaluate the characteristics and efficiencies that could be achieved in institutions offering distance education.

### 4.4.5 International cooperation

As a means to improve our distance learning services through benchmarking, collaboration and sharing of practices, technologies and content, the Ministry could develop formal agreements of

[^35]: Regarding funding, the Alfred Sloan Foundation is likely the leader in promoting virtual education. The organization initiated a consortium specifically focused on on-line courses and programs. This consortium seeks to promote quality in on-line delivery, and has set high qualitative and quantitative goals.
cooperation with other governments and non-profit international organizations that support distance learning and education development.

These agreements should include, among other issues: exchange of students and professors; participation in international committees devoted to the distance learning topic; participation of our institutions, educators, government agencies (national and regional), topic experts and technology and content providers in international forums and events; participation in international funding for research, quality improvement of education and widening of coverage; and benchmarking and evaluations of the development of our distance learning offerings by international experts.

In the long term the cooperation could be broadened to establish a network of countries (e.g. Andean community) combining efforts to develop courses and programs, common quality standards and funding research initiatives.

4.5 ACCREDITATION

The government relies on accreditation as a sign that institutions and programs meet quality standards and are then given the approval to enroll students and warrant allocation of government funds (e.g. student scholarships, loans and research projects). It is through the commitment to accreditation that higher education shows that its self-regulation and quality assurance systems are effective. If, on the contrary, accreditation were perceived as failing to confirm quality, the likely reaction would be a substantial increase in government regulation of higher education and a loss of self-regulation by educational institutions.

But the current accreditation values, policies, and practices were created for traditional higher education (i.e. site-based education). Distance learning is putting pressure in the accreditation system to make changes in the way it assesses faculty work, institutional operations, and student behavior. Specifically, distance learning challenges accreditation in three ways [14]:

- by altering the traditional faculty role in higher education, because of diminishing face-to-face contact with students, the division of intellectual tasks of faculty members (separating curriculum design from curriculum delivery) and shifting the responsibility for determining academic standards from faculty members to the staff of corporate or other distance learning providers who prepare courses and materials;
- by altering the meaning of “higher education institution” replacing or augmenting lecture classrooms with chat rooms, virtual campuses and virtual communities of learning and changing from a required number of hours attending lectures to a flexible environment where each student can access class information at the times more convenient for him (an “institution” is no longer anchored in physical space and time);
- by altering the achieving of a college degree, encouraging and supporting mobility of students who can attend more than one institution either serially or simultaneously, online or on-site.
Based on the previous issues, the accreditation system must be adjusted in each of three components: i) accreditations mechanisms, ii) responsibility for protecting both students and the public from poor-quality higher education, and iii) quality assessment in an internationalization process of higher education which is facilitated and encouraged by distance learning environments.

4.5.1 Accreditation mechanisms

In Colombia, accreditation procedures have been established for conventional education, and a National Accreditation Commission (CNA) is in charge of evaluating and accrediting programs and institutions.

We lack standards of quality for distance education. They could be set and maintained basically through three mechanisms: the market, private accreditation organizations, and government agencies. The market is a good regulator of quality because it positions products and services giving customers information to decide which offerings satisfy their needs. But education is a public good that cannot be left solely to competition for students, more so in our country where the distance learning market is nonexistent and our students are unaware of what good quality in distance educational services means. Thus, the government must establish some basic standards and create the proper controls to ensure compliance with them.

The CNA would be the natural actor to be in charge of distance education, but it has scant experience in setting standards and evaluating distance learning environments. Then it is questionable whether institutions will tolerate a non-qualified CNA evaluation when they will be in a field that is driven by pressures from both students and a new breed of competitors (in other words, a field that is market-driven) who will force institutions to adjust promptly their learning services, easily leaving behind the CNA.

However there has been much progress on the topic in the US and Europe which could allow us to strengthen our accreditation system and the CNA. For example, we can learn from the mistakes made by the regional accreditation commissions in the US which, until recently, began seeking to become active players in the new educational environment [24]. Dozens of articles from the Chronicle of Higher Education and other publications from the early 1990s recorded a classic case of resistance to change, with evidence ranging from indifference to demands that Web courses adopt the existing models for "quality" education, lecture seat-time and all.

By 2000 the regional commissions formed an alliance to work together toward the consistent application within the regional accreditation framework of a common definition of what constitutes quality in distance education. The first manifestation of this alliance was through two documents: "Statement of the Regional Accrediting Commissions on the Evaluation of Electronically Offered Degree and Certificate Programs," and its implementing "Guidelines for the Evaluation of Electronically Offered Degree and Certificate Programs". What remains for

\footnote{The regional commissions limit their scope to include only degree-granting institutions. Educational offerings provided at a distance that do not lead to degrees (short-term and specific skills training courses leading to, at most, certificates) are considered as included within the institution's accreditation and thus are subject to evaluation too.}

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regional commissions is to gain experience in distance education as the only path to credibility in setting and enforcing standards.

