Non-University Higher Education and the Relationship of Its Graduates and the World of Work: Colombia

Dissertation
By

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Summary

The non-university sector has been part of the Colombian higher education system for more than 50-years. Despite its long years of existence, it has never occupied such an important role within the education system as the one it is having today. Therefore, the aim of this work is to analyze the development of the non-university sector in the framework of the country's social, educational and economic demands. Likewise, its actual situation and certain aspects of the relationship between its graduates and the world of work, i.e., graduates' employment characteristics, the relationship of higher education studies and their work, as well as their early career success, are examined.

In order to generate the required information, a graduate survey was carried out in Atlántico (Colombia). The target population was graduates from higher education institutions registered in Atlántico who were awarded a technical, technological or professional degree in 2008 from any of the following knowledge areas: Fine Arts, Health Science, Economy-Administration-Accountancy and similar, and Engineering-Architecture-Urban planning and similar. Besides, interviews with academic and administrative staff from non-university institutions were carried out, and higher education related documents were analyzed.

As a whole, the findings suggest that the non-university sector is expanding and may help to achieve some of the goals, for which it is widely promoted i.e., access expansion for under-represented groups, enhancement of the higher education system, and the provision of programs pertinent to the needs of the market. Nevertheless, some aspects require further consideration, e.g., the sector's consolidation within the system and its quality. As for the relationship between non-university higher education and the world of work, it was found to be close; particularly in those aspects related to the use of knowledge and skills in the work, and the relationship between graduates' studies and their work. Additionally, the analysis of the graduates' in their early career stages exposes the significant role that the socioeconomic stratum plays in their working life, particularly in their wages. This indicates that apart from education, other factors like the graduates' economic or social capital may have an impact on their future work perspectives.

Zusammenfassung

Seit mehr als 50 Jahren ist der nicht-universitäre Hochschulbereich Teil des kolumbianischen Hochschulsystems. Trotz dieser langen Zeit des Bestehens spielen nicht-universitäre Hochschulen heute eine wichtigere Rolle im Bildungssystem als jemals zuvor. Aufgrund dieser gewachsenen Bedeutung ist es das Ziel dieser Arbeit, die Entwicklung des nicht-universitären Hochschulbereichs unter Berücksichtigung der sozialen, ökonomischen und Bildungsanforderungen in Kolumbien zu analysieren. Darüber hinaus werden die aktuelle Situation dieses Sektors sowie spezifische Aspekte der Beziehung zwischen Hochschulen und der Arbeitswelt, d.h. Beschäftigungsmerkmale der Absolventinnen und Absolventen, die Beziehung zwischen Hochschulstudium und der beruflichen Wirklichkeit der Absolventen sowie deren erste Schritte in ihrer beruflichen Karriere untersucht.

Um die erforderlichen Informationen für eine solche Analyse zu gewinnen, wurden im Rahmen einer Absolventenstudie Absolventinnen und Absolventen von 11 Hochschulen in Atlántico (Kolumbien) befragt. Zur Zielgruppe gehörten Absolventinnen und Absolventen von Hochschulen in Atlántico, die im Jahr 2008 einen technischen, technologischen oder berufsbezogenen Abschluss in einem der folgenden Fächer erworben haben: Kunst, Gesundheitswissenschaften, Wirtschafts-, Verwaltungswissenschaften, Rechnungswesen u.Ä. sowie Ingenieurwesen, Architektur- Stadtplanung u.Ä. Zusätzlich wurden Interviews mit Wissenschaftlerinnen und Wissenschaftlern und Personen aus der Verwaltung von außeruniversitären Hochschulen und eine Dokumentenanalyse von Dokumenten der Hochschulbildung durchgeführt.

Insgesamt zeigen die Befunde, dass der außer-universitäre Hochschulbereich expandiert und dass dies dazu beitragen kann, einige der Ziele, für deren Verwirklichung der Bereich weitgehend gefördert wird, zu erreichen: insbesondere die Erweiterung des Hochschulzugangs für unterrepräsentierte Gruppen, die Verbesserung des Hochschulsystems insgesamt und das Angebot von Studienprogrammen, die den Bedürfnissen des Marktes entgegenkommen. Dennoch gibt es einige Aspekte, die eine nähere Betrachtung erfordern. Dazu gehören u.a. die Konsolidierung des nicht-universitären Hochschulsektors innerhalb des Hochschulsystems sowie seine Qualität. Im Hinblick auf die Beziehung zwischen nicht-universitärer Hochschulbildung und dem beruflichen Sektor wurde ein enger Zusammenhang zwischen den beiden Bereichen gefunden, insbesondere in Aspekten der beruflichen Nutzung von Wissen und Fähigkeiten sowie der Beziehung zwischen dem Studium und dem Beruf der

Absolventinnen und Absolventen. Zusätzlich ergab die Analyse der frühen Karrierestufen der Befragten, dass die sozioökonomische Schicht der Absolventinnen und Absolventen im Arbeitsleben, vor allem beim Gehalt, eine wichtige Rolle spielt. Dies zeigt, dass neben der Ausbildung andere Faktoren wie das wirtschaftliche oder soziale Kapital der Absolventen großen Einfluss auf ihre künftigen Arbeitsperspektiven haben.

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Table of Contents

List of Tables

Table of Graphs

List of Abbreviations, Acronyms and Terms

CERES: Centros Regionales de Educación Superior (Regional Centers of Higher Education)

CESU: Consejo Nacional de Educación Superior (National higher education Council)

CNA: Consejo Nacional de Acreditación (National accreditation council)

COLCIENCIAS: Departamento Administrativo de Ciencia, Tecnología e Innovación

CONACES: Comisión Nacional Intersectorial de Aseguramiento de la Calidad de la Educación Superior (National higher education quality assessment commission)

CONPES: Consejo Nacional de Política Económica y Social (National Council for social and economic policy)

DANE: Departamento Administrativo Nacional de Estadística (National department of statistics)

DNP: Departamento Nacional de Planeación (National planning department)

EDP: Educational Development Plan

ICETEX: Instituto Colombiano de Crédito Educativo y Estudios Técnico en el Exterior (Colombian Institute of Educational Credits and Technical Studies Abroad)

ICFES: Instituto Colombiano para la Evaluación de la Educación (Colombian Institute for the Educational Evaluation)

ITP: Instituto Técnico Profesional (Technical Professional Institute)

IT: Instituto Tecnológico (Technological Institute)

IU: Institucion Universitaria (University Institution)

NDP: National Developmen Plan

NUI: Non-University Institution

NUG: Non-University Graduate

NUP: Non-University Program

NUS: Non-University Sector

MEN: Ministerio de Educación Nacional (National ministry of education)

OLE: Observatorio Laboral de Educación (Labor Observatory of Education)

SABER PRO (former ECAES): Exámenes de Calidad de la Educación Superior (Higher education quality exam)

SENA: Servicio Nacional de Aprendizaje (National Apprenticeship Service)

Uni: Universidad (University)

UG: University Graduate

UP: University Program

US: University Sector

SNIES: Sistema Nacional de Información de la Educación Superior (National Higher Education Information System)

1. Introduction

Early in the second half of the last century, as a result of the societal and economical changes originated from the end of the World War II, a new higher education sector emerged i.e., non-university sector, which enhanced the scope and field of action of higher education. In this framework, new institutions were established; they differed from universities in various aspects, namely little involvement in research, providing short-lasting programs and a vocational orientation.

During the late 1960s and the early 1970s, the non-university higher education sector consolidated in Europe with the appearance of the Instituts Universitaires de Technologie, in France; the Polytechnics, in the United Kingdom; and the Fachhochshulen in Germany. Meanwhile, the Community Junior Colleges, already existing since the beginning of the twentieth century, strengthen themselves as post-secondary institutions in the United States.

Similarly, Latin American higher education systems underwent a period of development and transformations after the 1960s; however, the strengthening of the non-university higher education sector just started in some countries like Chile and Colombia in the 1980s. Furthermore, since the late 1990s the non-university sector has grown in most countries of the region and certain policies have been developed to expand and to consolidate this sector within their higher education systems. Moreover, the development and promotion of this sector has been generally addressed by supranational organization (e.g., the Economic Council for Latin America and the Caribbean- ECLAC, 1992; World Bank, 1993; UNESCO, 1994) as a means to improve the economic and social performance of the Latin American region.

As for Colombia, the non-university sector has shown a continuous growth since 2000; it has not only been in terms of enrolments, but also in terms of new institutions and study programs. Furthermore, higher education policies have stressed the non-university sector as one of the pillars to achieve the country's economic and social goals since 1998. The expansion of the higher education system through the enhancement of the non-university subsystem, principally via technical and

technological programs, aims principally at increasing the employability opportunities and to expand the access to higher education to some underrepresented sectors of the society.

As mentioned earlier, one of the principal reasons of promoting non-university programs is to increase and improve the possibilities of being employed for a greater number of Colombians, especially for those who cannot afford long study programs due to geographical location, financial and/or time restrictions. However, despite of the important role non-university higher education has been given in the country; there is not much research about the non-university higher education sector and is even more limited the research on the relationship between their graduates and the world of work.

Hence, the purpose of this investigation is to get to know more about the Colombian non-university sector and its graduates as well as about the relationship between its graduates and the world work. In this framework, this research analyzes the socioeconomic and educational characteristics of graduates and certain spheres of the relationship between higher education and the world of work i.e, graduates' employment and work conditions as well as their early career success.

With this background, four specific goals have been set as the main guidelines of this investigation:

- To analyze the development of the non-university sector in the framework of the country's social, educational and economic demands;
- To interpret the current situation of this sector in terms of type of institutions, students, research and quality in regards to the university sector.
- To analyze the relationship between graduates, non-university graduates and university graduates, and the world of work in terms of work-characteristics and the relationship of higher education studies and their work,
- To provide guiding elements to promote the investigation of the higher education system in Colombia, particularly of the non university sector, and about its graduates and their work

1.1.Relevance of the Topic

Since the last decade, the demand for non-university programs has been promoted in Colombia; in fact, the last three National Development Plans have underscored their importance in the expansion of the higher education system and is considered determinant in the process of qualifying the Colombian labor towards the improvement of the country's competitiveness. They are said to play an important role in the medium and long term higher educational policies. Furthermore, it is expected that 60% of the students enrolled in higher education in 2019, will be enrolled in technical and technological programs (Ministerio de Educación Nacional-MEN, 2006).

Furthermore, certain governmental actions confirm the importance gained by the higher education sector in general and the non-university sector in particular, in the last years: the creation of the vice- ministry of higher education, the enactment of the Law 749-2002 and the establishment of the Observatorio Laboral para la Educación-OLE (Labor Observatory for Education) are some examples. In particular the OLE, which is in charge of carrying out graduate surveys to know the employment situation and work conditions of graduates, manifest the national interest in knowing about the whereabouts of their graduates and their relationship with the world of work.

Paradoxically to the importance gained by the higher education sector in the last decades and the increasing interest for the non-university higher education, the research on the topic is in general scarce and most of research focuses on the university sector. A similar situation is found when revising the research on the relationship between higher education and work; most of it focuses on the description of different quantitative characteristics of graduates and the labor market, and the research specifically analysing the situation of non-university graduates is almost nonexisting.

Bearing in mind the a mentioned facts, this study seeks to contribute in the understanding of the non-university higher education and its role within the Colombian higher education system; furthermore, it aims at shedding light in the interpretation of the current relation between higher education graduates and the world of work i.e., graduates characteristics, graduates employment situation and work conditions and graduates' early career success.

This research is pertinent; especially, at this moment in which the higher education system is expanding and its future is one of the main topics of debate at the national level. Certainly, the findings of this study are of great interest for the non-university higher education institutions, as it offers information about the strengths, weaknesses and the challenges that the students face once they have graduated. This information will be valuable to improve the pertinence of non-university programs, and may also contribute to tight the linkages with the economic sector. Additionally, it will provide relevant information that may help to design, develop and promote new policies in this field and/or to modify or redirect current ones.

1.2.State of Art

The relationship between higher education and work has been addressed in plenty of economic studies and specially analyzed from the human capital perspective, in which education is regarded as an investment that is positively correlated with the productivity of people. Furthermore, the analysis of the monetary and non-monetary returns to education represents one of the major areas of research, when studying this relationship, cf. Kiefer (1985), Hill (1989), McMahon (1991), Psacharopoulos (1993), Psacharopoulus and Patrinos (2002).

As the time has passed, the amount of research on this topic has increased and the study approaches have broadened. According to Teichler (1996), in Europe, most of research on the relationship between higher education and work goes back to the 1970s when in some countries regular graduate surveys were established. Moreover, since the 1990s several investigations on the topic have aimed at including more variables to contribute in the comprehensive interpretation of this relationship. For instance, "From Higher Education to Employment" published by the OECD in 1992, compile the results of studies undertaken in eighteen countries. These studies go beyond the rates of return to education and include other aspects in their analysis, e.g. graduates' destination and transition conditions.

More recently, the CHEERS Project (Careers after Higher Education- a European Research Study), deals with this topic and addresses a wide range of factors such as: the socio-biographic background, the transition to employment and career start, the current employment situation, the work assignment and the substantive links

between study and work, the competences and job requirements, the study orientation and job satisfaction, as well as international mobility, in 11 European countries and Japan (Teichler, 2007). Thanks to the ample spectrum and the variety of variables used in CHEERS, it is possible to find both, quantitative and qualitative analysis on a significant variety of topics, which deal with single countries as well as comparative analysis that includes all countries or just a group of them. For instance, Allen and Van der Valden (2007) and Salas (2007) study the transition from higher education to work; Johnston and Little (2007) analyze the socio-biographical background of higher education graduates; and on competencies and work requirements can be mentioned the work of Kellerman (2007).

In other latitudes, like Latin America, studies about the relationship between higher education and work are few and most of them deal with rates of returns to education. That is the case of the investigations of Alam and Psacharopoulos (1991), and Fiszbein and Psacharopoulos (1993), which analyze the rate of return to education for Venezuelans for 1987 and 1989, using the Venezuelan Household Survey. Other examples are the work of Tannen (1991) that estimates the returns to schooling in Brazil using in addition of the traditional variables, e.g. gender, years of schooling and type of education, other type of variables, i.e., geographical variables; Kugler and Psacharopoulos (1989), who based on the Buenos Aires Household Survey studied the relationship earnings and education; and Tenjo, Ribero and Bernat (2005), who analyzed the evolution of the wage gender gap in six Latin American countries, namely, Argentina, Brazil, Colombia, Costa Rica, Honduras and Uruguay.

In contrast to the significant diversity of approaches and variety of topics found in European and American studies, those of the Latin American region are relatively limited. Nevertheless, since the 1990s, graduates' surveys have been used to study this relationship, principally in Mexico. Cabrera, de Vries and Anderson (2008) focus on job satisfaction and employment perspectives of graduates from traditional and not-traditional majors of the Benemérita Universidad Autonóma de Puebla; and Salgado (2005) study the work conditions and employment perspectives of graduates from the bachelor in Economics from the Autonomous University of the State of Mexico.

As for Colombia, there is also a considerable amount of research analyzing the returns to education and changes in productivity given the level of education. Just to mention some of these investigations, Tenjo (1993) analyze the returns to education for the whole country and the effect of the higher education expansion between 1976-1989; Arango, Posada and Uribe (2005) analyze the changes in the real wages for full time workers of the formal sector of the economy based on their level of education; and Prada (2005) analyzes the evolution of returns to education for the period 1985-2000 by level of education.

Nonetheless, since the beginning of the XXI century it is possible to find some few studies using alumni survey as an instrument to interpret the various relationships between higher education and work. Several from those analyses have been based on the national graduate survey carried out by the Observatorio Laboral para la Educación in 2005. For instance, Forero and Ramírez (2008) based on the mentioned graduate survey and using the human capital and signaling theories, seek the determinants of graduates' income for the period 2001-2004.

In Medellin, the Universidad EAFIT has also carried out several surveys to know more about their graduates and the relation with the labor market, e.g. Londoño (2001) and Jaramillo et al (2002) analyze the perception of quality that graduates have about their institution; furthermore, they include certain variables to know more about work conditions, and the match between competencies acquired during their studies and their real use in their jobs.

Other investigations have concentrated in further aspects of the relationship between higher education and employment, such as: Viáfara (2006) that studies the effects of race and gender on educational achievements, occupational status and first employment in Cali; Martínez (2003) analyzes the unemployment and employment duration of Colombians using disaggregate data for the ten major cities; Viáfara and Uribe (2009) analyze the duration of unemployment in Colombia in 2006 as indicator of the effectiveness of search methods.

Studies that focus on the relationship between non-university higher education and work are less frequent than those from traditional higher education. It can be mentioned the work of Hollenbeck (1993) who emphasized his analysis on the labor market outcomes; he compared students who have pursued technical education

programs with those who have pursued academic programs and with those individuals who have not pursuit any type of postsecondary education; as well as Grubb (1993) who using the National Longitudinal Study of the Class 1972, analyzed the effects of postsecondary vocational education on wage rates and earnings.

Concerning Colombian non-university higher education, there is little research in this field and it is even less the research that focuses on its relationship with the world of work. One of the first studies on the topic is the one carried out by the department of sociology of the National University during the time period 1988-1990. This study evaluated the external efficiency of technological higher education in Colombia; in addition, it presented the principal characteristics of the supply of technological higher education and the demand of their graduates in the labor market (Gómez, 1995). Other studies are those of Mora and Ceballos (2008) and CCV (2008). The former study deals with the pertinence of technical and technological higher education in the labor market of Cali for the period 1994-2005, by analyzing the development of the relationship between unemployment and job vacancies using the information obtained from the Servicio de Información para el Empleo-SIE (Information Service for the Employment). While the latter study determines the return rate to education in Cartagena by level of education i.e., primary, secondary or tertiary education. Due to the lack of relevant information on the non-university sector, the analysis of returns is not possible; however the authors strive, by using statistics from different sources, i.e., SENA, MEN and OLE, to provide a description of the average wages of non-university graduates. .