In addition, the Department of Education has granted the Accrediting Commission of the Distance Education and Training Council (DETC) the authority to accredit "private and non-private distance education institutions offering non-degree and associate, baccalaureate, and master's degree programs primarily through the distance learning method" (U.S. Department of Education, Office of Postsecondary Education). With goals similar to that of the regional commissions for maintaining the quality of the education, the DETC has a higher profile in many areas than the regional commissions do. The DETC has a student-as-customer orientation which has ensured consistent standards of instructional design and delivery.

Other valuable experience from the US is the Distance Education Demonstration Program authorized by the 1998 amendments to the federal 1965 Higher Education Act. The focus of the program is to develop effective means to provide student aid while assuring quality, emphasizing student achievement, and preventing fraud and abuse in distance learning environments. The first phase of the program involved eight institutions, five systems, and two consortia for a total of 111 institutions offering electronically based distance learning.

The lessons from the Demonstration Program would be translated into practices and expectations in distance learning that will help preserve the autonomy of institutions while strengthening the accreditation system for distance learning. The program offers an interesting shift in the analysis: a "student-based" system for student aid independent of how higher education is delivered (e.g., whether the experience is site based or distance based).

Other inputs for our accreditation process are the results from studies made by different agencies in the US about quality of web-based education (see Eaton [20]). Based on these results and some studies from prominent experts in the US, the Institute for Higher Education Policy carried out a comprehensive study in 2000 and the outcome was a list of 24 benchmarks that are essential to ensure quality in Web-based distance learning. The benchmarks were grouped into the following seven categories: i) institutional support (context and commitment), ii) course development, iii) teaching and learning process (pedagogy or the art of teaching), iv) course structure, v) faculty support, vi) student support, and (vii) evaluation and assessment (of learning).

However, there are many questions still not yet answered about quality assurance in distance learning in the US. At the moment, 17 of the 19 (89.4%) regional and national accreditors are actively engaged in scrutinizing distance learning which includes the topics of application of accreditation standards, guidelines or policies to distance learning courses, programs and degrees to determine academic quality.

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37 These organizations included the American Council on Education, the National Education Association, the Global Alliance for Transnational Education (GATE), the Southern Regional Electronic Campus, the Commission on Higher Education for the Middle States Association of Colleges and Schools, and the Western Cooperative for Educational Telecommunications.
On the other hand, three European universities, three research institutes in Europe, the EuroPACE 2000 body, and EUA - European University Association\(^{38}\) have initiated a joint undertaking in order to develop the Benvic project within the SOCRATES program of the European Commission [42]. The project is focused on the establishment of evaluation criteria in order to achieve quality standards for virtual campuses.

The specific goals of the project are: i) to develop, test and establish an education approach to evaluation of "virtual campuses" experiences throughout Europe, ii) to promote a collaborative network able to implement evaluation through comparison and benchmarking, iii) to develop a competence map related to the design and implementation of "virtual campuses", and iv) to promote the new knowledge and approach made available by the project to the European Academic Community.

To date the Benvic project has produced some case studies of virtual campuses that have been the subject of study and evaluation and an evaluation methodology and approach with the detailed description of quality criteria and evaluation tools.

The studies mentioned look like a good starting point to begin a project to define our quality assurance system and standards for distance education. Another useful contribution might be the World Bank’s proposal about specific parameters to design quality systems for on-line programs in developing countries [10].

A final issue about accreditation mechanisms is that the dynamics of distance education would lead to the continuous creation and update of many courses and programs that would need accreditation. From the first chapter we understood that this procedure could take between one and three years in the CNA. Maybe is time to think about private accreditation organizations, authorized by the CNA, so the accreditation work could be distributed and the time to get approbations could be reduced.

Last, but certainly not least, may be that the most important improvement needed in our accreditation system, is that the government’s and institutions’ quality assurance systems pay much greater attention to the student learning outcomes. What are students learning? Are on-line students obtaining at least the same set of skills, knowledge and competency levels as students from the best conventional universities? Are they effectively being enrolled in the labor market?

For the first two questions the Ministry has established the obligatory application of exams of quality of higher education (called ECAES) for undergraduate students. This is the solution for undergraduate distance programs too. But for technical and technological programs the Ministry has not defined a mechanism to measure the skills achieved by students.

For the third question, neither the Ministry nor the institutions are assuming responsibility. The Labor Market Observatory would be a mechanism to improve the relevance and convenience of

\(^{38}\) The research institutes involved in the project have contributed with the methodological approach for educational evaluation of the Virtual Campuses. These institutes have many years of experience in the establishment of quality criteria for online distance learning products.
programs of higher education, even though it is the student who assumes the responsibility for his success in the working environment.

4.5.2 Protection of students and the public from poor quality education

The rapid growth of distance education has created the potential for fraud and abuse in other countries. With so many courses and programs that could be offered by so many providers, how can students determine which courses and programs are worthwhile - and which ones are shams?

It is the Ministry’s responsibility to create the means to publish consumer information that assists students in making judgments about the quality of institutions and programs based on, among other factors, accredited status of institutions and programs and, recently, results in the ECAES exams.

In the face of new providers and new forms of delivery of higher education, the government must define the systems, forms and content of comprehensive and detailed information about quality of distance learning offerings.

Once the new procedures and mechanisms to assess the quality of distance learning programs (the adjusted accreditation mechanisms), are defined, the government must:

- Explain the specific criteria to evaluate quality in distance learning.
- Assure easier availability and clearer descriptions about what accreditation guarantees and what it does not.
- Educate the public about the importance of the role of accreditation.
- Develop the standards and systems for institutions to publish detailed information about institutional effectiveness as defined by, for example, student success and achievement (e.g., competencies gained, entry to graduate school, employment, etc).
- Publish and maintain updated detailed information about quality of distance education programs.
- Assist students in the review process and choice for higher education offerings.
- Create effective mechanisms to strengthen communication with institutions and future external review organizations about quality assessment of distance education.
- Create the appropriate means of accountability to explain to the public the results of distance learning.
- Adjust the existing inspection procedures and sanctions, if needed, to protect students against poor distance learning services, fraud and abuse from institutions.

4.5.3 Internationalization of higher education

With many countries around the world using distance learning technologies to expand their own course, program, and degree offerings, but at the same time importing and exporting education programs and services, the discussion of quality assurance must include and pay attention to the growth of international distance learning offerings.

There is no current regulatory control by the Ministry of overseas distance education. Any non-local institution could introduce its programs without any intervention from the government. But,
as is happening in other countries, it is time to establish public safeguards to protect students from incompetent and sub-standard offerings.

Questions such as the following are pertinent for distance (and traditional) education:

- What controls over higher education imports does Colombia need?
- What strategies does Colombia need to assure that it is importing quality higher education?
- What authority does Colombia (really) have over outside providers of programs?
- What controls over higher education exports does Colombia need?
- Must the country inform the public about foreign offerings as a way of protecting its citizens from poor quality education? If not, what protection can Colombia provide to its citizens and institutions?
- Does the government need to guide institutions in the exchange of higher education assuring some standards of quality? Or is the market enough to regulate quality?

To date, there are few answers for these questions, but many governments such as Canada, the US and the EU countries are undertaking conversations about potential solutions to the issue such as bilateral agreements, development of a single set of international quality assurance standards, a market solution (reliance on competition) and a World Trade Organization (WTO) solution. Also some highly effective international agreements already exist (e.g. the European “Accreditation Scheme”, Hong Kong’s practices for the import of higher education), but none of these solutions fully addresses the question of a global framework for trade of services in higher education.

The Ministry has included the internationalization of Colombian higher education in their national development plan for the education sector; that project must clearly include the topic of distance learning services. In that sense we are just on time to look for the ways to get involved in the mentioned international conversations. But more importantly, the Ministry must lead and handle the national discussion about quality assessment in an international market and the role of the market as regulator of higher education.

In the long term, the competition between local and foreign supply will contribute to the improvement in quality, relevance and effectiveness of our local offering, and will help us in achieving a wider coverage in higher education. Thus, the Ministry must encourage competition with foreign institutions but by establishing the proper rules to control the quality of that foreign supply.

4.6 RESEARCH AND DEVELOPMENT

Another fundamental contribution of the Ministry is its funding of initiatives and projects in social, educational and technological research seeking to contribute to the design and implementation of pedagogical and organizational advancements in distance education issues that could lead to innovations or adoption of foreign practices in our distance learning model.
The fundamental aims of the research efforts would be: a) stimulate innovative pedagogical and organizational processes, b) develop strategies for improving the quality of educational, c) support of teachers, trainers and managers, d) improve the access to education for all those who are presently excluded, e) develop strategies for traditional institutions to make the transition to distance learning services\(^{39}\), f) identify and adopt technologies to support distance learning models.

Based on the international experiences, the lines of research could be extensive as distance learning involves pedagogical, organizational, technological and social aspects. But, some examples of lines of research are:

- Evaluation of different learning theories, methods, technologies and materials, identification of areas of content and technologies which cause the greatest learning difficulties/performances amongst students, etc.
- Impact (outcomes) of distance programs from all aspects (competencies, skills, changes in social behavior, etc.).
- Pilot experiments in new pedagogical techniques: virtual immersion courses, three dimensional simulation, impact of different technologies in the learning process and outcomes of students, exploring the application of technologies to encourage collaboration between students, teachers and trainers, etc.
- Content development: three-dimensional simulations, multimedia developments, standards for course development, strategies to foster the development of content, etc.
- Technological developments that broaden the possibilities for distance education: software for navigating the Internet with low bandwidth access, new devices (e.g. handhelds, cellular phone with more multimedia capabilities, thin computers), new wireless possibilities (e.g. WiFi, BlueTooth), new tools for authoring and management of content, etc.
- Organizational models to deliver distance learning programs: forms of alliances between institutions and between institutions and private organizations, models to make the transition from a traditional university to distance education, models to organize resources for distance education in a region and in the country, etc.
- Quality assurance of distance education: there is little consensus of what constitutes a quality distance course, there has been some progress in how to evaluate institutions providing distance education, but not a recognized best procedure, and the huge unsolved issue of accreditation and measurement of quality in distance education.
- Other uses of distance education programs: new audiences that could be served with existing courses (e.g. basic undergraduate courses could be offered to high school students, adults who have not completed high school could take open courses, public free courseware, etc.).
- New learning environments and offerings for new student targets: those with disabilities and those who belong to disadvantaged groups because of their social or working situation, communities and local associations, corporations and governmental agencies.