To sum up, the current literature in Colombia deal mainly with the university sector of higher education, rather than with the non-university sector. Regarding research addressing the relationship between higher education and work, it is normally addressing the situation in the country's three principal metropolitan areas, namely Bogotá, Medellin and Cali. For other cities, information about the relationship between higher education graduates' and work is limited, and research focusing on graduates from the non-university sector is even scarcer. In general, the majority of studies on the subject just describe different aspects of the cities'/departments' labor market, such as: composition of the labor force by sector, by degree, by gender, etc.

1.3. Structure of the Dissertation

The structure of this document is as follows. Chapters 2 and 3 deal with the analysis of the development of the non-university sector as well as the current state of this subsystem internationally and in Colombia. Chapter 4 provides an understanding of the relationship between higher education and work, in Colombia and internationally. In chapter 5 the methodological approach is expounded. Meanwhile, the chapters 6-8 present the main research findings, i.e., socioeconomic and educational characterization of graduates, work characteristics and the relationship between the higher education and work, and determinants of graduates early career success. Finally, chapter 9 presents the conclusions and recommendations.

2. Non-University Higher Education: Diversification and Diversity in Higher Education Systems

Since the mid 1950s higher education systems around the world have experienced not only quantitative but also qualitative transformations, which have contributed to redefine its role in the society. In fact, between 1970 and 2006 the number of students enrolled in the higher education system increased considerably, going from 29 million to over 141 million (Freeman, 2009). This great development was accompanied by the expansion in the routes of access, changes in the curriculum, structure, mode and length of studies; for instance, short cycle study programs and non-university institutions (hereafter NUIs) were created, along with alternative modes of study, like distance education, evening and part time programs were developed. These changes were and are some of the results of the diversification of higher education. To address the continuous and changing societal needs higher education systems diversify and as a consequence the overall diversity of the higher education system is widened.

This chapter aims to expound the development of the non-university sector (hereafter NUS) and to show some international experiences on the subject. The first part describes briefly the scenario in which this sector appeared, particularly in developed countries and developing countries, with special emphasis in Latin America; while, the second and last part shows the current state and future perspectives of non university higher education internationally.

2.1. Non-University Higher Education: Historical Background

Before starting with the description of the emergence of the NUS and to understand the various changes higher education systems have undergone in their development process, it is important to define the terms diversification, diversity and to know the rationales that supported this process.

Huisman (1995; p.18) using the biological and ecological theories define the term *diversity*, in the higher education context, as the variety of types of entities (higher education institutions, study programs, disciplinary cultures) within a certain

system (the higher education system, a sector of the system, a university) or to a combination of the variety of types and the dispersion of entities across the types; while the term *diversification* refers to a process in which a system of types of entities changes into a system that is more diverse.

Besides, the term *differentiation* signifies a process in which different structures or functions develop from a formerly integrated whole, for instance an institution in which the research and teaching were intertwined, but through time became institutionalized within different structures (schools or departments).

Having these concepts in mind, the next paragraphs present some of the rationales that may explain the diversification of higher education. Varghese and Püttmann in their publication: "Trends in diversification of post-secondary education" identified five reasons that might contribute in the understanding of diversification, they are namely (2011, pp. 13-16):

1. ***Diversification due to academic drift – from 'knowledge as knowing' to knowledge as operational:*** the emergence of the knowledge economy places great value and emphasis on knowledge production as it is widely believed that the future growth potential of the economy depends on its capacity to produce knowledge. However, at the same time, the market also demands to know how to use the knowledge in production. In this framework, higher education institutions have to adapt and widen their scope to be able to supply the market with students that know things and know how to do things.
2. ***Diversification due to democratization:*** nowadays, tertiary education is no longer perceived as a privilege for a few, but as right for all; therefore, efforts to bring a larger number of students from different backgrounds into the higher education system has resulted in a more diversified clientele. In this context, higher education has to diversify in order to fulfill the needs and interest from different types of students.
3. ***Diversification due to globalization, the knowledge economy, and changing demand for skills:*** to be internationally competitive higher education is called to educate a highly qualified and trained pool of professionals with practical and applicable knowledge to respond the increasing and newly demands of the

labor market, particularly in the service sector, which is one of the growing sectors in the knowledge economies.

4. ***Diversification due to the expansion of secondary education:*** the expansion of education in previous levels, primary and secondary levels, has increased the social demand for higher education, and therefore has led to the diversification of the tertiary system of education.
5. ***Diversification due to growing specialization:*** the growing specialization of the academic field may contribute to institutional diversification as it is assumed that at a diverse system with differing institutions may respond faster to the requirements of the society and the economy.

As observed, the rationales behind the emergence of the NUS are various. Furthermore, the occurrence of these events is not mutually exclusive, in many cases these conditions occur simultaneously, marking the path to reforms of higher education systems not only to respond the immediate needs but also to set the guidelines toward specific goals.

As a matter of fact, most industrialized countries experienced societal and economical transformations that called for changes and reforms in many areas, including the higher education after World War II. For instance, in Europe, during the 1950s and the 1960s, most higher education systems underwent a period of expansion; in France, the number of enrollments in higher education grew from 185,400 in 1950 to 527,000 in 1965, similarly occurred in Germany and England, in the former country the enrollments climbed from 146,900 to 367,400 and in the latter country from 294,700 to 433,400, during the same time period.

Likewise, in the United States and Japan the enrollments skyrocketed. In the fifteen-year period (1950-1965), the number of enrollments rose from 2,297,000 to 5,570,300 in the United States and in Japan, it went up from 240,000 to 1,093,000 (Cerych, Furth & Papadopoulus 1974). Such quantitative expansion along with social movements of the time, were to a great extent considered the driving forces for the higher education reforms taking place in the post-war period.

According to Cerych and Sabatier (1992) during the late 1960s and the early 1970s, higher education reforms in most western countries, aimed at three principal issues:

1) ***Widening access to higher education:*** most of the higher education reforms at this moment were focused on the access expansion to higher education to unprivileged or underrepresented population groups, specially to: a) adults and mature students, usually employed or with work experience; b) individuals with insufficient formal education who do not fulfill traditional admission requirements; c) geographically disadvantaged populations, especially in economically backward regions or those that lacked of higher education opportunities; d) students from disadvantaged social strata.
2) ***Increasing regional relevance of higher education:*** reforms in this regard were in many cases driven by four reasons: a) to combat the widespread criticism of traditional universities as academic ivory towers detached from the real problems of society; b) to justify the belief that education is a potentially powerful factor in economic growth; c) to achieve the goal of interregional equalization; d) to moderate any regional brain drain.
3) ***Developing more vocationally oriented and short cycle higher education:*** two motivations laid the development of more vocationally oriented and short cycle higher education: a) a growing conviction that Western Europe were in great need of qualified workforce for which secondary school diplomas were not sufficient and traditional university degrees either unnecessary or unsuitable because of their over theoretical nature: b) the assumption that existing universities were unable to cope with continuously growing student numbers and that the pressure on them had somehow to be diminished.

Within this framework, most countries drew their own objectives and strategies to cope with the changes that their higher education systems were experiencing at that moment.

Concerning the latter point, developing more vocationally oriented and short cycle higher education, countries used various approaches to pursuit this goal, for instance, certain countries opted to develop short and long cycle higher education courses within a broader, but single type of institution; while other countries responded by developing an alternative sector –NUS, that is short-cycle higher education institutions (hereafter HEIs) with distinct mission and profile than those

from universities, which would specialize in short-lasting and vocationally oriented programs (Furth, 1992).

It is to point out that the emerging NUS occupied an important role in the higher education policies of many European countries in the subsequent decades, which led to the consolidation of the newly created programs and institutions.

The development of the NUS gained relevance in many other countries, especially in developing countries, during the 1980s. Moreover, since the beginning of the new century it has played an important role in the educational policies towards the diversification and enhancement of higher education; short cycle courses and institutions have been promoted and supported to achieve certain economic and social objectives in many developing countries.

Briefly speaking, the enhancement of higher education diversity by diversification is not exclusive to certain countries; it is an issue of general interest no matter the country or the system. Furthermore, by increasing the diversity of systems, their scope and fields of action broaden as well.

The next section will deal with the development of the short cycle higher education from the late 1960s until 2010. The first part will go back to its start, when the higher education reforms in most industrialized countries meant the promotion of alternative options of higher education, i.e., short and vocationally oriented study programs. Besides, it will attempt to show concisely, the different circumstances in which short cycle higher education developed in industrialized countries, i.e., Western European countries, the United States and Japan. Subsequently, the process of development of this type of higher education in Latin American will be briefly described.

2.1.1. Higher Education Reform: Emergence and Development of the Non-University Sector

During the late 1960s, the concept non-university higher education appeared in the European higher education domain. It implied the emergence of a new sector of higher education, the NUS, and in most cases the development of other types of HEIs, i.e., NUIs.

Some of the aspects taken into consideration for the development of the NUS were the following: to provide access opportunities to groups hitherto underrepresented due to age, sex, social origin, educational or geographical background; to ensure greater responsiveness to regional and community needs; to develop a type of higher education better suited to the wider range of aptitudes and interests of students, and to do all these, whenever possible at a lower cost (Furth, 1992). Indeed, alternative types of HEIs were developed in most western European countries in the late sixties and early seventies, some examples are the Instituts Universitaires de Technologie, in France; the Polytechnics, in the United Kingdom; and the Fachhochshulen in Germany. These institutions, NUIs, differed from universities in various respects, e.g., little involvement in research, a vocational emphasis of programs, and in most cases shorter study programs (OECD, 1972 in Teichler 2007b).

In general, during the 1960s most European countries concentrated their efforts to enhance the diversity of provision at postsecondary level, through the establishment of a new higher education sector and new types of higher education institutions; while, the community colleges consolidated as post-secondary institutions, alternative to the universities, in the United States.

Community colleges are the outgrowths of the junior colleges that began in the turn of the twentieth century. The junior colleges were conceived as "institutions that would relieve universities of educating those school graduates that were considered too immature or too uncommitted to follow a scholarly or professionally oriented line of study" (Diner 1986, cited in Cohen 1992) and to prepare students that did not required university studies. In 1922, there were 207 two-year colleges in 37 of the 48 states and by 1930 more than 400 institutions were operating all across the United States. Their major growth was during the 1940s coinciding with the expansion of postsecondary education driven by the increasing high school graduation rates, 55 percent of the 18 year-old age group; that meant not only a higher number of potential applicants, but also different preferences concerning higher education programs.

At that moment, the community colleges gained their place in the American educational system. They succeed on educative tasks that universities could not or would not undertake, like preparing people for middle-level or semi-technical

occupations. Furthermore, during the 1960s and the 1970s community colleges consolidated as NUIs within the higher education system, supported to a great extent on public funds that promoted the college emphasis on career preparation (Cohen, 1992).

Besides, after World War II certain higher education policies in the United States aimed at enhancing the access to the postsecondary system of education. That is the case of the G.I. Bill (1944) and the Higher Education Act of 1965; the former policy was particularly directed to returning veterans, while the latter was extended to the general population. The main objective of these two policies was to provide financial assistance for students to attend two and four- year colleges (Eaton, 1997). In fact, between 1960 and 1970, the number of community junior colleges raised from 678 to 1,038; and the number of enrolled students, for the period 1960-1969, grew from 660,216 to 2,186,272 (Martorana, 1973).

Also in Japan, higher education went through a period of quantitative and qualitative transformations after the Second World War. The overall education reform, in the late 1940s, meant the reorganization of the higher education system, which included among others: the introduction of an almost uniform four-year course at the undergraduate level; upgrading of training colleges to university status; equal access to higher education for both, men and women; and the amalgamation of former universities, colleges, and higher schools (Narita 1978; p. 11).

Despite the efforts for unification of the higher education system, the two or three- year junior colleges consolidated within the Japanese higher education system. The two or three- year junior colleges, established in the early fifties as temporary measures, were recognized as permanent part of the higher education system in the 1960s, after the policy for diversification.

These changes were driven by the growing demand for higher education seats and the higher requirements of the industry to improve the quality of education, particularly in science and technological areas as well as the need of the industry for people trained for mid-level technical positions. In this context, the development of the NUS was fortified by the expansion of the existing junior colleges and the establishment of colleges of technology and training colleges (Narita, 1978; Kobayashi, 1992; Kusahara, 1992).

As it can be seen, the two decades after the World War II meant several transformations in the higher education systems of most industrialized countries. Kerr (1986) affirms "The late 1960s and early 1970s were the greatest period of attempted reform of institutions of higher education in the western world in eight hundred years".

The emergence of the NUS in some countries and its consolidation in others, took place in the framework of what was called diversification of higher education. Various are the arguments underlying the diversification of European higher education systems in the post war period, Gellert (1991, p.13) affirms that these initiatives for diversification were based on two political considerations: the manpower approach and the social demand approach.

The *manpower approach* was based on the conviction of employers and policy makers that the national output of highly qualified manpower had to grow if the respective country was to compete successfully on the world market in times of rapidly changing technologies. This political argument is based on economical reasons, particularly oriented to the improvement of countries competitiveness and to support their economic growth. The *social demand approach* was founded on the idea that post-compulsory education was a general civil right; then, the educational system with its high selectivity, was only serving the small societal elites.

Wasser (1999) states that the diversification process higher education systems underwent in the mid 1960s was due to three factors: economic, social and financial. Concerning the economic factor, the NUS was needed to provide graduates skills to work at middle level positions, especially in the fields of commerce and engineering, in order to fulfill the requirements of the labor market. From the social point of view, these institutions would develop short or practice oriented courses to provide higher education opportunities for a majority of secondary school graduates. And the financial factor refers to the lower costs that the NUS and its programs would represent to the state budget.

Other authors coincide that the sharp expansion of the population, consequence of the high fertility and birth rates during the post war period (particularly, between 1946 and 1964), together with political changes arising out of the successful war

against fascism created a growing demand to increase the number of graduates with more than secondary school education in most industrialized economies (Trow, 2005).

It is also worth mentioning that the OECD (1973) reaffirmed the call for change in higher education systems: "The 1970s will represent for most European countries a critical transition period between elitist and mass higher education. Should this be the case, it is clear that policies for higher education based on "more of the same" strategies will be insufficient and ineffective for the future: traditional universities will have to undergo major changes, and equally important, new types of higher education will have to be developed to deal with increasing numbers, a more diversified student body and the rapidly changing manpower needs of highly industrialized societies" (p.13).

For the OECD, the new sector was conceived to dinamize and fulfill the changing requirements of the society, i.e., to respond to the increasing pressure of individual demand; to contribute to the equalization of educational opportunities; to respond to growing needs for a wide and diversified range of qualified manpower; and to generate or facilitate innovation in the post-secondary system by assuming a number of functions which traditional universities are often reluctant to accept.

Besides, certain changes in higher education policy drew the path and supported the process of diversification taking place in the late 1960s and the early 1970s. Four stages can be identified (Teichler 2007, p.24):

1) In the early years after the World War II, the reconstruction of the educational system did not merely focus on qualitative consolidation and quantitative growth. Rather, the vertical structure of secondary education was either substituted by a horizontal structure, whereby various routes led to higher education […].
2) The spread view that a considerable expansion of education was indispensable for stimulating economic growth, in the latter half of the 1950s and the early 1960s. During this period, the OECD expanded its activities in educational fields, and various planning and counseling bodies were established in different countries.
3) The common vision in favor of societal reform in the mid-sixties. A reduction of inequality of opportunity seemed to be indispensable in order

to stimulate the talents required and the growing need for qualified labor, which should likely either reduce social inequalities or to legitimize the remaining inequity as just in terms of a meritocratic or achievement society.

4) The growing variety of students, in terms of educational background, motives as well as job prospects, in the late 1960s and the early 1970s.

Concerning the structure of the emerging sector, in the beginning, was compounded of vocational secondary institutions that were upgraded to higher education institutions; though, as the time passed every country developed its own and particular system of NUIs.

Despite of the particularities of each system it is possible to identify three types or models (cf. Furth 1973, Greinert 2004, OECD 1973).

- *The multipurpose model:* NUIs have a close link to university education, facilitating transfer to university programs. They offer both, academic and vocational approaches and are mainly geared to meet local and regional needs. These types of institutions are widely spread in the United States.
- *The specialized model:* NUIs have very little connection with universities. They provide mostly terminal programs and specialized in certain vocationally oriented fields. It is common to find this model in continental Europe.
- *The binary model:* the major representative is the United Kingdom with the Polytechnics. They were completely separate from the university sector, highly diversified and offered practically all levels of study.

In spite of the different models that can be distinguished, certain common features characterized the NUS, e.g., a compulsory school completion certificate is the basic entrance requirement, short and vocationally oriented study programs, lower fees, emphasis on instruction rather than on research, program relevance is a high priority consideration, decision making is more decentralized with stronger student and community input and practitioner non-degree professionals are engaged as teachers on part time assignment (Kintzer, 1984).

In this framework, the non-university higher education emerged and developed in the different industrialized countries. Since its appearance, this sector has also been recognized and named as non-university/short-cycle higher education (OECD 1973), alternative to university (OECD 1991), vocational and technical higher education, professional higher education, the college sector, etc.; however, a consensus never emerged about the most suitable term (Teichler, 2002).

The same purposes of short-cycle higher education identified in the 1973 OECD publication, which were previously mentioned, and the characteristics identifying the NUS appear to be valid in the development of the NUS in less developed countries, particularly in Latin American countries.