\(^{39}\) Multimedia equipment and access to the Internet are still missing from many traditional universities and, as we saw, universities offering distance programs are not using the technology well.
- Social development of students: dimensions of social interaction, communication and relationships developed by distance interaction between students and faculty and students and students, taking into account the different means of interaction on-line, telephone, broadcast and web.
- Ethnographic studies of students taking distance programs.
- Education in ethical values in distance learning environments: design of learning virtual spaces that favor the development of values as justice, honesty, solidarity, respect, responsiveness, etc.
- Strategies to improve students’ retention as well as their progress and outcomes.
- Roles and competencies of the faculty staff to implement distance education in higher education environments: identification of roles and competencies, strategies to develop these competencies, steps to change from traditional to distance teaching methods, guidelines to select professors for distance education programs and design of faculty development, evaluation of faculty, etc.
- Educational impact of distance education in higher education: analysis of costs and benefits compared with traditional education and benchmarking against international experiences.
- Evaluation of student and faculty satisfaction in distance learning programs as a means to identify complementary services and adjust the ones currently in operation.
- Economic impact of distance education: effects of widened coverage of tertiary education and increased education level of Colombian citizens, monitoring of the socio-economic impact of distance education (Is it effectively covering the lower income levels? The intended students market?), economic effects of internationalization of education through distance learning services, etc.

Government support for the research could be organized as the model created by the European Commission [38] which facilitates funds to launch collaborative projects concerning the promotion of open and distance learning. Funds are assigned based on the quality of the pedagogical approach, potential impact of the project and number of institutions involved (this Commission looks for collaborative projects which create synergies and permit transfer of knowledge to more than one institution).

Three kinds of projects can be presented to the Commission:
- Improving the understanding of innovations in progress: action research projects, studies and pilot experiences.
- Developing information and communication services: projects to collect, structure and facilitate access to information about educational services, technologies, supply for distance universities.
- Creating pilot modules and developing methods, directed towards the professional training of faculty and developing of content.

The Ministry could create alliances for cooperative activities with foreign research institutes as the UOC’s Internet Interdisciplinary Institute, UOC’s EduLab, MIT’s Media Lab, OU’s International Centre for Distance Learning (iCDL), the KERIS project in Korea or the Open Learning Agency in Canada, among others, as key sources of research on the topics of information society, e-learning, resources and organizational models for distance education. In
addition, these international centers could also be a model to design our own research center(s) in distance education.

Finally, institutions could complement the Ministry’s effort by developing the teaching and research area of education and new methodologies and technologies as part of their distance and traditional programs, in which master and doctorate students improve distance education by their research. This is the strategy followed by OUC and it has worked really well. But a warning: research is expensive and rarely, with some exceptions, external funds cover its full costs. The iCDL has closed many of their research lines because of this lack of external funding.

4.7 CREATION OF A MARKET OF DISTANCE EDUCATION SERVICES

Due to the poor supply of good quality distance education programs and the fact that the potential demand for tertiary education would overwhelm the projected capacity of our new Virtual University, it is clear that there is enough demand for more distance programs.

Additionally, a free market can assure that all the interests of potential students, their different wishes and learning styles are satisfied. Only institutions which have to earn their money by satisfying the needs of the individuals really have their finger on the pulse of the market, and they are normally more willing to try experiments if they see an interest or a new market.

I am aware that the role of the Ministry is not to create or promote entrepreneurship to strengthen the supply of distance education, but higher institutions by themselves will not have the resources or the initiative to create the kind of services that the country needs, as we discussed before. The Ministry can initiate some activity to create the conditions for a market of distance education, at least at the beginning. One way is the assurance of some demand (discussed in numeral 4.1.1) and other is financing a pool of initial distance programs.

The current initiative of “Community Centers for Higher Education – CCES”, that is currently driven by the regional interest and resources for higher education, could be highly improved if the Ministry uses its funding power to finance a handful of well-selected institutions to create and operate distance education programs and centers based on the needs of the Ministry’s students target.

In the case of public institutions, the Ministry should evaluate whether their offering is to transform a current traditional program into a distance methodology or if it is to create a new program that would operate in addition to the traditional program. The Ministry should, as well, determine what would be the additional budget to assign to institutions considering that in the first case they are receiving public funds for the traditional programs.

The selection of these institutions should be competitive and based on public bid processes. The criteria for the evaluation of proposal could be the number of students currently served by distance education, the range of program and course offerings, the existence of appropriate technology and infrastructure or the proposal to improve them, the existence of an appropriate organizational structure for production and delivery of the educational service or the proposal to
improve them, the distance learning model proposed, the geographical coverage and the business plan to create self-sustainable services.

There are three caveats to this strategy: i) The selection process could degenerate into unfair treatment with other institutions that having no experience in distance education could propose better services than institutions with previous experience (remember the evaluation of our current supply of virtual education). ii) The financial aid by the Ministry must be accompanied by financial investment from the universities to develop their proposals. The government’s aid would not last for more than two or three years because the economic goal is to create self-sustainable services. iii) The financial aid must be contingent on a previous agreement on the number of students to be covered, the quality of the courses and programs to be delivered and the dropout and failure rates to be achieved. If an institution breaches these agreements, it must reimburse the financial aid received to the government. The purpose of this condition is to encourage institutions to be more conscious of their responses to students’ needs and to think about the effectiveness of their offerings in terms of student progress and achievement.

Of course, this strategy of helping in the creation of a market of distance education requires the identification of the relevant programs for the labor market. I am expecting that the Labor Market Observatory will deliver its first results in March 2005, so institutions will have 2005 to select and train their faculty, organize academic programs, develop/acquire courses and materials, organize educational services, etc. If this expectation is not fulfilled, the Ministry would need to look for other solutions, such as market research, to identify the programs very soon; otherwise it will not have enough qualified supply for 2006.

If this strategy is implemented and successful, some predictions about what could happen in the future, if we have a similar evolution of the distance education market of that saw in other countries, would be:

- The government interest in financing distance higher education would be mirrored by private enterprises and professional associations, initially to cover their own training needs and then to enter the students market addressed by the government.
- Increasing pressure from within traditional universities for distance education to deliver flexible study options for their students in ways that are more cost-effective than on-campus traditional teaching.
- Growing tensions between the expectations of quality and the cost-effectiveness of services, with trends toward substituting face-to-face interaction with technology mediation, even if that affects students with special learning needs and reduces the number of academic offerings to enable greater economies of scale.
- Increasing tension between the desire to employ new technologies in teaching and learning and the real possibilities of access for students in remote areas or from low-income groups.
- Growing requirements of experts in distance learning to support institutions’ initiatives seeking to apply new technologies and methodologies.
- Attempts to create alliances to broaden offerings and coverage of distance learning services, at the beginning with many problems to standardized quality and presentation of courses and to create smooth administrative services for students.
An additional important concern is the governance of the distance education system through market mechanisms. The topic is of the most relevance because cost-effectiveness of programs would depend on the achieved economies of scale and that could lead institutions to organize themselves to address particular students’ niches (by field, level of instruction, ages or other factors), leaving the less attractive niches without supply.

If the market dynamics lead to institutions becoming monopolies, there would be the great danger of potential abuse and fraud of students. Thus the Ministry would need to exert greater control over programs’ quality and protect students from poor services and abusive institutions (e.g. exaggerated costs, inflexibilities in the delivery of educational services, etc.) or, in, extreme cases, from closing of programs or institutions. And also, if some student segments become underserved, the Ministry would need to study the options to fill the gap, especially for students from the low income levels. Education is a public good that cannot be left solely to competition for students and money.

4.8 CONCLUSION

The Ministry plays the roles of policy maker, accreditation and funding in distance higher education and a leading role in helping in the development of a market of good quality distance programs and creating the conditions for the demand to get access to the new offering. In addition, in the initial stages of the development of distance education in the country, the Ministry should strengthen institutions to face properly distance education and create the mechanisms for cooperation with international governments and organizations.

But the Ministry may have a not very distant future challenging role: the convergence of conventional and distance education. With more conventional institutions introducing distance practices and tools into their methodologies, the edge between traditional education and distance learning is blurring.

Some educational experts [39] have studied this phenomena in those countries which are more advanced in distance education and they have found that nontraditional and traditional institutions are converging in their methodologies, goals (in coverage and quality), and students markets.

Many experiences in Europe, Australia and the US show that traditional universities have entered the distance education field creating what is known as “dual-education” or “hybrid mode” where distance services are an integral part of the universities’ missions and are supported by a solid organization and infrastructure. Institutions are offering courses, programs and degrees that are site based, delivered at a distance, and a combination of both.

The studies also found that contemporary students, with possibilities to access education, increasingly represent a mix of characteristics of conventional and non-conventional students. They are becoming more flexible to move along life between traditional and distance education and in some countries students attend traditional campuses while taking online courses from the same institutions or others.
If this trend is followed by Colombian institutions and students, and based on the evolution of distance education in the world that seems to be highly likely, the Ministry must be attentive to the evolution of this tendency and to its effects in policies, accreditation system and funding strategies for higher education.
5 CONCLUSION

Distance education is the process whereby the education of a student occurs in a geographical space different from the place where the educator is, and the interaction between them is accomplished by one or more forms of technology. It is not a new concept, distance education was initially offered through print-based correspondence courses, then through broadcast media as television and radio and videotapes, and now through computer-based instruction and the Internet.

Much of the research on distance education indicates that students do as well or better compared with traditional programs and are satisfied with their learning experiences. In the experiences evaluated in the second chapter we found that students from UOC, OU and UBV got even better results than students from their equivalent conventional programs. In addition, good quality distance education can cost around 60% of traditional education without sacrificing quality.