2.1.2. Emergence and Development of the Non-University Sector in Latin America

In the late 1940s, Latin American higher education systems experience an expansion in both sectors, public and private. According to Union de Universidades de America Latina y el Caribe-UDUAL (Union of Universities from Latin America and the Caribbean), nearly 60% of the 174 public universities in existence by 1970 were created after 1940, nearly 50% after 1950 and 30% after 1960. Private university proliferation was even sharper; the comparable figures for the 113 private universities are an impressive 90%, 80% and more than the 50%. Regarding enrollments, the situation was similar; only about 167 students per 100 000 inhabitants were enrolled at tertiary level in the 1950s. Despite the relative low number, this figure represents a takeoff. As late 1890, the figure had been 33, and by 1940 still only 85; thus the figures nearly doubled in the 1940s alone. By 1960, it reached 250, and by 1970, 469 (Levy, 1986).In spite of the raise in the number of students and HEIs, between the 1940s and 1960s, higher education systems changed very little in Latin America.

The pressure for expansion of the tertiary sector, its inability to respond to the increasing demand of students, along with the political and social instability prevailing in the mid 1960s, ended with the collapse of public provision of higher education and marked the emergence and development of private HEIs in many countries.

Moreover, the emergence of a new sector of private institutions (horizontal diversification), which at the beginning were resembling those universities from the

public sector represents the first stage of diversification that can be identify in Latin America. During the second and third quarter of the twentieth century, a bunch of universities either catholic or secular were created, for instance: in Argentina, Universidad del Norte Santo Tomás de Aquino (1958), Universidad Argentina de la Empresa (1968); in Chile, Universidad Católica de Valparaiso (1928), Universidad Austral de Chile (1954), and in Colombia, Universidad Libre (1930).

As for the second stage of diversification, it is characterized for the emergence of new types of HEIs offering study programs and different degree levels from those offered at the traditional universities (vertical diversification). Many of these new types of NUIs were created in the early 1970s. However, the number of NUIs grew indiscriminately during the 1980s and the 1990s in most countries (see Garcia 1996, it presents a list with the date of creation of HEIs in Latin America, since the colonial period until 1995).

Some of the rationales influencing these changes and expansion of Latin American higher education system are presented in Schwartzmann (1993; p.11):

- *The students movements*, which hoped to change not only the universities, but the whole society. This situation generated frequent confrontations between the government and students, and delegitimized the academic tradition universities had, and making difficult for the government to use policies other than those of repression and confrontation. In many cases universities were closured for extended period of time.
- *Scholars' criticisms about the obsolete structure of universities,* they demanded structural changes and research funds. In some countries these scholars were absorbed by other type of institutions or they even founded their own HEIs.
- *Larger numbers of women, elder and poorer persons* who started to flood to universities; these groups were either absorbed by the traditional universities or incorporated in new private institutions.
- *The emergence of a university lecturer group*, which differentiate from the traditional professor and the researcher. The lecturers organized very quickly in strong professional unions, which put forward an agenda of

> employment protection, egalitarian treatment, and public financing that blocked most attempts at evaluation, differentiation and administrative rationalization that emerged from time to time. At the same time, large administrative bureaucracies were developed at universities, which created their own unions and political agendas.

Other aspects that contributed to the expansion of higher education systems, the consolidation of the private sector and the emergence of new types of institutions in Latin America were: a) expansion of the secondary education and the emergence of alternative routes besides the classic curriculum; b) the increasing needs of qualified manpower, it is important to have in mind that the expansion of higher education was necessary to achieved the socioeconomic goals drawn by the economic models adopted in the previous decades (cf. Schwartzmann, 1991; Landinelli 2008, Baena, 1999, Rama 2006). The circumstances mentioned above along with the financial restraints, very frequent on that time, supported the expansion of the private higher education sector and the development of new types of NUIs in Latin America.

In the twenty year period, 1960-1980, the number of students at tertiary level rose from 540 thousand to 4, 7 million and the higher education enrollment ratio grew from 3% to 13,5%. Likewise, the number of HEIs grew indiscriminately from 164 institutions in 1964, mainly universities, to slightly more than 450 institutions, in 1985 (Garcia, 2005).

The 1980s represented a period of change in many Latin American countries. Differentiation and diversification of higher education were mainly driven by the expansion of the private sector and the NUS. For many authors (Schwartzmann 2001; Arocena 2004, Rama 2006) this period represented the start of a new wave of reform which is still taking place in many countries.

In Chile, for instance, the reform in the early 1980s changed completely the structure of the system. Up to that moment, Chile counted with two public and six private universities; the reform introduced a vertically differentiated higher education system, composed of three levels (universities, professional institutes and technical centers) ordered by the type of diploma and the length of studies. Between 1980 and 1990, 40 private universities, 78 professional institutes and 161 technical centers were

created, and the two national universities were divided into 16 smaller ones (Brunner, Balán, Courard, Cox, Durham, García et al. 1995).

Colombian higher education system experienced a great expansion during the 1960s and 1970, but just only in 1980 the government made its first attempt to organize the higher education provision.

The Decree 80/1980 was the foremost law elaborated in Colombia to rule, control, organize and mark the path for the further development of the higher education system. Certain reforms introduced by this law are the establishment of higher education modalities and the development of a new typology of HEIs, which were divided into three kinds of institutions: Instituciones Intermedias Profesionales (later on renamed Instituciones Técnicas Profesionales, ITPs), Instituciones Tecnológicas (IT) and Universidades (Unis).

In the following decade, the 1990s, the process of differentiation and diversification of higher education continued its course in Latin America. In fact, the topic was common in the reports of supranational organizations like the UNESCO and the World Bank. In this regard, the publication Higher Education the Lessons of Experience by the World Bank in 1994, addresses four vital higher educational strategies to face the challenges originated in the higher education systems all over the world since the 1970s. Their strategies were mainly concentrated on the search of possible paths to deal with the increasing financial constraints and the pressures for enrollments expansion that were affecting both, developed and developing countries, but being more acute on the latter countries. The World Bank strategies were aimed to four key directions, which should show the path to reform for developing countries:

- Encouraging greater differentiation of institutions, including the development of private institutions,
- Providing incentives for public institutions to diversify sources of funding,
- Redefining the role of government in higher education,
- Introducing policies explicitly designed to give priority and equity objectives.

With regards to the strategy promoting the differentiation of HEIs, the World Bank affirmed that it could help developing countries meet the growing demand for

higher education and make it more responsive to changing labor market needs. Besides, the creation and developing of NUIs and programs is more attractive, for both students and providers. On one hand, they are more appealing for students as they have relative lower fees, shorter and more labor market oriented programs than those offer by traditional universities; and on the other hand, for public or private providers, NUIs and non-university programs (hereafter NUPs) are of lower cost and easier to set up.

Other example is the UNESCO Policy Paper for Change and Development in Higher Education 1995; it stated that relevance, quality and internationalization will be the center of policy debate at international, regional, national and institutional level. Particularly on the subject relevance, the document included topics like democratization of access and growing opportunities for participation in higher education during various stages of life, links to the world of work and the responsibility of higher education towards the education system as a whole. Furthermore, in this framework, the diversification and flexibilization of higher education systems was considered an important strategy to respond the country's economical and societal requirements.

Both policy papers aimed to the restructuring of higher education systems in the region. Despite their different approaches they coincide in the challenging issues higher education would face in the near future, and presented some similar actions to cope with those changes; for example, a common recommendation was the diversification of the higher education system, by means of institutional and/or programs differentiation, or by the creation of a private sector.

In this framework, several higher education systems in the region experienced changes in their structure, and in their relations with their environment, towards the improving of relevance and pertinence of higher education. In some countries, like Mexico, a new type of HEI was created, i.e., Technological Universities; in some others, like, Brazil, Colombia, Chile were developed incentives to create NUIs and/or were launched credit lines for students to study NUPs.

In short, diversification of higher education systems has occupied an important part on the higher education agenda in many Latin American countries in the last

decades of the twentieth century. Furthermore, the motives behind this process have some similarities to those that promoted the diversification in industrialized countries.

2.2. Non-University Higher Education in the World: Current Realities and Future Challenges

By 1990 the NUS had acquired recognition and legitimacy within national systems of higher education in industrialized countries. In fact, the OECD Report, Alternative to Universities, which analyzed the development of this sector in OECD countries since 1970s, stated: "in several respects the non-university sector seems to be better equipped than traditional universities to cope with the present situation. […] it is surviving fairly well, and in some respects benefiting from the dilemmas facing higher education overall"(1991, p.15).

In general terms, the last decade of the past century meant a period of great changes for the NUS in most countries around the world; changes that in many cases were driven by the economic slowdown and the rise in student numbers in higher education. This situation along with the singular needs and problems of each country has contributed to the reshaping of higher education in a great number of countries in the last years.

The following paragraphs attempt to present a picture of the development of the non-university higher education in certain countries from different world regions in the last two decades.

2.2.1. Asia and Oceania

Between the early 1980s and 1990, 114 vocational universities were established in China. Moreover, the number of enrolments in this type of institutions increased from 27,331 to 72,449 in the same time period. Within the Chinese higher education system, vocational universities are those HEIs that offer short-cycle programs of vocational and technical nature closely linked to local industry and business needs. These programs lead to a sub-baccalaureate degree that could not be awarded at a different type of institution (Topical Research Group 1991 cited in Ding 2002).

In the early 1990s, the Chinese NUS underwent a period of changes. In 1991 the State Council formulated the "Decision on Energetically Developing the Vocational and Technical Education" identifying the tasks and objectives for the further development of vocational education in the light of economic and social developments in China (Chinese Ministry of Education, 2009). In 1998, the ministry of education issued a new policy to expand vocational higher education beyond the vocational universities. Then, higher education vocational programs were allowed at adult institutions and junior colleges, and also four year universities were permitted to establish vocational institutions within their institutions; besides, they also encouraged this type of programs in the private institutions (Ding 2002).

In the last decade, Chinese higher education system has been characterized for substantial growth in the number of students in short-cycle programs. In 1998, both the number and proportion of newly enrolled students in short cycle programs made up the biggest part (64,2%)of the total; although, in 2002, this proportion decreased to 60,5% (Huang, 2005).

In Japan, nowadays, the NUS consists of junior colleges and colleges of technology. The Japanese Ministry of Education, Culture, Sports, Science and Technology-MEXT (2011) states that the purpose of Junior Colleges (Tanki-daigaku) is conducting teaching and research in specialized disciplines and developing abilities necessary for vocational or practical life. The study duration is two or three year and graduates are awarded an associate degree. Those who have completed the junior college may go to university and their credits acquired at junior college may be counted as part of the credits leading to a bachelor's degree.

Colleges of Technology (Koto-senmon-gakko) conduct teaching in specialized subjects and aim to develop in students such abilities as required for vocational life. Unlike universities and junior colleges, they admit graduates of lower secondary schools. The term of study is five years on average (from which the two final years are considered a part of higher education) and graduates are awarded the title of associate.

Apart from the college of technology and the junior college, the special training college is considered to be part of the higher education system in Japan. They were established in 1976 as a vocational postsecondary institution. These institutions were created to respond the increased diversification of jobs in the Japanese

employment market and the increase number of Japanese women interested in careers outside home (Harada, 1993). These colleges one-year to three-year predominantly full time courses for specific vocational areas, mostly required 12 years of prior education (Teichler, 2007).

Between 2000 and 2005, there were some changes in the Japanese NUS, especially in junior colleges. During this period, the number of enrolled students declined, it went from 327,680 to 219,355 (49,4%), and it was accompanied with a reduction in the number of institutions, they went from 572 to 488 (-17,2%) (MEXT, 2009). A possible explanation for the reduction in the junior college sector is the upgrade of a substantial number of junior colleges into universities (Teichler, 2007). Although, according to Sato (2010, p.2) when analyzing the arduous situation Junior Colleges are experiencing, he states: "the real cause for their difficulties is that they continue the education style modeled on four-year university education, and they have failed to establish their own distinctive identity".

In contrast, the college of technology sector showed relatively less changes; in the five year period, the number of institutions remain steady, 63, and the absolute number of students increased moderately, from 56,714 in 2000 to 59,160 in 2005 (4,3%) (MEXT, 2009). Since its creation in the 1960s, it has represented a small ad stable sector within the non-university subsystem.

For the academic year 2009 there were 406 Junior Colleges, 64 Colleges of Technology and 2,927 Specialized Training Colleges offering postsecondary courses. In terms of students, during the same year, the number of enrollments in junior Colleges was approximately 160,000, in Colleges of Technology 59,000 and in Postsecondary courses of Specialized training Colleges there were 625,000 students enrolled (Yoshimoto, 2010).

In general terms, the share of Japanese students enrolled in the NUS was 24%, in 2009. In short, in the last couple of years the development trends has slightly changed in this sector; the number of junior colleges as well as the enrollments in these institutions have declined, while the situation in the colleges of technology has remained steady. As whole, the NUS plays a modest role in today's Japanese higher education.

In Australia, the higher education system has different kinds of providers apart from universities. Some of them specialize in particular disciplines – like the National Institute of Dramatic Art, NIDA, or the Melbourne College of Divinity –, and others for instance, focus on supporting a specific community – like the Bachelor Institute of Indigenous Tertiary Education (Department of Education Employment and Workplace Relations-DEEWR, 2008).

Concerning short cycle programs, they are principally offered in NUIs, however, since the late 1990s and early 2000 emerged a new type of institutions known as "Dual Sector Universities". Dual sector universities are universities that have a substantial student load in both vocational education and higher education; they undertake research and award research doctorates (Moddie, 2009).

2.2.2. Europe

In most countries, the NUS has been undergoing a process of changes since the early 1990s. In some of them, like Germany and Norway the differences between the US and the NUS have become less pronounced than in previous decades; simultaneously, other countries like Austria and Switzerland have established the NUS. The subsequent paragraphs will present the development of certain NUS in Europe since the 1990s until today.

In 1992, the binary system of United Kingdom was replaced with a unitary system by means of the Further and Higher Education Act, 1992. In this framework polytechnics were dismantled and changed their designation of polytechnics into universities. However, today, it is possible to find three types of institutions, apart from universities, which provide higher education: higher education colleges, further education colleges and other education establishments (Brennan and Williams 2008). These institutions offer wide range of study programs: short-cycle higher education vocational oriented programs, bachelor programs, postgraduate programs, and also provide further education.

Since the early 1990s, Germany has also experienced several changes that have reduced the differences between universities and Fachhochschulen, especially in issues related to length of studies, and research activity; however, universities are in charge of training the junior academic profession. They provide doctoral programs or supervision of doctoral work, award doctoral degrees, offer, post-doctoral positions and undertake research projects in which staff on a postdoctoral level qualify for a professorship (Klumpp & Teichler 2008; pp.103).

In Norway, the district colleges established in the late 1960s went through a period of transformation in the second half of the 1980s. These colleges were created mainly to achieve two primary objectives: to decentralize the higher education system, and to provide short-term vocationally oriented programs; besides, they should also relieve universities of some of the teaching burden for some introductory courses, to provide some adult and continuing education, encourage research , particularly that of regional relevance, so forth (Cerych & Sabatier, 1986).

Since the late 1980s the NUS has been in a process of academic drift, standardization and rationalization that is likely to continue in the coming years as stated by Kyvik (2008). Influenced by these trends, the NUS in the last decade has experienced many change in these directions, such as:

- *academic drift*: introduction of Master's and PhD. degrees in some colleges, which under fulfillment of certain requirement give them the possibility to upgrade to university status; research is now by law a task of NUIs;
- *standardization*: standardization of steering and organizational issues, standardization of structure and content of teaching programs, but also a standardization of working condition and career structure among academic staff;
- *regionalization*: merging of former district colleges into regional colleges, as a mean to be more efficient (by obtaining economies of scale), and to contribute in a greater extent to the development of the local economy (pp. 169-171).

In Austria, non-university higher education is relatively new; this sector was first introduced in 1993, with the Act that established a Fachhochschule sector. With

the new sector the Government intended, in contrast to those courses offered by universities, to provide courses with strong practical orientation, in order to educate students for specific vocations. Courses at Fachhochschulen were defined as higher education courses that serve to educate on a scientific basis for vocations. Despite research was not considered one of their principal aims at the time of their creation, academic staff is motivated to work in applied research in order to guarantee that courses would be in compliance with their objectives; however, more recently, research activity has widespread and it has been more accepted; albeit, they concentrate on applied research, while pure research is done by universities (Hackl, 2008).

In the Netherlands, the NUS went through a period of expansion during the 1980s, mainly supported by the reforms introduced in 1983 and 1986, which contemplated its restructuring. Today, it is possible to find NUIs (Hogescholen) that are bigger, in terms of student numbers, than the largest university. There are specially three elements that characterized these two sectors: differences in entrance qualification, the exclusive basic research function of the universities (including the right to award Ph.D. degrees), and variations in the awarded degree. However, there are also similarities: duration in study programs, and professionally oriented programs are offered in both sectors (Huismann, 2008).

In other countries, like Spain, the NUS did not develop by means of the creation of NUIs, instead short-cycle programs were catered by existing universities. However, in the last years the Spanish higher education has undergone some reforms that have had effects on the NUS. Since 2006, there are two forms of non-university higher education in Spain: one refers to studies that aim the qualification of Diplomados, which are offered by universities; and the other refers to training studies to pursuit the qualification of Técnico Superior, which are offered outside universities (Bricall & Parellada, 2008).

Table 1 and Table 2, shows the number of HEIs and the number of students enrolled by type of institution, respectively.

Table 1 Number of higher education institutions by type of HEI

Country	Year	Unis	NUIs
The Netherlands	2005	12	41
Norway	2008	13	26
Portugal*	2004	15	15
Germany	2003	174	163
Austria*	2008	22	20

* Public system of higher education included only
Source: made by the author based on information from the Dutch Ministry of Education, Culture and Science; German Federal Ministry of Education and Research; Austrian Ministry of Education,Science and Culture and Fachhocshulerat; Statistics Norway; and the Portuguese Polytechnical Institutions Coordinating Council

Table 2 Number of students enrolled in higher education by type of HEI

Country	Year	Unis	NUIs
The Netherlands	2005	206,200	357,300
Norway	2008	111,763	102,727
Portugal*	2004	165,770	107,518
Germany	2003	1,467,890	551,941
Austria*	2008	240,324	33,615

* Public system of higher education included only
Source: made by the author based on information from the Dutch Ministry of Education, Culture and Science; German Federal Ministry of Education and Research; Austrian Ministry of Education, Science and Culture and Fachhocshulerat; Statistics Norway; and the Portuguese Polytechnical Institutions Coordinating Council.