This means that distance education can be seen not only as a complement to the formal educational system, but also as a low-cost, good quality alternative to expanding higher education. With our poor supply in the more remote zones of the country and, especially, rural areas and the restrictions for students from the lowest income levels, the Ministry of Education can see distance education as an important or even necessary tool for national development to expand and extend formal higher education.

Distance education also provides supplementary opportunities to adults to continue their education and to students who can pursue an education in addition to fulfilling their commitments to jobs and families. It also provides the means for helping people to learn new skills to respond to the changing labor market and provides accessibility for those not located near a traditional institution.

Both the knowledge and the global economy demands new skills from employees and new learning environments which are more flexible, more convenient and quicker to react. The new technologies of information and communications are changing education offering ways to reproduce and diffuse materials, to deliver courses and to support new distance methodologies. And even more, tools such as the Internet make the offering of completely virtual education viable. But the issue is not technology itself, but rather how it is used in the design and delivery of courses.

Distance education conveys the design of an effective distance learning environment taking into account the different needs and learning styles of students; the effective selection and use of technologies to support this environment; the selection and training of faculty (professors and tutors) in the distance environment and technologies chosen; the design of the proper organizational structure (hierarchy, processes, locations, rules, management style) to support the management and operation of academic programs; the definition of a sustainable business model to achieve cost-effectiveness without sacrificing quality; the planning processes to react to changes in technologies, labor market and student needs; and the quality assurance system to ensure that the planned goals are being met and the outcomes for students are being achieved at the intended level or even better.
I have insisted throughout this document about the cost-effectiveness issue, and I have described the kinds of universities that could reach such effectiveness with good quality educational services. Successful large and small distance institutions have been able to do that because they first reorganized the teaching-learning process and then used particular technologies to support the learning system they have designed. This path is very different from the one in which the motivation is how to reduce costs by using new technologies such as the Internet or one on which technology by itself will improve the learning process.

The key element in the design of the learning system is that it starts with the student and arranges an effective learning environment for individual study. That means commitment to efficiency balanced with the proper mix of face-to-face and distance interaction, one-to-one tutorial supported by the best faculty staff and technology in order to fulfill students’ needs and learning styles.

The reorganization includes the business proposition as well because the issue of long-term sustainability is crucial for the growth of the institution and the maintenance of the quality level of academic services. In distance education the costs are driven by three aspects: student support (tutors and professors as well as complementary services such as digital library and job postings), driven by the number of students enrolled and the nature and quality of the educational services offered; course development (including complementary materials), driven by number and size of academic programs, the media mix and the shelf-life of courses; and the costs of infrastructure (technology and facilities), driven by the pedagogical model.

Cost-effectiveness must be achieved, of course, while assuring that courses and programs meet minimum quality standards. In Colombia, as in other countries, the traditional method of determining that higher education institutions meet these minimum standards has been through an accreditation system. However this system was created for traditional education and does not include the particularities of distance education. The topic of quality assurance for distance education has seen much controversy and debate in even the most developed countries, but it seems that some accreditation practices and standards have been agreed upon and can serve as the starting point for our country.

Distance education courses or programs may be offered by traditional institutions, by "virtual" institutions whose entire offerings are online, by online consortia, by for-profit institutions or by a mix of those organizations. Distance learning is creating alternative models of teaching and learning, new job descriptions for faculty, and new types of higher education providers.

Traditionally tertiary institutions have almost determined their academic programs. However ‘adult learners’ seem more interested in customizing their educational programs to meet their specific needs. This customization includes not only relevance of courses, but also entry requirements, location, time and pace constraints, and easy transfer of credits between institutions.

Then the challenge of institutions in tertiary distance education is to offer integral academic programs while responding to the needs of students, managing their costs to maintain fixed costs.
at a low point, and conquering mass-markets to create a business model which allows the institution growth and sustains good quality educational services.

I studied the characteristics of distance education in Colombia and seven international experiences to identify the elements for a virtual university. The current stage of distance education in our country is characterized by a fragmented supply with weaknesses in defining and adopting a virtual pedagogical model, the use of technology capabilities, the organizational structure to support virtual education, and the planning and quality assurance processes. This diagnosis shows that, with few exceptions, virtual education is not truly a strategic issue for universities and they are not prepared to tackle that challenge. Institutions offering distance educational services have opportunities for improvement and innovative developments but they lack the necessary resources.

Based on the current situation of distance education in our country, our needs in terms of challenge in coverage of higher education, and the elements identified from the international experiences, a Virtual University was proposed with the purpose of being an ‘Open and distance learning university’ with “open” meaning access to everybody and “distance” including the appropriate technologies and pedagogical models to offer distance education. Incidentally, maybe a better title for this thesis could be “A model for an open and distance learning university in Colombia”.

The Virtual University was set up primarily to serve those sectors of the population who have been excluded from the traditional education system, principally young students and adults from the lowest income levels who have finished their high school education. The strategic analysis for the new university was developed in the third chapter.

I proposed three alternatives to implement the virtual university: i) a new centralized and autonomous organization, ii) a network of universities under an umbrella of a Virtual University, and iii) free competition among institutions. I concluded that the best option was the first one because it could guarantee the goals in coverage, priority student markets, and quality that the Ministry has stated for distance learning in the next years. That alternative, which also broke with past practices of distance and traditional universities, could deploy a distance learning university appropriate for our country in a shorter time, and could take advantage of economies of scale with high quality services. The huge caveat with that option is that it will not be easy to get the necessary approval to create the new university.

The three alternatives were discussed with the Vice Minister of Higher Education. After the analysis of each one and being realistic in that the current presidential administration is reaching the midpoint of its term, a fourth option appeared as a transitory solution for the Virtual University. However this new option did not fulfill the requirements of our students markets (‘young learners’ and ‘adult learners’), the best strategic, pedagogical and administrative practices to design the new university, the national goals in coverage and quality proposed for the Virtual University, and the need to create a sustainable organization.

The implementation issues for the Virtual University about characteristics of students, the value chain for the delivery of distance educational services and the risks and potential mistakes were
developed for the new centralized and autonomous organization alternative. However, many of these issues apply to the model chosen by the Ministry.

We can gain some time by learning the lessons from the significant experiences of universities such as Open University (UK), Phoenix (US) and Instituto Tecnológico de Monterrey (Mexico) and from the recent but successful experience of Universitat Oberta de Catalunya and Universitat de Barcelona Virtual. We have proved that technologies and content, things that ten years ago were still immature, can be acquired and adapted allowing us to deploy our distance education system in a shorter time.

But a shorter time does not mean than we will achieve the same quality, cost-effectiveness and distance learning expertise as the OU, for example, in the short term. This will be a process that will involve public and private, traditional and distance institutions, the business sector, the IT sector, and the regional and national governmental agencies in charge of higher education in the country. But I am sure that if the Ministry leads that process we will get the distance education system that the country requires.

The Ministry has an immense task that can be summarized as helping in the creation of a market of good and relevant distance educational services and creating the conditions for the demand to get access to that new offering and to be able to face this new way of education.

The Ministry should encourage economies of scale through partnerships between institutions, shared investments, shared courses, shared experimentation and shared innovation, all of them under a set of quality standards that provide a common and objective evaluation system. And in the initial stages of the development of distance education in the country, the Ministry should strengthen institutions to properly face distance education and create the mechanisms for cooperation with international governments and organizations.

One interesting thing is that growing distance education and especially online education attracts a significant service industry for the functions that could be outsourced as we saw in the value chain of the Virtual University. Companies interested in providing simulation and online lab software, online faculty training courses, authoring and managerial tools for course and programs, technical support, connectivity services, etc. would have a new market niche.

When the distance education system consolidates and if it achieves international quality standards, I foresee many possibilities of new markets and businesses (i.e. new streams of revenues to improve our distance education), for example:

- Some institutions could focus in the development of content and could license their products to other institutions focus in the delivery of courses.
- New audiences that could be served with existing or new courses such as high school students, adults who have not completed high school could take open courses, public free courseware, communities and local associations, corporations and governmental agencies.
- Export of our programs: especially technical and technological programs could be very successful because there is not much supply in other countries (in fact, neither of the
experiences evaluated offered technical or technological programs) and is a necessity in all developing countries.

There are many benefits from distance learning and it seems to be a good solution for the Ministry’s coverage challenge in higher education. In the current Ministry’s development plan for the education sector distance education is barely mentioned. I hope that this thesis gives the Ministry the elements to clarify its goals in distance education and the policies and regulatory aspects required to support those goals.

Finally, this thesis could not develop all the issues that distance education and the new technologies will produce in the education sector. The diversity is so great, that each issue could produce enough material for an individual thesis. But maybe it is appropriate to finish this thesis by recalling Wulf [46] who raised many questions about the future of the university due to the impact of digital technology in education. Here are some of those questions for future reflection:

- Does it make sense for every university to support the full complement of disciplines, or should universities specialize and share courses in cyberspace?
- The decision by MIT to make its courseware available for free has stimulated other universities to similar benevolence. Will this decision enhance the ability of smaller and non-US schools to deliver high-quality instruction in deeply technical areas? (Would it make sense to follow this same path in Colombia, once we reach a mature stage in distance education?)
- Might professors affiliate with several institutions or become “freelance” tutors to tele-present students?
- Might some employers (and hence students) prefer a transcript that lists with whom certain courses have been taken rather than where?
- Will universities merge into larger units or will the opposite happen?
- Will more universities serve a global clientele? In particular, will private universities have greater flexibility to adapt to globalization?
- Does the function of socializing young students need to be coupled with the educational function, or could it be done better by some form of social service?