It is to remark that in some countries the NUS occupied an important place within the higher education system, indeed, in countries such as, the Netherlands, Norway, at least half of the students enrolled in higher education are registered in NUIs. In other countries, like Austria, the number of students enrolled in NUIs, i.e., Fachhochschulen, is relatively low if compared with those students enrolled at universities.

A common trend in Europe, especially during the last twenty years, has been the blurring of borders between Unis and NUIs. This situation is to some extent due to two contrasting forces, i.e., academic drift and vocational drift, which most higher education systems have undergone in the last decades. The “drift theories” states that different types of institutions, Unis and NUIs, are not necessarily eager to serve a variety of needs. Rather, institutions aim to stabilize themselves and increase their status by getting closer to the most successful ones.

In this framework, it is then possible to observe the *academic drift*, noted among NUIs, and the vocational drift that recently emerged under conditions of tight labor markets and general pressures for a growing practical relevance of higher education (Neave, 1996; Williams, 1985; cited by Teichler, 2004).

The Bologna Process has also influenced the development of the NUS, in the last decade. In the framework of this process, most higher education systems in the region have been restructured and in some of them i.e., Portuguese' systems, the Bologna Process have contributed to make clear the differences and have strengthen their role within the country's higher education system. In other countries, such as Norway, the adoption of common bachelor's and master's degrees in the two sectors of higher education has shown apparent convergent moves towards the unification of its higher education system (Machado,L., Brites, J., Santiago, R, & Taylor, J., 2008).

As it could be observed there are some common factors (Bologna Process), but also particular factors (country's higher education systems) that have influenced differently the development of this sector in most European countries in the last twenty years; thus, future trends of this sector in the region are not clear yet. Opinion among scholars are varied, but many of them coincide and affirm that the time for institutional differentiation, in vogue during the 1960s and the 1970s, is over (Garrrod & MacFarlane 2009; Scott, 2006; Teichler 2007).

Garrrod and MacFarlane state that a modern economy needs graduates who are able to blend academic knowledge with the skills and attributes required by employers; therefore, the idea to separate knowledge and skills into different post secondary institutions has lost momentum and the new social and economic changes calls for a reshaping of higher education.

In this reshaping process, certain countries, particularly Anglophone ones have developed a new type of higher education institution known as dual sector institutions (or "duals"). Duals represent a distinct type of modern university, characterized by significant provision and commitment to further and higher education provision of seamless progression and reverse 'articulation' opportunities for students; one example is the Thames Valley University in the United Kingdom (2007; p.579).

At present, there are no agreements whether or not the changes currently happening will lead to the convergence as far as the types of higher education are

concerned; although, there is common opinion that due to the standardization of programs introduced by the Bologna Process, the inter-institutional differentiation has lost its momentum (Garrrod and MacFarlane 2009; Kyvik, 2006; Scott, 2006; Teichler, 2008).

Other common point, is the increasing role that has gained the market in the restructuring of higher education systems in the region. Actually, the Bologna Process aims at the creation of a European higher education area, in which mobility of students and recognition of degrees is possibly due to the creation of some standards, e.g., European Credit Transfer and Accumulation System (ECTS) and the introduction of Bachelor/Master programs, which allow to compare and validate period of studies and degrees in the European Union.

Mobility of students is only one of the objectives of Bologna Process, the common higher education area looks forward to become more competitive in the international higher education market. However, the market's influence has also been present in the development of the single higher education systems and indeed the various forms of relationship between the national economic sector and higher education institutions is considered as one of the current and future sources of diversity within higher education systems.

In short, there are no agreements about the future developments of the NUS; however, the bologna process along with the market forces have played an important role in the recent transformations the European NUS, and it will certainly influence the reshaping of European higher education systems in the years to come.

2.2.3. Latin America

In 1999, a report on the comparative study of higher education policies in Latin America carried out by researchers from Argentina, Brazil, Chile, Colombia and Mexico affirmed that the differentiation and diversification of Latin American higher education systems would be one of the major topics of debate in the region in the threshold of the XXI century.

Indeed, the NUS has grown in the last ten years across the region. In Brazil, Colombia, and Chile as well as in other countries of the region, it has shown a boost in the number of enrollments. In Chile, for instance, the NUS, which is represented by

the Institutos Profesionales (IPs) and Centros de Formación Técnica (CFTs) has shown an expansion in the number of enrolments. During the period 2000-2005, enrollments at NUIs grew from 133 258 to 182 122 (36%), while enrolments at universities increased from 317,871 to 402,609 (26%), as in table 3.

Table 3 Enrollments in Chilean higher education by types of HEI for the years 1995, 2000 and 2005

Type of HEI	1995	2000	2005
Unis	231,061	317,871	402,609
NUIs(IPs and CFTs)	113,715	133,258	182,122
Total	344,776	451,129	584,731

Source: table made by the author based on Informe sobre la Educación Superior en Chile: 1980-2003

Table 4 shows student enrollments in three Latin American countries by type of institutions in1995, 2000 and 2005. In the three countries the enrollments in NUIs grew considerably, particularly in Brazil. In the ten-year period, 1995-2005, enrolments in this sector grew 214% in Brazil, meanwhile in Chile and Colombia the enrollments grew 60% and 88%, respectively.

Table 4 Enrollments in higher education by subsystems of higher education in certain countries for the years 1995, 2000 and 2005

Country	Subsystems	1995	2000	2005
Brazil	Unis	1,127,932	1,806,989	2,469,778
	NUIs	631,771	887,256	1,983,378
	Total	**1,759,703**	**2,694,245**	**4,453,156**
Chile	Unis	231,061	317,871	402,609
	NUIs	113,715	133,258	182,122
	Total	**344,776**	**451,129**	**584,731**
Colombia	Unis	438,893	640,088	794,627
	NUIs	205,295	293,997	385,287
	Total	**644,188**	**934,085**	**1,179,914**

Source: table made by the author based on Informe sobre la Educación Superior en Chile: 1980-2003, INDICES 2006; Sinopse Estatística do Ensino Superior 1996, 2000 and 2005 (Brazil); Sistema Nacional de Información de la Educación Superior, SNIES (2008) and Instituto Colombiano para el Fomento de la Educación Superior, ICFES (2002)

Likewise, the share of students at NUIs has increased. In Brazil the number of students enrolled at NUIs as a percentage of the total number of students enrolled at higher education is higher than that in the other two countries for the year 2005, 44% in comparison to Chile 31 % and Colombia 33% (see table 5).

Table 5 Percentage of students enrolled at NUIs for the years 1995, 2000 and 2005 in certain Latin American countries

Country	1995 (%)	2000 (%)	2005 (%)
Brazil	36	33	45
Chile	33	30	31
Colombia	32	31	33

Source: Made by the author based on information from Table 4

It is also to point out that only in Brazil the number of students at the NUS as a percentage of the total students enrolled in higher education increased considerably in the ten-year period 1995-2005, it grew from 36% to 45%. In the other two countries the share of students enrolled at non-university higher education have slightly changed, and even in Chile the number decrease.

From these figures, one could interpret that Brazil is the country where the policies of diversification and promotion of the subsystem of NUIs have relatively succeeded if taking into account the figures from the other countries. However, it is important to underscore that the three countries has shown a growing pattern in the number of enrollments in this subsystem, which is one of the common objectives Latin American countries have drawn for their development.

Mexican higher education system also experienced some changes in the 1990s. In 1991, in the framework of the national policies for the modernization of the higher education system, a new type of HEI, *Universidad Tecnológica* (UTs), was created. The UTs would provide shorter and vocational oriented careers, looking forward to supply the Mexican labor market with specialized people in certain technological fields (Secretaria de Educación Pública- SEP, 2008).

The new institutions have three main objectives: 1) to decentralize the higher education service and to provide higher education to marginal communities; 2) to enhance and diversify the higher education supply, providing a type of education related to the local socioeconomic reality; and 3) to increase the linkage between the productive sector and the academia (CGUT, 2006).

The subsystem of UTs has grown in a constant pace, in the last 15 years, i.e., the number of UTs, academic programs and enrollments has considerably increased. The number of UTs grew from 3, in 1991, to 60, in 2005; also, their regional presence was significantly improved, in 2005 there were UTs in 27 states out of 32. Despite the

creation of UTs has been important to achieve, to some extent, the decentralization of higher education provision; there is still much work to consolidate the UTs and its programs within the higher education system, especially in issues related to expansion of this subsystem of higher education and graduates employability (Ramírez, 2008).

According to Rama (2006) higher education systems in the region are on the third wave of reform, which is characterized for developing mechanisms for quality assurance; starting the process of internationalization; developing virtual higher education; promoting and leading the demand of higher education to certain sectors, for instance, indigenous and to specific study programs and HEIs, e.g., vocational programs and NUIs.

In short, the diversification of higher education in Latin America has been an important issue in the education agenda of most countries. Furthermore, certain governments like Chile, Colombia and Mexico have created/strengthened their NUS especially to decentralize the higher education provision, enhance the enrollment at the tertiary level and increase the access of vulnerable segments of the society. The non-university provision has been used and most likely will be used as an instrument to contribute not only to the economical development of their countries, but also to improve the life standards of their citizens in the coming years.

2.2.4. North America

In Canada, there is no national system of higher education; rather provincial systems. Therefore, the NUS' role within the higher education systems differs from place to place. This situation is due to different historical, religious and linguistic traditions of the provinces and territories in Canada (Dennison 2006; p.108).

Until late 1980s, the distinction between the two sectors of higher education, the US and the NUS, was clear in Canada. In the early 1990s this sector experienced some changes in various provinces, in British Columbia, for example, due to the constrains of access to higher education, particularly to baccalaureate degree programs, the government launched an Access for All policy and created university colleges from existing colleges in 1989. The newly established university colleges would provide university degree programs through an upper level university college component (Levin 2003 cited in Fleming & Lee, 2009).

By the end of the 1990s, there were five functioning university colleges in British Columbia, with substantial numbers of students graduating from traditional university fields but also from vocational programs. Furthermore, during this decade university colleges were accepted into the Association of Universities and Colleges of Canada, a membership that signifies university status because of its prerequisite for joining institutions to possess legal authority to grant baccalaureate degrees (Levin, 2003).

Shanahan and Jones (2007) affirm that today, the traditional distinction between university and NUIs have become conflated to the point that hybrid institutions that do not fit neatly into existing classification systems are emerging (p.38 cited in Fleming & Lee, 2009). That is the cases of university colleges, that as stated by Dennison are new institutions in which neither the university nor the community college component is predominant. […] they are dual sector institutions whose diverse ranges of programs collectively contribute to their unique culture (2006; p.111)

In the United States, the American Association of Community Colleges (2009) reports 1,195 colleges out of which 987 (83%) are public institutions; they enroll 11,5 million students, in credit and noncredit granting courses; and 46% of all U.S. undergraduates are in Community Colleges.

Since their inception in the education system, in the early 1950s, Community Colleges have experienced many changes. They have widened their services, far beyond than offering vocational training and general courses; nowadays, they function as gateway of American higher education due to their open access, minimal enrollment requirements and low tuition. They offer occupational certificate programs, general education credits towards the completion of an associate's degree and for transfer to four year colleges, developmental (remedial) education, English language instruction, and non-credit short courses for business training, self improvement, or leisure (Dougherty, 2002). As stated by the Academic Senate for California Community Colleges in 1998: "Community Colleges have become, rather, lifelong learning centers, serving virtually every conceivable post-secondary educational need of their communities, often becoming the community's cultural center as well".

Since the late 1990s, vocational and technical education has been increasingly supported by the government, for instance, the Carl D. Perkins Vocational and Technical Education Act of 1998, whose purpose is "to develop more fully the academic, vocational, and technical skills of secondary students and postsecondary students who elect to enroll in vocational and technical education programs". Through the Perkins Act, the federal government provides grants to states to support academic, vocational, and technical education in high schools, community colleges, and regional technical centers (GAO- United States Government Accountability Office, 2008).

With respect to the vocational and technical higher education offered at community colleges, some changes, principally aimed at being more responsive to the needs of the industry, have been introduced. A national survey on community administrators reported that in the last years community colleges have indicated a mission change; they have particularly emphasized on areas like workforce and economic development and meeting the training needs of employers and students (Amey & Van der Linden, 2002).

Indeed, the GAO (2008) examined how community colleges collaborate to meet the 21st century workforce needs. This study shows that community colleges have developed various approaches and programs for career and technical training to meet the needs of industry sectors, individual employers, and certain types of students and workers. Some of the mechanisms used by community colleges are gathering information about local labor markets trends, which they use to maintain their existing programs, to create new programs, and in some cases to discontinue programs that no longer meet local needs. Likewise, offering contract training to respond quickly to an individual employer needs, by developing either a specific training course or an entire training plan (p. 17-20).

Besides, Amey and Van der Linden reported that college administrators identified several common areas of mission change over the next ten years. Some of the changing issues are the following: increase in the vocational training; use of technology in instruction and administration; increase development of certificate and baccalaureate programs and the introduction of other offerings to meet constituent needs (2002, p.3).

2.3. Synopsis

To summarize, higher education systems all over the world have experienced many transformations since the first half of the last century. However, the two decades following the World War II marked the path for the restructuring of most higher education systems, not only in industrialized but also in developing countries. One of the transformations higher education systems underwent is related to the emergence of the NUS. The apparition of this sector took place in different periods of times and under different circumstances which have influenced their development in each country.

In most industrialized countries the NUS emerged in the mid 1960s. In the last 40 years, this sector has consolidated within the higher education system, as an important sector, specially for attending special segments of the population, and for developing programs relevant to the needs of the labor market, like in the United States. In other countries, European countries, the NUS have undergone many changes, some of them driven by the Bologna process, which have contributed to the blurring of borders between the two sectors, e.g., Norway, Germany.

In Latin American countries, the diversification process has been taking place since the 1980s, when in some countries, for instance Chile and Colombia, the law recognize short cycle programs and the providing institutions as a part of the higher education system. In other countries, like Mexico, diversification took place in the early 1990s. It is also to remark in Latin America that in the process of diversification, the private sector has played an important role in the diversification process and in the consolidation of the NUS; this aspect is one of the most clear differences of the processes developed in the European and American higher education systems, where the diversification was lead by the public sector.

In Japan, the non-university subsystem has always represented a small sector within the Japanese higher education system; similarly is the case of Spain whose higher education system has been associated with university education. However, these two countries have shown different paths in the recent years; while Japan has shrunk its NUS, Spain, has enlarged the non-university provision.

Concerning the future perspective of this sector, it is not clear yet, in some countries, namely, China, U.S., Colombia, certain higher education policies looks

forward to the strengthening and expansion of this sector. In other countries, mainly Anglophone ones, in the last years have developed the dual sector, or comprehensive higher education institutions that bridge the division between technical/vocational and more academic post-secondary education. In some European countries the Bologna process is contributing to lessen the heterogeneity in the higher education systems, not only among countries but also within single higher education systems. As there are several factors influencing its development, it would be difficult to affirm what would be the future of this sector; however, certain aspects like the increasing importance being given to the employability within the higher education, the technological changes and the emergence of new fields of knowledge, could be signs towards systems' convergence and a growing diversity.

3. The Non-University Higher Education in Colombia

The NUS has been a part of the Colombian higher education system for approximately fifty years; a time in which it has gone through many quantitative and qualitative changes. Particularly in the lasts Planes Nacional de Desarrollo (National Development Plans-NDPs) the NUS has been frequently recognized as an instrument to support the educational and employment goals. Furthermore, it has been considered a strategic factor that may contribute to improve the country's international competitiveness.

The present chapter aims to depict the NUS' development in Colombia. It is important to bear in mind that due to the characteristics of the Colombians higher education system, it is necessary to consider two aspects for its analysis: on one hand, institutions' classification, and on the other hand, the classification of programs. The reason to do that is that NUPs are not exclusively provided at NUIs; thus, in order to avoid the omission of relevant information and to have a more complete overview of this subsystem is indispensable to take into account these two aspects.

Having in mind this situation, the first part of this chapter presents a chronological description of the events that marked the development of this sector in the second half of the XX century. The second part offers a current characterization of the Colombian NUS; and the third part presents the synopsis and final considerations.

3.1. Historical Background and Development of the Non-University Sector

In the 1940s, a group of institutions with academic programs specifically oriented to the fields of industry, mining, agriculture and commerce, offered study programs known as intermediate careers, i.e., programs with shorter duration and vocational oriented. This type of programs existing at the time could have been the starting point of the NUS in Colombia (Gomez, 1995).

On the other hand, several authors agree that the NUS emerged with the promulgation of the Law 48 of 1945 in which the *Colegios Mayores de Cultura Femenina* were established in Cundinamarca, Antioquia, Cauca and Bolívar. Their main goal was to offer short academic programs for women to promote their insertion in the higher education system (Nuñez, 1976; ICFES, 1974)

It is worth to mention that during that time the country's was undergoing a series of changes in the framework of the adoption of the Imports Substitution Industrialization (ISI) model. Thus, the rapid growth of the intermediate careers could have been encouraged by the changes introduced with the adoption of the ISI model.

By the end of the 1940s, there were a considerable number of institutions offering intermediate careers in the country; however, they did not have a clear mission within the system, and the authorities lacked the rules to control their creation and the quality of their programs.