Note: In Appendix – Table 4, I list many articles that could help the Ministry and the reader to deepen their knowledge of topics related to the implementation of distance education services.
## APPENDIX

Table 1: Number of tertiary institutions per state and type of institution in Colombia

<table>
<thead>
<tr>
<th>Province (State)</th>
<th>Technological Institution</th>
<th>University-Level Institution</th>
<th>Technical Institution</th>
<th>University</th>
<th>Grand Total</th>
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<td>1</td>
<td>1</td>
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<td>1</td>
<td>14</td>
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<td>14</td>
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<td><strong>Grand Total</strong></td>
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<td><strong>97</strong></td>
<td><strong>50</strong></td>
<td><strong>108</strong></td>
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### Table 2: Number of tertiary institutions per state and owner (private or public) in Colombia

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<thead>
<tr>
<th>PROVINCES (STATES)</th>
<th>PUBLIC INSTITUTIONS</th>
<th>PRIVATE INSTITUTIONS</th>
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<th>%</th>
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<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>BOYACA</td>
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</tr>
<tr>
<td>CALDAS</td>
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<td>3</td>
<td>6</td>
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</tr>
<tr>
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<td>0.31%</td>
</tr>
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<td>0.31%</td>
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<tr>
<td>CAUCA</td>
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<td>0.61%</td>
</tr>
<tr>
<td>NARINO</td>
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<td>1.53%</td>
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<td>VICHADA</td>
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<td><strong>GRAND TOTAL</strong></td>
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Table 3: Number of public schools in Colombia with computer labs and access to the Internet

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<td>ARAUCA</td>
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<td>ATLANTICO</td>
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<tr>
<td>BOGOTA D.C.</td>
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</tr>
<tr>
<td>BOLIVAR</td>
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<td>BOYACA</td>
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</table>

Graph 1: Geopolitical map of Colombia

<table>
<thead>
<tr>
<th>Topic</th>
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<td>Cost model for distance education</td>
<td>Haulsmann [15] describes a complete cost model for distance education and identifies the potential economies of scale that can be achieved. He also indicates the differences in costs between European and Asian universities offering distance education, compares costs in traditional and on-line education an compares costs of different technologies.</td>
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<td>Texas A&amp;M University [21, 22] has designed a method for pricing and tracking costs of distance courses guided by two premises: prices must be affordable to the student market and cost-effective to the university.</td>
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<td>Intellectual property of web courses</td>
<td>Stevens Institute of Technology [18] provides a good example of how an institution managed the issue of property rights over web courses.</td>
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<td>Quality of distance education</td>
<td>Meyer [41] presents the results of studies about student outcomes in web-based education compared to those of students in traditional education.</td>
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<td>Organizational models and experiences for the delivery of distance learning programs</td>
<td>Hill and Baer [43] present the analysis of the creation of the Minnesota Virtual University (MnVU) and suggest some criteria for determining if a state is ready for a virtual university initiative. For the MnVU they present its success in the creation of a framework for the Minnesota public higher education systems to address joint development of online student systems, curriculum development, faculty and staff development, K–12 connections, transfer issues, industry partnerships, and rapid development of learning resources to meet learner needs; and the failure in the creation of the delivery of the courses, certificates, modules, or programs. MnVU is not a degree-granting institution.</td>
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<td>In 2003 the Association Liaison Office for University Cooperation in Development (ALO) published a document about five models to organize resources for distance education program delivery, not only internationally, but nationally and also at the level of the individual institution. The models studied were: Enabling model, Contractual model, Brokering model, Multiple Alliance model, and Commissioning model. See <a href="http://www.aascu.org/alo">www.aascu.org/alo</a></td>
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<td>Martyn [44] presents a successful hybrid on-line and face-to-face model developed and implemented by the Baldwin-Wallace College (Cleveland, Ohio).</td>
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<td>Literature for the development of guidelines for institutions</td>
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<td>The role of the Ministry</td>
<td>Braman [5] analyzes the legal context in which higher educational institutions operate and how it must be tailored to the challenges of ITC. She develops three main aspects: autonomy of institutions, economics and public sphere, the first two are relevant to Colombia and are useful in defining the regulatory aspects that the Ministry would apply to support the development of distance education. Autonomy refers to the restrictions of campus activities, freedom available to restructure themselves and universities acting as ISP (Internet Service Providers)(^{41}). Economics refers to the right of universities to expand the scope of their economic activity, where the use of ITC provides a rich scenario for new businesses (open courses, consultancy services, specially made programs for companies, etc.) and the protection rules of ownership of web-courses. Public sphere refers to how universities participate and act in the larger community sphere.</td>
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<td>Governmental initiatives in distance education</td>
<td>Jung and Rha [47] examines recent governmental policies in higher education, describes the Virtual University Trial Project developed in South Korea and its impacts on higher education.</td>
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\(^{40}\) ACE, founded in 1918, is the major coordinating body for all the US's higher education institutions. It seeks to provide leadership and a unifying voice on key higher education issues and to influence public policy through advocacy, research, and program initiatives. Its members include approximately 1,800 accredited, degree-granting colleges and universities and higher education-related associations, organizations, and corporations.

\(^{41}\) Universities provide computing and communication infrastructure for its faculty, staff and students.
REFERENCES


[34] The California State University – web site. http://www.calstate.edu/