Hence, the national government by means of the law 143-1948 did the first attempt to structure technical education in Colombia at both, secondary education and higher education levels; furthermore, it set the bases for the establishment of the Colombian Institute of Educational Credit and Technical Studies Abroad - ICETEX (due to its name in Spanish). Nevertheless, this law could not accomplish their goals. Some of the reasons were the lack of financial resources, distrust of the education system's capability to provide this type of education, and the interest of the ruling class to maintain and reproduce its status, which could only be achieved through the universities (Currie 1951 cited in Lebot 1972, pp. 133-135).

In the 1950s, Colombian higher education was characterized for being mainly provided by public institutions; low women participation (just 16% of the student body was female) and lack of relationship with its environment. Most of the criticisms were concentrated in the lack of linkage between what was taught and the real needs of the country and the regions. In 1958, the Lebret Report on higher education affirmed: “Unaware of the national reality, poorly equipped for research and without any connections with the ruling bodies, universities are fatally disconnected from the real needs of the country. In fact, neither the content, nor their aims and structure correspond to the development phase of actual Colombian development” (Ministerio de Educación Nacional-MEN, Instituto Colombiano para el Fomento de la Educación Superior- ICFES, Organización de Estados Iberoamericanos- OEI. 1995).

The 1960s and the 1970s was a period characterized by changes in the composition and organization of the Colombian higher education system. There were particularly four rationales that motivated these processes to occur (ICFES, 1974):

1) Increasing the number of high school graduates that did not have an access to higher education either because of lack of financial resources or for shortage of seats in universities,
2) the high drop-out rate of long study programs,
3) the high concentration of higher education provision in four departments, Bogotá, Antioquia, Valle and Atlántico,
4) unemployment and underemployment of professionals in certain disciplines, which in many cases was caused by the theoretical orientation of study programs that did not provide graduates with the knowledge and skills required by the labor market; in short, no alignment between the higher education provision and the market's needs.

By means of the diversification and the development of the NUS, the government aimed to respond to the social and economic pressures the country was facing at that time. In fact, starting the 1960s the Ministry of Education promulgated the Decree 1637-1960, which aimed at restructuring the ministry. Furthermore, the *División de Educación Superior y Normalista*, which was composed of the Teaching Training Section and the Higher Education Section, was established. Some of the section's tasks were the planning and development of non-university promotional campaigns, and the inspection of NUIs and their programs.

Afterwards, the Decree 1464-1963 was released to regulate the establishment, and approve and control the NUIs. Furthermore, Art. 9 defined NUIs as follows:" …Institutes and higher education schools that without being part of a university do offer programs with the following characteristics: *training for professionals*, short or intermediate programs whose entrance requirement is the certificate of Bachillerato or other degree of equal level; *training of medium level technicians*, programs that only require the basic education as entrance requirement, but that are different of those programs offered at the level of high school; *specialized teachers' training,* programs that are not offer at universities and whose entrance requirement is the certificate of Bachillerato or similar". At this point, the scope of NUIs was relative broad; NUIs did not only provide short-cycle higher education, but also vocational courses and specialized courses for graduates of normal schools.

A year later, the national government issued the Decree 1297-1964, in which the existence of Universities and NUIs in Colombia's higher education system is confirmed and regulated.

In the late 1960s, representatives from public and private HEIs gathered to develop a plan that would mark the path to follow in the coming years. The Plan Básico de Educación Superior 1967 was the result of those meetings. In this Plan, higher education is shown as the strategic factor for the country's social change and economical development. Most important, it made a clear distinction between universities and university institutions, which is one type of NUI.

"University is a private or public institution devoted to research and to the teaching of natural and social sciences, mathematics, humanities, art and liberal professions […]. It is qualified by the government to award bachelor and other kind of degrees and academic titles like masters and doctorates. Meanwhile, the University Institution is a public or private higher education institution that would be authorized by the state to provide vocational programs of shorter duration and to grant the respective degrees; to offer study programs that help students the transition to the university; etc. […] Neither the University Institution will fulfill duties given exclusively to universities, nor universities will fulfill duties given to the University Institutions; however there will be some analog programs to help the transition from University Institutions to Universities" (Pacheco, 2002, p.30).

During this period, higher education experienced a quick expansion, not only in number of students, but also in the number of institutions and academic programs. In fact, new types of NUIs e.g., Polytechnic Institutes and Technical Institutes were established during those decades. Table 6 presents the number of students' enrollments in the NUS for the three-year period 1967-1969. It only includes the short-cycle programs, i.e., programs, whose entrance requirement was the degree of bachillerato or similar.

Table 6 Number of Enrollments in the NUS for the three-year period 1967-1969 by type and sector of the Institution

Type of Institution	Sector	1967	1968	1969	Growth 1967- 69 (%)
Unis	Public	4,934	5,664	8,06	63
	Private	2,244	1,917	2,961	32
	Total	**7,178**	**7,581**	**11,021**	**54**
NUIs	Public	1,513	2,112	2,506	66
	Private	1,193	1,734	1,601	34
	Total	**2,706**	**3,846**	**4,107**	**52**
Total	Public	6,447	7,776	10,566	64
	Private	3,437	3,651	4,562	33
	Total	**9,884**	**11,427**	**15,128**	**53**

Source: Made by the author based on statistics from the DANE (1972).

From the table it is clear that the provision of short cycle programs was concentrated on public institutions, particularly in universities. Slightly more than the 60% of students enrolled in short cycle programs were enrolled in the public sector and 70% of them were studying at universities. It is worth mentioning that the enrolments in these programs showed a positive growth in the three-year period, 1967-1969, in total numbers the sector grew in 5,244 students, that is 53%.

As a result of the increasing interest on the NUS the national government requested foreign assistance, technical and financial, to set the guidelines for its development. In this framework, the government summoned a group of experts from the Great Britain and the United States, during the first half of the 1970s. According to the experts, the characteristics of technological higher education, i.e., programs of shorter duration (up to 3 years), with a vocational orientation and practical instruction would contribute to cope with socioeconomic demands of the time. In short, the technological education was specifically aimed at 1) respond to the growing demand for higher education, 2) to provide educational opportunities in the regions, that is to decentralize the higher education provision, and 3) to fulfill the country's need of qualified human resources at different levels of expertise (ICFES, 1974).

As a whole the 1970s was an important decade for the development of the NUS, not only in terms of quantitative expansion, but also in terms of the national interest it gained and the studies carried out to shape its future development. For instance, the Decree 1358-1974 defined the different types and scopes of HEIs, both

universities and NUIs, i.e., Technological Institutes and other types of HEIs. Furthermore, it stated the government interest in promoting the provision of technological programs at NUIs, particularly at Technological Institutes.

Other attempts from the government in this regard are the Decree 089-1976 and the Decree 2667-1976. The first one, defined two types of higher education programs, their length and their academic entry requirements; while the second one, established the characteristics of technological programs and set the norms that would rule this type of higher education.

It is worth mentioning that despite the efforts from the various education laws to unify the concepts to be used to refer to NUPs, NUIs and their certificates; they were not put completely into practice. This situation was evident in different documents and statistical reports of the time that made clear the non-existence of a unified terminology and measuring processes in the higher education system. For instance, in the previous table made with the statistics from DANE (1972), HEIs were classified in two groups, university and other institutions; while in the document "La Educación en cifras 1970-1974" from the ICFES (1975) HEIs are divided again in two groups, universities and technological institutions, not including the other institutions, which according to the ruling law were also part for the higher education sector.

Other example is related to the naming of this type of education for which various terms were used, for instance, short-cycle education, intermediate education, etc. In order to clarify this issue and to make a differentiation between vocational education at secondary level and at higher education level, the ICFES proposed the name of Technological Education in 1969; however, in later documents and Laws i.e., Decree 1358 of 1974, this term is used along with the term short-cycle education; that is, there were used two terms, making people think that they were two different types of education, when they were in reality just referring to the same.

Despite those issues, all the changes and developments the higher education underwent during this decade did help to pave the path for the organization and recognition of the NUS within the higher education system, later confirmed through the Decree 80-1980.

Mosquera (1993) presents a description of the various events that explain the expansion and diversification of Colombian higher education during those decades;

they may contribute to understand the real state of higher education at the end of the 1970s:

- Public HEIs were created due to political pressures and the demand from some regional groups. The cities in which they were created did not count with a market big enough to make them economically viable.
- A high number of private HEIs were created in the main metropolitan areas driven by the inability of the public sector to supply the growing demand for tertiary education.
- The high opportunity costs of day programs increased the demand for evening and distance programs. This demand found good reply from the supply side.
- The saturation of the labor market, in particular from graduates coming from traditional (long) academic programs, increased the demand for shorter programs, e.g., technical and technological programs.
- The teacher's statute from the public sector strongly promoted the proliferation and diversification of bachelor degrees as well as specializations in higher education sciences.
- The growth in the number of postgraduate programs (specializations, and masters), particularly in business, education and health sciences.

As observed, the diversification of Colombian higher education system was not always based on rational decisions; instead, personal and group interests were, in various cases, the main rationales for diversification. Moreover, the inability of the state to fulfill the needs of the Colombian society regarding higher education and the legal loopholes in this sector were also determinant factors in the over dimensioned diversification that the system experienced during those decades.

"In1980, Colombia was one of the countries with the highest number of HEIs in the world: it counted with two hundred one higher education institutions. Fifty-six were public institutions (28%), hundred forty-five were private (72%)…this expansion was not always based on the quality improvement of the higher education system" (Aline Helg cited in Pacheco, 2002; p.34).

Despite all the changes and the evident progress higher education experienced in the 1960s and 1970s there were still some areas that were either tangentially addressed or not at all in the previous laws and policies. Similarly, new challenges that claimed for changes in the higher education sector appeared during those decades.

As a matter of fact, the first attempt to transform the Colombian higher education sector took place in 1980, by means of the Decree 80-1980. It was the foremost law elaborated to rule, control, organize and mark the path for the further development of the country's higher education system. The most important reforms introduced by this Law are the following (Velilla, Gómez, Romero and Moreno, 2003; Pacheco, 2002):

- Establishment of higher education modalities: At undergraduate level they are *Formación Intermedia Profesional* (later named Formación Técnica Profesional by art.2 law 25/1987), "refers to very practical education required for the practice of auxiliary or concrete activities"; *Formación Tecnológica* "refers to practical oriented education based on scientific principles"; *Formación Universitaria,* "it is characterized by high social and humanistic content and high emphasis on scientific principles and research" .
- Development of a new typology of HEIs, which were divided into three kinds of institutions: Instituciones Intermedias Profesionales (later on named Instituciones Técnicas Profesionales), Instituciones Tecnológicas and Universidades.
- Recognition of research as one of the fundamental objectives of higher education.
- Appointment of the Colombian Institute for the Promotion of Higher Education (ICFES) to lead the higher education system.

Furthermore, it also mentions the main objectives of higher education. Some of them are the following:

- to enhance access into higher education systems for indigenous and people from less developed areas;

- to decentralize the higher education system so it can respond to the different needs of the regions;
- to integrate the higher education system with other sectors of society; and
- to facilitate the mobility within HEIs and programs.

The Decree 80 established a new higher education modality, i.e., I*ntermedia professional*, which was clearly differentiated from the modality *Tecnológica;* furthermore a new type of institution was created, Instituciones Intermedias Profesionales. In short, as of 1980, the NUS is composed of two types programs, and two types of institutions.

Table 7 presents the number of enrollments by type of program modality for the years 1980, 1985 and 1988. In general the higher education grew 53% during the eight year period; being the largest expansion in the NUS.

Table 7 Total numbers of enrollments by sector and higher education modality for the years 1980, 1985 and 1988

Program Modality	Sector	1980	1985	1988 (I Semester)	Growth 1980-88 (%)
	Public	10,157	26,191	39,975	294
NUPs	Private	26,768	45,767	48,057	80
	Total	**36,925**	**71,958**	**88,032**	**138**
Ups	Public	88,763	126,830	133,323	50
	Private	141,396	184,852	188,331	33
	Total	**230,159**	**311,682**	**321,654**	**40**
Total	Public	98,920	153,021	173,298	75
	Private	168,164	230,619	236,388	41
	Total	**267,084**	**383,640**	**409,686**	**53**

Source: Tablas made by the author based on Statistics from ICFES (1987); Ramírez, M and Reyes A. (1989).

The enrolments in the NUS went up from 36,925 in 1980 to 88,032 in 1988, which represents a growth of about 140%; whereas the enrollments in the US went up from 230,159 to 321,654, a total growth of 40%. It is also to point out that the main expansion took place in the public HEIs; although more than half of students were enrolled in the private sector, 60%.

In general, the 1980s were characterized by the overall expansion of the higher education system. In addition to the enrollments' growth, there were also an expansion in terms of institutions and programs. Just in one year, from 1979 to 1980, the system

grew in 67 institutions that is a growth of about 56%. Actually, during that year 60 ITPs were established, which was the new type of NUI introduced with the Decree 80 of 1980. This impressive growth in ITPs could, to some extent, be the consequence of the upgrading of some post-secondary technical schools that were not part of the higher education.

All through the decade the number of institutions kept growing, they went up from 189 in 1980 to 241 in 1989, as shown in Table 8.

Table 8 Total Number of HEIs Colombia, for the years 1980, 1985 and 1989

Type of Institution	Sector	1980	1985	1989	Growth 1980-89 (%)
	Public	2	9	10	400
ITPs	Private	58	53	51	-12
	Total	**60**	**62**	**61**	**2**
	Public	9	12	14	56
ITs	Private	12	22	31	158
	Total	**21**	**34**	**45**	**114**
	Public	5	18	18	260
IUs	Private	1	41	44	4300
	Total	**6**	**59**	**62**	**933**
	Public	40	30	30	-25
Unis	Private	62	40	43	-31
	Total	**102**	**70**	**73**	**-28**
	Public	56	69	72	29
Total	Private	133	156	169	27
	Total	**189**	**225**	**241**	**28**

Source: Made by the author based on ICFES (n.a.)

The expansion took place in both sectors, the public institutions created during that decade were mainly *instituciones técnica professional* type institutions, in total were established seven; while in the private sector the greatest expansion was in institutos tecnológicos and instituciones universitarias type of institutions. There were established about twenty institutions for each type, as in Table 8.

Furthermore, this table shows that the number of *universidades* type of institutions shrank during the decade. This situation might be explained by the following reasons: 1) HEIs have the possibility, after fulfilling certain requirements, to change their academic character that is to upgrade their level; 2) changes in the count

methodology of ICFES; before 1982 instituciones universitarias and universidades were classified under the name Universidades.

Although decree 80-1980 attempted to organize the higher education system, there were several complaints about the newly introduced higher education modalities, which in many cases lead to misunderstandings (Velilla et al., p.5). For instance, the ICFES when addressing the topic of characteristics of the higher education modalities, specifically the *Intermedia Profesional* states: "there is a need to differentiate it, in particular to the modality Tecnológica…their definitions are still confusing" (1984; p.120). Later on, the document also mentions the fact that if the said modality "focused on the technique and its mastering through the practice, there would be a contradiction when offering technical programs in the Humanities and Religious studies as well as in the Social Sciences" (p.121). Morover, it is even proposed to integrate the two modalities, namely *Intermedia Profesional* and *Tecnológica*, so that the higher education would have only two modalities.

Ten years after the reform, there were no improvements in those aspects. Villalba (1990) and Palacio (1990) agree that the decree 80-1980 is deficient in several aspects, for example: it lacks a conceptual definition of technical and technological modality. Also, it is deficient and/or superficial in terms of quality assurance methods and in terms of institutional/program's articulation. In fact, the latter author states the need to reform the Decree 80-1980 and propose to transform the technical education at both, secondary and tertiary levels. The idea was to create a subsystem of education with a technical approach. According to their studies, the higher education level of this subsystem would be composed of the some of the technical and technological programs, particularly those programs of business, education and arts, which do not required a high level of theoretical foundations. With respect to the technological modality, it is proposed to remove it from the higher education system and to create a national network of *universidades polítecnicas,* which will focus on programs of applied sciences and would work as the university's counterpart.

All in all, the 1980s was a decade of great changes in the overall higher education system. It was characterized by the organization of higher education in modalities, the emergence of new type of institutions, and other events that

contributed to configure and expand the system. Despite all those transformations, some areas still needed some improvements, and certain aspects required changes in order to adapt and support the social and economic changes that Colombia started to experience in the early 1990s.

In 1992, the Colombian government reformed the higher education system through law 30 of 1992. This law included certain aspects not taken into account or not clearly specified in previous laws; additionally, it aimed to provide the system with mechanisms to respond more effectively to the changes the country was undergoing in its process of getting in tune with the higher education world trends.

The Law 30 of 1992 established the principles, objectives, fields of action, academic programs and types HEIs. Likewise, it also defined their autonomy issues as well as established the bodies in charge of promoting, assessing and monitoring Colombian higher education system. The new law set three types of HEIs and the degrees they are allowed to offer:

- *Instituciones Técnicas Profesionales* (ITPs): they are the institutions that are legally authorized to provide educational programs to train students in specific practical activities. The length of the programs is between five and six semesters, and after the satisfactory completion of these programs, students will receive a certification as professional technicians. The highest level of education these institutions are allowed to offer are specialization, which should correspond to the same field of that of the undergraduate programs (Ley 30 1992, Instituto Latinoamericano de Liderago-ILL, 2002).
- *Instituciones Universitarias o Escuelas Tecnológicas*: (IUs) they are allowed to offer technical, technological and professional programs; likewise, they can offer specializations. The length of the technological programs is eight semesters on average, while for a professional program is nine to ten semesters (ILL, p.16). Technological programs train people in practical activities based on the scientific principles that support them. Their research activity is oriented to the creation and adaptation of technologies. After the completion of these programs, students will receive a technological degree in the respective area of studies (ICFES 2002).

- *Universidades* (Unis): they are all HEIs "that are scientific and technological research oriented and their aim is the production, development and transmission of knowledge to the universal and national culture. Their programs take approximately ten semesters; however, for evening programs, the length could be eleven or twelve semesters. These institutions are accredited to offer postgraduate programs, such as specializations, masters, doctorates and post-doctorates programs" (ILL, p.16). The programs offered at universities are characterized "by a wide social content with an emphasis on the scientific and research foundation and it is oriented to the production, development and examination of knowledge, techniques and arts. After the completion of the studies, students will receive a degree in the profession or academic discipline in which the studies were done" (ICFES, p.11).

It is also important to mention that in the art. 21 of this law, the possibility for Instituciones Tecnologicas and Instituciones Universitarias to open doctoral programs is stated, which require the fulfillment of certain conditions.

In general, the decade showed a stable growth in both student enrollments and institutions. The number of students went from 473,747 in 1990 to 832,538 in 1999, a growth of 76%; meanwhile, in the same period, 39 new HEIs were established (See table 9 and Table 10).

Table 9 states that the number of students in the private sector almost doubled during the period 1990-1999; it went from 285,227 to 550,568. In fact, at the start of the decade, 60% of the students were enrolled in the private sector and by the end of the decade the figure changed to two thirds, 66%.

In terms of institutions, the private sector did also exceed the number of institutions created, 25 in contrast to 14 established in the public sector. The highest growth, in the public sector, was in university type of institutions; while for the private sector were universities and technological institutes types of institutions. In general, during the 1990s, the development of the higher education system differed from that of the preceding decade; while in the 1980s the major growth took place in the public sector, during the 1990s it was in the private sector (See Table 10).

Table 9 Number of enrollments by sector and type of program for the years 1990, 1995 and 1999

Program Modality	Sector	1990	1995	1999	Growth 1990-99 (%)
	Public	42,646	45,432	56,253	32
NUPs	Private	67,731	82,577	92,028	36
	Total	**110,377**	**128,009**	**148,281**	**34**
	Public	145,874	153,831	225,727	55
UPs	Private	217,496	324,666	458,540	111
	Total	**363,370**	**478,497**	**684,267**	**88**
Total	Public	188,520	199,263	281,980	50
	Private	285,227	407,243	550,568	93
	Total	**473,747**	**606,506**	**832,548**	**76**

Source: La Educación Superior en la Década de los Noventa (ICFES, 2002)

Table 10 Number of HEIs for the years 1990, 1995 and 1999 by sector and type of HEI

Type of Instituition	Sector	1990	1995	1999	Growth 1990-99 (%)
	Public	10	11	11	10
ITPs	Private	50	44	42	-16
	Total	**60**	**55**	**53**	**-12**
	Public	16	18	20	25
ITs	Private	31	43	43	39
	Total	**47**	**61**	**63**	**34**
UIs	Public	18	13	17	-6
	Private	44	47	53	20
	Total	**62**	**60**	**70**	**13**
	Public	30	38	40	33
Unis	Private	43	51	55	28
	Total	**73**	**89**	**95**	**30**
	Public	74	80	88	19
Total	Private	168	185	193	15
	Total	**242**	**265**	**281**	**16**

Source: La Educación Superior en la Década de los Noventa (ICFES, n.d)

As mentioned before, the 1990s was a decade of great changes for the Colombian higher education system, especially generated by the Law 30 of 1992. During this decade certain bodies that have contributed to structure and organize the provision of higher education were created:

- *Consejo Nacional de Acreditación-CNA* (The National Council of Accreditation), which is in charge of assuring the quality of higher education programs and HEIs;
- *Consejo Nacional de Educación Superior -CESU* (National Council of Higher Education), it advises the Ministry of Education in higher education topics; and the
- *Fondo Nacional para el Desarrollo de la Educación Superior -FODESEP* (National Fund for the Development of Higher Education), it assist financially HEIs in specific development projects.

In the early 2000s, after a couple of decades, the national government once again had interest in the NUS and decided to engage in its development. In 2002, the Law 749 was released; it organized the vocational/technical higher education system. Furthermore, it proclaimed ITPs and ITs as the HEIs in charge of leading the technical and technological education and responding the social demands of this type of education with the highest levels of quality.

This law defines ITPs as HEIs characterized by their vocation and work in technical activities […] this education guarantees the interaction between the intellectual, instrumental, operational and technical knowledge. Whereas, Technological Institutes are defined as higher education institutions characterized by their vocation for professions of technological character with scientific and research foundations.

These institutions, ITPs and ITs, may offer and develop academic programs up to professional level; although, programs should only be offered in cycles in the fields of engineering, business and information technologies. The professional programs should be derived from the respective technical and technological programs (Art. 3 Law 749, 2002). Hence, they can offer three cycles and award the degrees of Técnico professional (after the completion of the first cycle), Tecnólogo (after the completion of the second cycle) and Profesional (after completion of the third cycle). Besides, the ITPs and ITs can offer specialization programs, only in the same fields of their undergraduate courses.

With respect to the entrance requirements for higher education programs offered in cycles, this law states the following requisites:

1) fulfillment of the Institutions' entrance requirements,
2) students should have the certificate of Bachiller, and
3) students should have taken the ICFES (state administered national exam). In addition, students over 16 years of age who have finished the basic education; or students who have been granted with the Certificado de Aptitud Profesional, CAP, issued by the National Apprenticeship Service (SENA, by its name in Spanish) may also apply for these types of programs.

This law also addressed the issue of educational articulation. It says that ITPs should maintain their technical programs to give students who finish their basic education the possibility to enter into the higher education system. Furthermore, it states that all HEIs must set the criteria to allow horizontal and vertical mobility of students.

When referring to the quality issues, the 8th, 9th and 12th Articles states that all vocational/technical programs must have the Registro Calificado (it certifies that the academic program fulfills the minimum quality standards set by the government). In case the programs are offered in cycles, each of them must have their own Registro Calificado. Moreover, in order to be granted the permission to offer the professional cycle, the two previous cycles should have been accredited for their quality excellence by the CNA.

To summarize, since the 1960s Colombian higher education has undergone process of both, vertical and horizontal diversification. Concerning vocational/ technical education, it was clearly included in the higher education system by means of the decree 80/1980 and later ratified in the Law 30-1992. And finally, in 2002 the Law 749 set the specific regulations to organize NUS. All through the second half of the twentieth century the NUS has experienced certain periods in which it has been promoted and has indeed shown some growth. However, it has not been constant. Furthermore, despite the NUS' existence and the different laws that aim at organizing and structuring the NUS, most of them have not been sufficiently definite on the topic. Once again, since the beginning of this century, the country has engage in the development of NUIs and NUPs; although, some difficulties need to be overcome still.

3.2. The Non-University Sector in Colombia Today: Brief Sector's Characterization

As we could observe, the NUS has played a modest role within the higher education system over the years; however, in the last ten years more attention has been put on this subsystem. It has been considered a key sector to achieve those educational goals related to the system's expansion, equitable access, decentralization and graduates' employability. Its importance is reflected in certain aspects, for instance:

1) the national policies of education in which technical and technological education is specifically addressed;
2) a document on the technical and technological education was developed. It does not only deal with the difference between the scope and field of work for professional technicians and technologists, but also include other topics like how to support and develop those programs, in terms of curriculum, institutions, alliances with the productive sector, etc.
3) in the NDPs, particularly in the last two plans, this type of education is recognized as a key instrument to improve the country's international competitiveness;
4) in 2009, the network of public technical and technological institutions-REDTT, was created. Its principal objective is to promote the consolidation of these types of institutions in the higher education system and the Colombian society.

As a matter of fact, the NUS has been specially dynamic in the last decade; hence, this section attempts to present different aspects of this sector, namely its role in the framework of higher education policies; the sector's size and fields of action; information about the academic staff and student body; as well as the role of research in this sector, for the timer period 2000- 2010. They will certainly contribute to have a broad overview of the current state of this sector in Colombia.

3.2.1. The Non-University Sector in the Framework of Higher Education Policies

The World Bank in its study “Tertiary Education in Colombia Paving the Way for Reform” analyzes the whole higher education system, and one of its

recommendations is the system's expansion by increasing enrollments in technical and technological programs, which could be promoted by providing financial aid to students enrolled in those institutions. Furthermore, they advise the creation of specific processes of accreditation tailored for this type of education and the development of closer ties with the productive sector as mechanisms to achieve this goal (Banco Mundial, 2003; p.61). Later on, the Communiqué of the 2009 World Conference on Higher Education reaffirm the importance of higher education in the development of the knowledge society and call for diversity in higher education. Furthermore, it claims for "Policies and investments to support a broad diversity of tertiary/post-secondary education and research – including but not limited to universities – and to respond to the rapidly changing needs of new and diverse learners" (p. 18).

In this framework, during the last ten years, the NUS has received special promotion from the national government; particularly the last three NDPs give attention to three main areas: quality, equitable enrolment expansion, pertinence and efficiency. In this connection certain strategies, for instance, student's loans, promotion of NUPs and strengthening of the relationship between students and industry, have been developed.

The Education Development Plan (hereafter EDP), Revolución Educativa 2002-2006 is very concrete in relation to the technical/vocational higher education. It promotes the expansion by means of credits and scholarships for students from low-income families and the creation of Regional Centers of Higher Education, which in addition to UPs should also NUPs pertinent to the needs of the region. However, concerning quality there is no clear objectives for improving the quality of NUIs and their programs.

It is important to mention two events occurring during this period: 1) the creation of the Vice-ministry of Higher Education, which denotes the importance gained by this sector within the system; and 2) higher education is now completely under the supervision and control of the Ministry of Education in the head of the Vice-ministry of Higher Education (MEN, 2004).

The EDP, Revolución Educativa 2007-2010, is a continuation of the former plan, including their thematic areas. Concerning the expansion issue, one specific

project, which focuses on the flexibility of higher education supply, through the promotion and creation of more learning seats, especially in NUPs was developed. In relation to the projects oriented to the improvement of quality of higher education, they have a general scope and no particular strategy for NUPs is observed (MEN 2009).

In November 2010, in the framework of EDP 2011-2014, "Educación de Calidad, el Camino para la Prosperidad" was released the current higher education policies. They focus on four areas, namely: 1) closing the gap with regional focus (access and attendance); 2) quality in higher education; 3) pertinence for innovation and productivity; and 4) educational management model.

Concerning explicit actions in the NUS, there is one particular strategy that calls for the strengthening of technical and technological education, which should be achieved by working on two fronts: 1) encouraging the demand of this type of education; and 2) supporting the establishment and strengthening of academic programs at that level of education, particularly programs that respond to the regional socioeconomic needs. In regards to the other aspects such as quality and pertinence, there is no particular strategy for NUPs; rather, there are general strategies for programs and institutions.

In addition, the promotion of NUPs is included as an important strategy in the current country's development plan "Prosperidad para Todos" (Porosperity for all) to achieve social and economic goals the government has set for the four-year period 2010-2014. Specifically, in its third chapter is stated (NDP, 2011; pp.49-70):

1) To create an exchange program to bring experts from the more developed regions to the less developed regions. It will promote that either experts technicians, technologists or professionals from higher education institutions or research centers from the central region bring their knowledge and expertise to the less developed regions;
2) to promote the expansion and quality of SENA's technical and technological programs using strategic alliances with the private sector and the academic sector;
3) to establish incentives for NUIs, so they undergo the process to obtain the qualified register and accreditation of excellence.

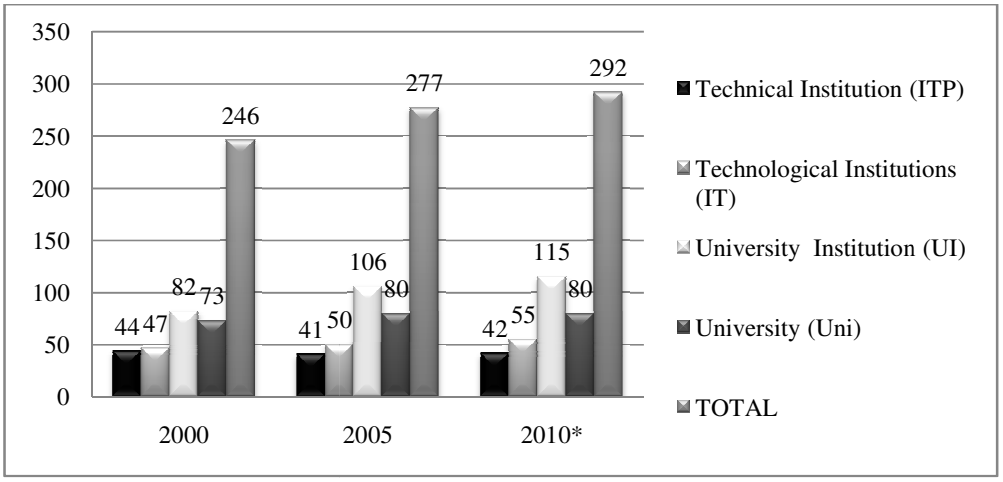
All in all, the NUS has gained some space within the national policies on higher education, especially in those areas related to the systems' expansion and decentralization. Nevertheless, there has not been developed specific strategies in other equally important areas like quality and innovation.

3.2.2. Size and Fields of Action

Approximately 95% of students in the HEIs are enrolled in undergraduate programs, the rest are enrolled in postgraduate programs. This situation has remained steady during the period 2001-2010.

In 2010, 292 HEIs were registered in the country, 46 more institutions than those existing in the year 2000. Graph 1 shows the number of HEIs by type of institution in three different time periods 2000, 2005 and 2010.

Graph 1 Number of HEIs by Type of Institution for the years 2000, 2005 and 2010



Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES 2012 (National Higher Education Information System).
*Preliminary data

It is to point out that with the exception of ITPs, whose number shrank during the period, the number of all other types of institutions, ITs, UIs and Unis has increased. The highest growth took place in UIs; in the period 2000-2010, the number of institutions raised from 82 to 115 (40%). In terms of number of institutions, the NUS led the growth of the higher education system, in 2001 there were 173 NUIs and 73 Unis, and for the year 2010 the number of NUIs was 212 and 80 Unis NUIs grew 18% while Unis growth was of 10%.

According to the latest statistics from SNIES, by April 2012 there are in total 286 HEIs in Colombia, from which 38 are ITPs, 52 are ITs, 116 are UIs and 80 are Unis. Less than a third (only 28%) of the total HEIs are public. Besides, a little drop in the number of HEIs leaded by an institutional reduction of the NUS is observed. Table 11 shows the number of HEIs by type of institution and sector.

Table 11 Number of HEIs by type of institution and sector By April 2012

Type of HEI	Public	Private	Total
ITPs	9	29	38
ITs	12	40	52
UIs	27	89	116
Unis	32	48	80
Total	80	206	286

Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES 2012 (National Higher Education Information System).

For the geographical distribution of HEIs, see Table 12. It shows that out of the total number of Colombian HEIs, 209 are located in the four largest departments, i.e., Atlántico, Antioquia, Santander and Valle and the capital city, Bogota. The other departments amount to 77 HEIs, out of which 31 are Unis and 46 are NUIs.

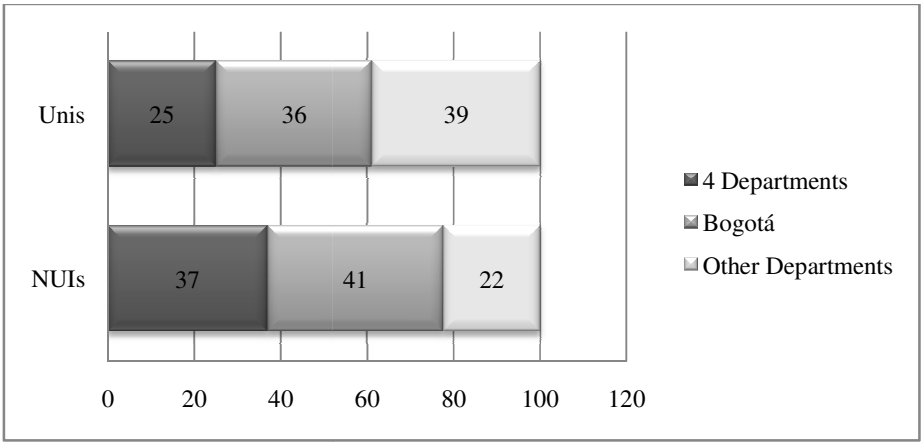
Table 12 Geographical distribution of HEIs April 2012

Type of HEI	Number of HEIs					
	Antioquia	Atlántico	Santander	Valle	Bogotá	Total
NUIs	33	11	9	23	84	160
Unis	7	5	3	5	29	49
Total	40	16	12	28	113	209

Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES 2012 (National Higher Education Information System).

Graph 2 shows the share of HEIs by type of institution and their location. In regards to NUIs, almost four fifths are located in the four departments and the capital city; geographically speaking, there is a clear concentration of these types of institutions in Bogotá and few other cities. With regard to Unis, the situation is similar, Bogotá has the highest number of this type of institution; although, the relative higher percentage of Unis located in *other departments* implies that they are more widespread in the country than the NUIs are.

Graph 2 Share of HEIs by type of institutions and location 2012 (%)



Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES 2012 (National Higher Education Information System).

Table 13 shows the number of enrollments by type of HEI for the years 2001, 2004 and 2008. As it can be seen, the number of students increased threefold in technological institutions (ITs). This growing pattern at ITs has denoted an increasing participation of these types of institutions in the overall higher education system, in short, the ratio of students enrolled at ITs grew from 8% in 2001 to 20% in 2008.

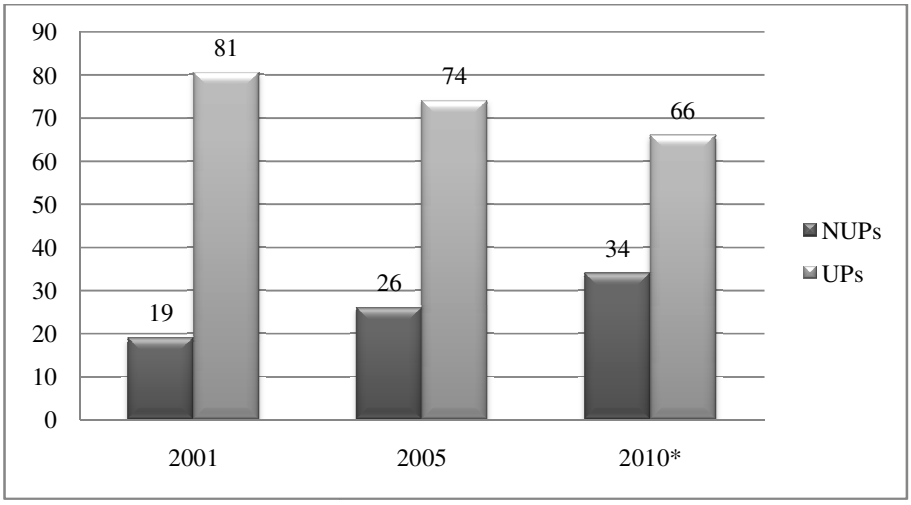
In contrast, the participation of Unis has decreased, an average of 1% per year; in the seven-year period its participation went from 67% to 60% in the higher education system. As a whole the enrollments in NUIs grew in the eight-year period 2001-2008 as they went up from 321,630 to 589,172.

Table 13 Higher education enrollments by type of HEI for the years 2001, 2004 and 2008 (share %)

Type of Institution	2001		2004		2008	
	Enrollments	Share	Enrollments	Share	Enrollments	Share
ITPs	40,962	4%	39,571	4%	37,776	3%
ITs	76,872	8%	157,644	14%	292,179	20%
UIs/ST	203,796	21%	211,509	19%	259,217	17%
Unis	655,613	67%	705,002	63%	894,459	60%
Total	977 243	100%	1 113 726	100%	1 483 631	100%

Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES for 2009 (National Higher Education Information System).
*Preliminary data

Graph 3 Share of enrolled students by type of undergraduate program for the years 2001, 2005 and 2010



Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educacion Superior-SNIES 2012b (National Higher Education Information System).
*Preliminary data

Regarding the number of enrollments by type of programs, table 14 shows the enrollments by type of undergraduate program for the years 2001, 2005 and 2010. In general, there have been an expansion in the number of enrolments; although, it has been more remarkable in the NUPs. In the ten-year period 2001-2010, enrollments in NUPs grew slightly more than 200%, they went up from 178,691 to 541,769; meanwhile, enrollments in professional programs increased about 40%, there were 740,227 enrolled in 2001 and 1,053,080 in 2010. This growth meant an overall expansion of higher education enrollments of about 73%.

Table 14 Number of enrollments by type of programs for the years 2001, 2005 and 2010

Type of Program	2001	2005	2010
NUPs	178,691	295,063	541,769
UPs	740,227	842 ,634	1,053,080
Total	918, 918	1,137,697	1, 594,849

Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012b (National Higher Education Information System).
*Preliminary data

In April 2012, 10,756 programs were registered in the SNIES, see Table 15. Slightly more than half of these programs are UPs and 46% are NUPs. Concerning the knowledge area of these programs, there are two that stand out for the relatively high

number of programs, they are namely the engineering and the business fields. In fact, 60% of the programs that are offered in Colombia are from any of these two areas. In contrast, the knowledge areas of Mathematics-Natural Sciences and Agronomy are the areas with the lowest proportion of programs; 2% and 3% respectively. These two areas are particularly of lower social and economical recognition, which could be the reason for the comparatively lower number of programs.

Table 15 also shows the number of programs according to their type, i.e., NUPs or Ups. In this regard, is to point out that there are certain areas in which there is a relatively low number of NUPs, it is especially evident in the areas of Mathematics-Natural Sciences, Education and Health Sciences. Specifically, the latter two areas, Education and Health Sciences, are under strict control of the government, and most the programs of those areas have been professionalized. For example, the Law 784 of 2002 states that the program of surgical instrumentation could only be offered at a professional level; before the this law this program was mainly offered at technical and technological level.

Table 15 Number of programs by area of knowledge and program's type

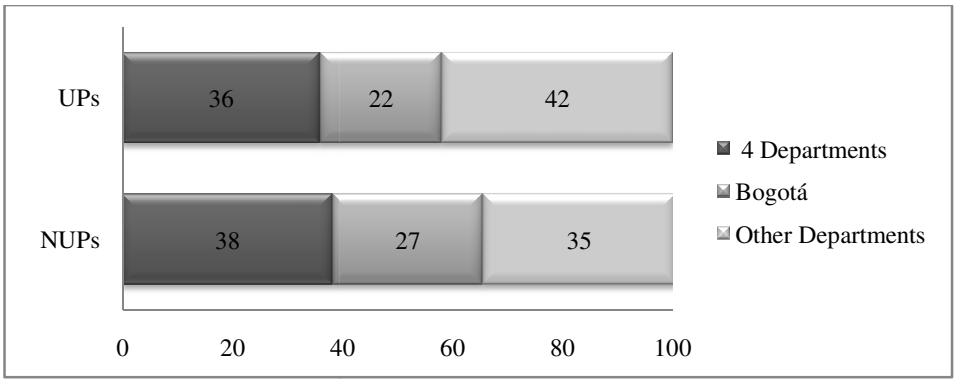
Knowledge Area	NUPs	UPs	Total
Agronomy, Veterinary and similar	242	95	337
Fine Arts	416	256	672
Education	51	1,302	1,353
Health Science	139	359	498
Social Sciences and Humanities	375	857	1,232
Economy, Business Administration, Accountancy and similar	1,962	1,403	3,365
Engineering, Architecture, Urbanism and similar	1,741	1,345	3,086
Mathematics and Natural Sciences	48	165	213
Total	4,974	5,782	10,756

Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012c (National Higher Education Information System).

Furthermore, there are other areas like agronomy and fine arts whose supply is mainly at the level of NUPs. This situation could be explained by the fields of action of those areas, which are strongly associated with the development of practical activities, for instance: advertising, photography, graphic design, palm oil production, cacao production, etc.

Regarding the geographical distribution of programs, it is very similar than the one of the institutions (See Graph 4).

Graph 4 Share of programs by type of program and location



Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012c (National Higher Education Information System)

Bogotá and the four departments account to 58% of the UPs and 65% of NUPs that are currently registered in Colombia. Apparently, the offer of UPs is less concentrated than that of NUPs, see Graph 4. This situation is not surprising taking into account the distribution of HEIs and the fact that UPs are mainly taught at Unis.

In a nutshell, during the period 2001-2010, a general enrollments' expansion of the higher education sector, driven by the enhancement of the NUS, took place. Despite the fact that most students enrolled in higher education pursue a professional degree, the number of NUIs is higher than the number of Unis. It is important to bear in mind that in Colombia UPs may be provided by Unis but also by UIs, which is a type of NUI. However, most of students enrolled in higher education are attending Unis; thus, the institutional size of NUIs is rather small when compared to the size of Unis. With regards to the geographical distribution of institutions, on average two thirds are located in a small bunch of departments with a similar geographical distribution of programs.

3.2.3. Academic Staff

As the higher education sector grew, the academic staff increased. In the time period 2003-2010, the academic staff went up from 90,303 to 106,219 that is a growth of about 18%. Both, higher education sectors did grow during this period; however,

the greatest change took place in the US, the academic staff increased by 21%, whereas the NUS's growth was only about 7%.

Table 16, shows that the public sector did have the highest academic staff growth during the mentioned period, 33% in contrast to 8% of the private sector. Such growth could be explained by the expansion of enrollments in the public sector, which was indeed higher than the expansion experienced in the private sector. During that period the number of enrolments in the public sector went from 474,384 to 823,759 that is a growth of 75%; while the expansion in the private sector was the 50%.

Table 16 Total number of academic staff by type of HEI and sector, I semester 2003 and 2010.

Type of HEI	Sector	2003	2010
NUIs	Public	6,560	7,794
	Private	15,559	15,950
Unis	Public	28,403	38,544
	Private	39,781	43,931
Total	Public	34,963	46,338
	Private	55,340	59,881

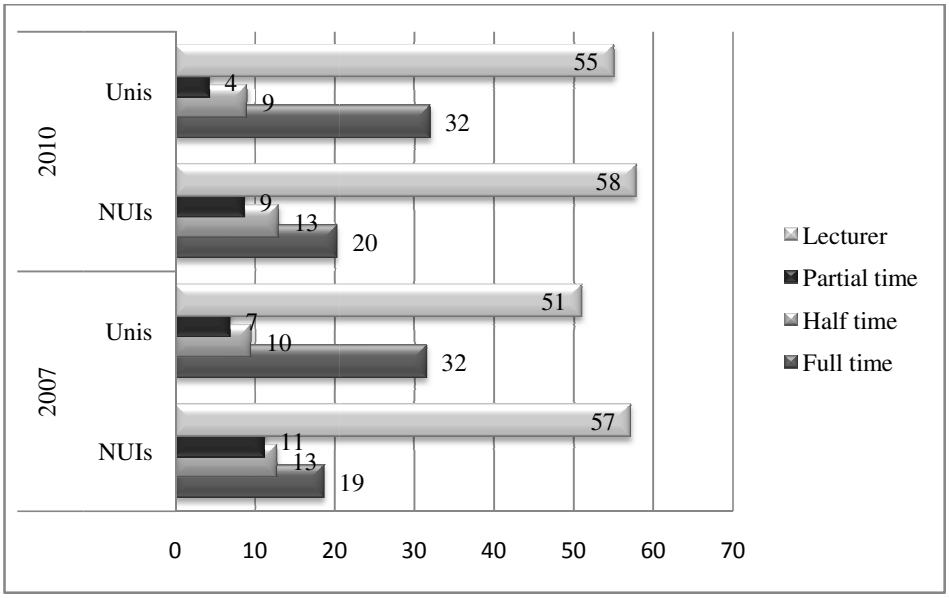
Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012d (National Higher Education Information System).
*Preliminary Data

Graph 5 shows teaching staff's work status by type of HEI for the years 2007 and 2010. From the chart it is clear that their distribution across sectors is similar. More than half of the teaching staff in the higher education system has a lecturer status and it is followed by teaching staff with full time status; they both make up, approximately, 80% of the higher education's academic staff. When compare to the teaching status by year, the composition of the teaching staff in terms of work status remain stable; the only group of teaching staff that showed an increase, in both types of institutions, was that with lecturer status. The general higher education expansion and the relatively lower costs of lectures could explain the enlargement of teaching staff with a lecturer status.

Another aspect that differentiates teaching staff across types of institutions is their level of education. Graph 6 shows that during the period 2007-2010, there were slight changes in the distribution of teaching staff according to the level of education in the two sectors.

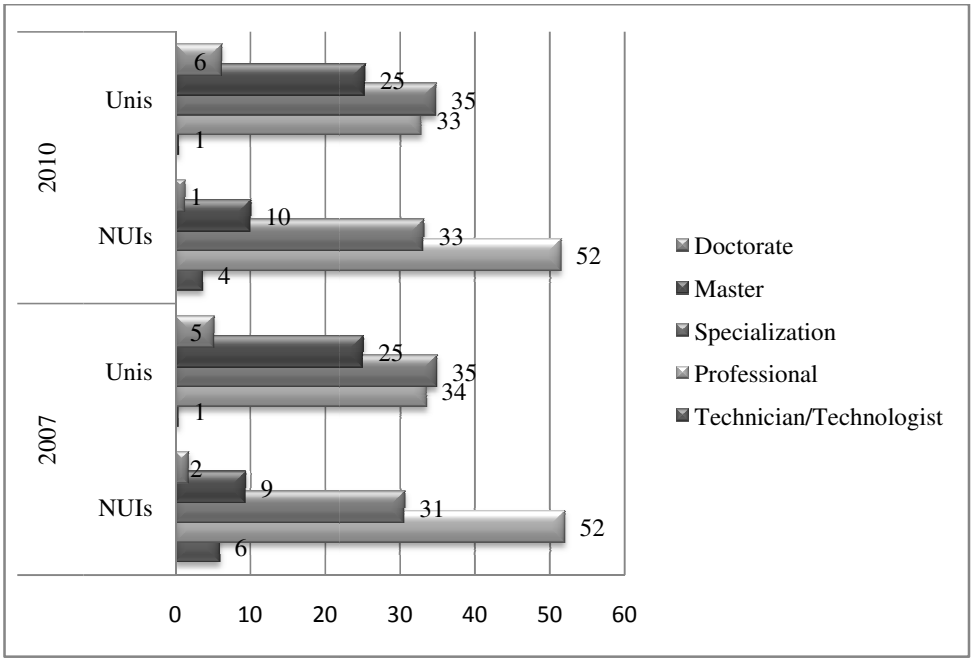
Unis type of institution and NUIs type of institution have clearly a different composition of their teaching staff. For instance, for the year 2010 approximately one third of the teaching staff, 34%, has attained any level of undergraduate education; whereas in NUIs slightly more than half of the academic staff, 56% has achieved such level of education. Nevertheless, in both types of institutions the vast majority of the teaching staff with an undergraduate level of education has a professional degree, as shown in graph 6.

Graph 5 Professor's work status by type of institution I semester 2007 and 2010 * (Percentage, %)



*Preliminary Data
Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012e (National Higher Education Information System).

Graph 6. Professors' education level by type of institution, I semester 2007 and 2010* (Percentage, %)*



*Preliminary Data
Source: Made by the author based on Statistics from the Sitema Nacional de Información de la Educación Superior-SNIES 2012f (National Higher Education Information System).

The remaining teaching staff has achieved some kind of postgraduate education, i.e., specialization, master or doctorate. In the four year period the composition of teaching staff by postgraduate level hardly changed in the two types of institutions; and as expected a higher percentage of professors with either master or doctoral degree is found in the US, which is comprehensible due to the academic character of Unis. As a whole the teaching staff has increased in the higher education system. This situation may be the result of the expansion that the system has undergone in the last decade. It is to point out that the staff's composition in terms of work status and level of education barely changed in the studied period. However, there are clear differences across types of institutions, particularly concerning the education level of the teaching staff.

3.2.4. Quality and Research in the Non-University Sector

In Colombia, different mechanisms of quality assurance for institutions and programs have been developed; some of them are mandatory while others are

voluntary. As for the mandatory ones, the government has set the basic standards of quality for HEIs and programs, which have to be fulfilled in order to be able either to open a new institution or to start a new program.

Another mechanism of quality measurement is the *accreditation of excellence*, for programs and institutions, which is of voluntary nature and their aim is to motivate institutions to engage them in a process of continuous quality improvement (Revelo and Hernández, 2003; p.29).

Besides, the quality of the outcome is assured by means of the Exámen de la Calidad de la Educación Superior- ECAES (Examination of the Quality of Higher Education), which recently changed its name to SABER PRO. The SABER PRO exam is a standardized instrument for the external evaluation of quality in higher education and it is regulated by means of the Decree 1781 of 2003. This exam is mandatory for senior students and has two principal objectives: "a) to check the degree of development in competencies of students in their senior year of undergraduate studies; and b) to serve as information source for the development of indicators for the assessment of the education public service (…)"(Decree 1781).

Students from NUPs took the exam for first the time in 2005. In that year, students from electronics, systems and other related areas were evaluated. By 2010, in addition to students from these two fields, senior students from business related programs took the exam. However, for a good number of programs the exam has not been developed yet.

As for the *accreditation of excellence,* it is of two types, one is for academic programs and the other is for institutions; they are awarded by the National Council of Accreditation (CNA by its name in Spanish). Initially, accreditation was only for programs, but since 2001, an institutional accreditation is also possible. Despite this process started in 1998, just until 2005 the guidelines for accreditation of NUPs were established.

By 2012, a total of 768 programs were accredited in Colombia. If taking into account the total number of programs registered in the SNIES by April 2012, less than 10% of programs have an accreditation of excellence. According to the type of institution, Unis are the type of institution that have the highest number of accredited programs, 650; whereas NUIs have just 118 accredited programs. In fact, a slightly

higher number of programs are taught at Unis; however, the number of accredited programs being taught at Unis is disproportionately higher than that from NUIs (CNA, 2012).

As for research in the NUS, it is in the early stages. These institutions focused on the training of students rather in developing research, which is mainly a task of Unis. Nevertheless, in the last years research is gaining space in NUIs. Their growing interest in research is reasonable if taken into account that NUIs, particularly ITPs and ITs have been granted the possibility to offer UPs in the framework of cycles; therefore their need of developing this area.

Another possible reason for the growing research activity may be explained by the quality accreditation process. Some of the aspects evaluated during this process are related to the promotion of research activity and the establishment of institutional research policies.

Additionally, research has particularly being addressed in the last NDPs as the key factor for the developing of the country, therefore its increasing promotion at all levels of higher education, and types of institutions. In this framework, the number of research groups, publications, and scientific journals has increased in the last ten years. In Colombia, research groups in order to be recognized as such, ought to be registered in the National Administrative Department for Science, Technology and Innovation, COLCIENCIAS- which is the national body in charge of promoting and coordinating all scientific and technological research in the country.

Table 17 presents the number of research groups registered in COLCIENCIAS by type of institution for the years 2007 and 2012. During this period, the number of research groups has raised in both types of institutions, being the growth slightly higher in NUIs. Despite of the progress achieved in the NUS, the share of groups by sector remained the same, 11% for NUIs and 89% for Unis.

Table 17 Number of research groups registered in COLCIENCIAS by type of HEI for the years 2007 and 2012

Type of HEI	2007	2012	Growth (%)
NUIs	509	612	20
Unis	3,996	4,735	18
Total	4,505	5,347	19

Source: Table made by the author based on information from the SNIES 2009 and ScienTI 2012.

Another research indicator is the number of journals registered in the National Bibliographic Index-IBN Publindex. IBN Publindex is made up of Colombian journals that are specialized in Science, Technology and Innovation (STI), which according to their scientific and editorial quality are classified in four categories A1, A2, B and C, where A1 is at the top of the rank.

Table 18 shows the number of Publindex registered and classified journals. In the period 2002 -2010 the total number of classified journals went up from 63 to 182 that is the number journals increased by a factor of three. Journals from NUIs showed a significant development, from no journals in the classification, in the early 2000s to 22 by 2010; however, the difference between NUIs and Unis is evident.

Table 18 Number of registered journals in publindex according classification, for the years 2002 and 2010

Type of HEI	2002				2010*			
	A1	A2	B	C	A1	A2	B	C
NUIs	0	0	0	0	1	3	4	14
Unis	0	6	5	63	18	61	54	168
Total	0	6	5	63	19	64	58	182

Source: Made by the author based on information from PUBLINDEX 2012
*Preliminary Data

The research situation ought to change if goals such as smooth transition among HEIs and programs are promoted, which has been the trend in the last decade.

3.2.5. Project of Reform Law 30 of 1992

In the year 2011, the government had the intention to pass a bill to reform the higher education law, Law 30 of 1992; however, it had substantial resistance, especially from the students' side. It is to highlight that despite the general consent of

all related actors for the need of a reform; the proposed bill was not well received and therefore was withdrawn from the Congress.

An important aspect of the proposal is that the existing typology of HEIs would disappear, but the programs' classification would remain the same; however, contrary to the Law 30, it defines in more detail the scope of programs.

With regard to HEIs the potential article 15 states "the denomination of higher education institutions should be in correspondence to their mission, their academic vocation, the type of programs that are offered and the diversity of knowledge areas and fields of action adopted in each institution". The denomination of "University" is reserved for those HEIs that prove the National Ministry of Education the fulfillment of certain conditions.

Concerning the types of academic programs, the proposal in its 58th, 59th and 60th articles defines each of the undergraduate programs to be offered by the system, namely technical professional, technological and professional.

> Art. 58. Technical professional programs will provide students with competences related to the application of knowledge to a group of work activities carried out in different contexts with a high degree of specificity and low degree of complexity, with practical emphasis and in the command of technical procedures.
>
> Art. 59. Technological programs will be directed towards the education of students to work in contexts that require the application and the practice, in an autonomous manner, of competencies in no routinary work activities with higher complexity than that from technical professional programs. These programs should provide students with analysis, evaluation, innovative problem solution competences and guaranteeing education in the foundations of sciences related to the respective knowledge area and level of education.
>
> Art. 60. Professional programs prepare students for their autonomous performance in areas that require high complexity competencies that are related to a profession or discipline. These programs should provide students with analysis, evaluation, management and innovation competences and guaranteeing an education in the foundations of sciences related to the respective knowledge area and level of education.

According to this proposal, the system will be composed of two types of institutions: Universities and other HEIs, that is, the relation between institutional typologies and the type of programs will disappear, as all HEIs may determine by themselves the type of programs they will offer. In short the institutional diversity would be reduced and therefore the system would be, in terms of institutions, more homogeneous. Despite that the proposal keeps the three types of programs; the fact of giving institutions the possibility of self-determining the type of program to be offered, could threat the needs and interest of different actors of the education system and the overall society. Perhaps, the variety of programs in terms of levels could be reduced. This situation would not be strange, taking into account that in Colombia UPs have higher social reputation and economical returns than the NUPs. In general, such changes might have negative effects on the recent growing trends of the NUS; hence the efforts made by the government during the past ten years could fall through.

3.3. Synopsis and Final Considerations

This chapter attempted to present different aspects of the NUS, which should help to make a picture of the development and current state of the sector.

As mentioned earlier, the NUS has existed in Colombia for more than fifty years, thereby occupying a modest role within the higher education system as compared to that of the US. This situation is noticed when analyzing its development and the most relevant educational documents (EDP as well as normative), in which those referring exclusively to the NUS are scarce. The sector has had problems of organization since the beginning; vagueness in its definition, scope, and role has been the common point in the different laws addressing the topic. In particular, the decree 80-1980 as well as the Law 30-1993 attempted to organize the higher education sector and to some extent they made some progress in certain aspects i.e., those concerning the quality of higher education; however, in the process of structuring the system the situation is different. One example is related to the naming of HEIs. In 1980 the IT is mentioned, which is one type of NUI that is allowed to offer NUPs, while in 1992 it is not mentioned at all; instead it refers to Escuelas Tecnológicas, which according to the definition is a type of HEI, a NUI, that is allowed to offer NUPs but also UPs and it is

compared to the UIs. Later on in the Law 749-2002, which is the law of the vocational higher education, refers only two types of HEIs, ITPs and ITs.

Furthermore, while analyzing the education policies from the 1980s and 1990s the NUS was hardly included. Such panorama has been the one in which the NUS has been developed, and it could help to explain the relative underdevelopment and the lower social recognition that the sector has had in comparison to the US.

Nevertheless, the NUS has once again gained attention from the government. Moreover, since the early 2000, it has been considered a key sector to achieve those educational goals related to the system's expansion, equitable access, decentralization and graduates' employability. The promulgation of the law 749-2002, which specifically addresses the NUS, is an example of the increasing interest in developing and consolidating this sector within the higher education system. However, despite the higher growth in enrollments of the NUS in the last ten years; its size, in number of students, is small when compared to the US. Furthermore, the concentration of supply in the country's five principal departments, the lower levels of quality in terms of program and institutional accreditation are aspects that have to be considered and call for actions to achieve the proposed goals. Furthermore, despite research is not part of the core mission of the NUS, some kind of research foundations should be provided at the NUPs if articulation between NUPs and UPs is one of the goals of the system. It would help not only to facilitate the upward mobility of students, but also the overall integration of the system, which would help in the NUS consolidation within the system.

4. Higher Education and the World of Work

The fields of higher education and work have always been interrelated and characterized for their dynamism and ability to adapt to the different circumstances that the societies have undergone through the years.

One of those events that marked changes in this relationship was the industrial revolution (1750-1850). Despite the existence of schools prior to this period, a few children attended them and they were not, in most of cases, crucial for entering in the world of work. Instead, apprenticeships were the common preparation for work during preindustrial times.

With the changes introduced with the industrial revolution and the adoption of industrial production under a factory system new forms of education as well as the expansion of the system was required. The education system was needed to inculcate the youth with the attributes needed to work in a modern work enterprise, i.e., the cognitive skills, the technical skills, and also the values of the new work system (Levin, 1987).

During the second half of the twentieth century, the access to education expanded, most of industrialized economies reached either universal or very high levels of education enrollments at primary and secondary level that led to a necessary expansion of the higher education system. Since then, new types of educational institutions have been established and changes in the curricula have been introduced; concurrently, changes in the methods of production, the communications systems, transport and the population composition of cities changed.

All these changes have called the attention of researchers from different fields, but principally to the economists and sociologists, who have developed certain theories to explain the relationship between education and economy, e.g., human capital theory, job assignment theory, the signal theory, as well as the meritocracy and credentialism theories.

These theories assume that education plays a determinant role and have considerable effects at micro and macro levels within a society. People’s level of education may have consequences in the labor market; for instance, it has repercussions on individuals' employment, their income, it can also change people’s

preferences affecting the goods and services markets. Furthermore, it has an impact on the overall society, e.g., the economic growth of a country, on the improvement of quality standards of their citizens, and their social structure.

All these circumstances have contributed to redefine the different relationships between education and the economy, particularly that of the higher education and the world of work. According to Kellerman (2007) the turning point of conceptions of higher education as preparation for employment could be the OECD conference on "Economic Growth and Investment in Education" in 1961. In the "Sector Working Paper 'Education' published by the World Bank in 1974, Robert S. McNamara wrote in the foreword: "While millions of people from among the educated are unemployed, millions of jobs are waiting to be done because people with the right education, training and skills cannot be found".

In general, since the late 1980's countries have started to increase pressure on higher education to contribute directly to the national economic development. For instance, in 1997 in the UK the National Committee of Inquiry into Higher Education (NCIHE) asserted that the primary role of higher education is to prepare students for the world of work. Similarly, in other countries around the world, the governments started to include the enhancement of the graduates' employability within the tasks of their higher education systems (Harvey, 2000).

Employability can be understood as the person's "capability of getting and keeping fulfilling work. More comprehensively, employability is the capability to move self-sufficiently within the labor market to realize potential through sustainable employment. For the individual, employability depends on the knowledge, skills and attitudes they possess, the way they use those assets and present them to the employers and the context within which they seek work" (Hillage, J. & Pollard, E., 1998, p.3). With the advent of the new century, the employability task of higher education has been reinforced, and therefore HEIs have undergone changes in their structure and curricula.

Furthermore, actions have been widely supported by national and supranational organizations, which have underscored the need for higher education to contribute significantly in preparing the human resources required by the economy. It is expected that developing a linkage between these two sectors will contribute to

increase countries' competitiveness, and to improve and enhance the employability of their citizens, which will lead to the economical and social well-being of individuals and the society as a whole, c.f. Sorbonne Declaration 1998; Moreno, J. and Ruiz, P., 2009; World Bank, 2007; Varghese, N. and Püttmann, V., 2011.

In this context, HEIs, being the main providers of advanced and specialized knowledge and training, play a major role in the development of people's employability. However, the relationship between these two sectors, i.e., higher education and the world of work cannot be limited to the employability issue and the way HEIs tackle with these changes, because this is just one of their multiple areas of interaction.

The linkages existing between these two fields are various; on one hand, education, but specially higher education represents an opportunity to individuals to be trained in such a way that they can easily enter and compete in the labor market for a job, which will give them the necessary resources for their self-support. On the other hand, HEIs are the main providers of qualified human resources needed for the country's economic development.

HEIs, either independent or in conjunction with the economic sector, develop technological research, and also contribute in the (inter)national cultural dissemination as well as to the economic and social development of individuals and the society as a whole. In fact, their interactions and their ability to perceive, interpret and respond their mutual signals affect the developments of the higher education system, the society and the economy as whole. These are just some of the multiple relations that link these distinct but interdependent worlds, which directly or indirectly have effects on the development and in the well-being of a particular society.

As mentioned earlier, the relationship between higher education and the world of work is manifolds; Brennan, Kogan, Teichler (1996) while analyzing their multiple linkages has identified different themes that are the focus of study of this relationship, higher education-world of work; please see Table 19.

Table 19 Relationships between the higher education and work

Dimensions of higher education relevant to work	Linkages between higher education and work:	Dimensions of work relevant to higher education
• Quantitative and structural developments	• Labor market, intermediary agencies and transition	• Employment
• Curricula, training and socialization	• Regulatory system	• Career
• Educational provision and students options	• Life-long education and work	• Work Tasks and requirements
		• Profession
		• Quality of work and employment

Source: Taken from Brennan, Kogan, Teichler (1996, p.2)

In this way, the relationship between higher education and work is on continuous change and will be changing as the world does; it is not only flexible and adaptable to requirements of the economy, but also to the social and cultural transformations that societies undergo. Furthermore, their relationship involves the interactions of different actors, i.e., students, teaching staff, policy makers, governments, employers among others; in short, it is multidimensional and therefore cannot be reduced to a mere relationship of supply and demand of human resources.

4.1. Higher Education and Work in Colombia

Since the second half of the last century, the NDPs and different educational laws have always considered education as one of the most important factors to develop the country socially, culturally and economically. By educating the population, the country enhances its human capital and with that the productivity will increase and so will the country's economy. In individual terms, education will provide the Colombians the skills and the knowledge to enter and stay in the labor market, thus an income, which will contribute to improve their quality of life and therefore all Colombians.

However, the relationship between higher education and work as compared to primary and secondary education is less emphasized on the educational plans and the

country's national development plans. During the 1980's the government remarked the importance of education for the socioeconomic development and specifically the role of education to increase the employability of Colombians, so they can have jobs with acceptable work-conditions.

In particular, education was regarded as a mechanism to counteract the low qualification of the youth (people between 15-19 years) and the high unemployment rates among adults over 30-years. This task was given to the secondary education and its diversification was proposed, by creating programs practically oriented to the productive vocation of the region. Similarly, the National Apprenticeship Service (SENA) is called to prepare especially those occupied in the informal sector in trades and to support them technically and academically in the creation of small enterprises.

As for higher education, it was mainly given the task to contribute in the transformation of the contents of the overall educational system, to promote and carry out research activities with the productive sector as well as to create doctoral programs. Despite the importance of the relationship between these two fields is often mentioned in the NDPs, there are a few times in which this relationship is clearly stated, namely, the call for the NUS to prepare Colombians for the work life (NDP 1978-82) and the creation of distance higher education programs that respond to the regional needs of qualifications (NDP 1982-86).

In general during the 1980s the relationship between higher education and work was not definitely stated as it was for the secondary education and the SENA. This situation may respond to certain circumstances of the time, for instance, the high unemployment rates of the population of 30 or more years that were already making a part of the labor market, but because of their lower levels of education were not able to cope with the market changes and therefore having problems either to find and stay in a job or accepting jobs with poor conditions. Hence, the SENA due to its characteristics could respond to their needs better than the higher education system, as it would train or re-train them with skills required by the labor market or offer the technical support needed to face the new challenges.

In the 1990s, Colombia experienced several transformations towards the development of a more open, competitive and international country. All these changes represented an important step in the structuring of the relationship between higher

education and work. At that time, the national government called a multidisciplinary group of ten Colombian scientists with the aim to debate and present proposals to develop the country's education system as well as the science and technology system. This Project was known as "La Misión de los Sabios" (the mission of the wise men).

While discussing the topic of education and work, this group concluded that there are four factors that may explain the failure in the previous employment policies. They are the following (Aldana et al. 1996): a) gap between education and work; b) cyclical unemployment; c) caducity of technical and technological education; and d) devaluation of the technical work.

They concluded that the education based on learning by rote in the acquisition of specific knowledge and skills, instead of contributing to increase the employment in Colombians, is reducing it.

As for higher education, they agree that the higher degree of specialization of NUPs and the rapid technological change are in conflict; Colombians are not able to adapt easily to the transformations that the country undergoes. In their words: "The problem is mistaking work with employment and education for work with education/preparation in trades. It is not about preparing students with specific knowledge and skills, but to prepare them with mental and physical competencies required to work, being either as salaried employee or independent (p. 70)".

In this connection, one of their proposals to improve the relationship between higher education and work was that instead of teaching very specialized skills that become easily obsolete, these programs should aim to prepare students in basic competencies to know the systems' and processes' internal logic and structure.

As for the NDPs, in the three plans of the decade, the SENA is remarked as the one responsible for the training and re-training of the Colombian labor, for instance, the unemployed and youth without the credentials to access higher education. Similarly, the need to create the "sistema nacional para la formación professional" (NDP 1994-98) was mentioned, which in conjunction with the companies should develop programs to prepare people in the areas required by the industry. Furthermore, this system will aim to articulate the system of vocational secondary education with the NUS of higher education.

Additionally, the NDP 1998-2002 presented certain clear and specific actions to develop even more the relationship between the higher education and work, i.e., increase the pertinence of programs to the needs of the market, to widespread the "Sistema Nacional de Información de la Educación Superior-SNIES". The SNIES is a system created to provide the citizens information about the educational offer, so they can take decisions and be familiar with their professional future.

This NDP also includes certain programs in the commerce and agriculture sector, which contribute to the strengthening between higher education and work: a) the creation of a "rural education system", which should adapt their NUPs to the production needs of the specific region; and b) to train students at all levels of education in English language, informatics and international commerce, so they can respond to the growing demand of this sector of the economy.

Moreover, all these social and economic transformations brought along the opening of the economy, required a reform in all relevant sectors; the higher education sector was reformed by the Law 30 of 1992. This Law meant a comprehensive change in the higher education system. It remarks the role of the higher education as the propellant of socio-economic change. Some parts in which this relationship is evident are the definition of the objectives of higher education, the definition of undergraduate programs as well as the classification of institutions. For instance, an undergraduate program is considered as the one that prepares students for the execution of an occupation, for the practice of a profession or discipline of technological or scientific nature or in the fields of humanities, arts and philosophy (Art. 9).

As for the classification of institutions, the relationship between these two sectors is clear. Despite all existing HEIs are allowed to offer programs for the training in occupations, NUIs are those called to fulfill this task; while universities are in charge of developing relevant scientific or technological research (see chapter IV Law 30-1992).

Another aspect of this law that shows the linkages between higher education and work is the team composition of the Consejo Nacional de Educación Superior - CESU (National Council of Higher Education). The CESU is the body in charge of coordinating, planning and advising the national government about topics related to higher education. This organization has as per law the requirement of having

representatives from the productive sector. Similarly, all public HEIs may have in their Consejo Superior Universitario (the university's supreme body of management and government) one member of the productive sector. Furthermore, all HEIs should have an educational project coherent with the international and national needs as well as the educational and labor market requirements.

By the end of the decade, the pressure from the continuous technical and technological changes in the production methods and the changes in the occupational structure made the national government to create a mission to develop a new system of technical, technological and professional education taking into account the work competencies, developed by the SENA in association with the labor market. Among the objectives of the mission was to advise the ministry about the topics related to the promotion of different forms of articulation between the higher education system and the labor market (See Decree 641-1998).

The Misión de Educación Técnica, Tecnológica y Formación Profesional presents its report and remarks the importance of the higher education, particularly the NUS, in the preparation for work (1999). "As the schooling level of the population increases and the attrition decreases, the weight of the technical and technological education moves towards the higher secondary (10^{th} and 11^{th} grade) and higher education, therefore efforts have to be directed to improve and enhance the education for work within the formal system of education (p.44).

The mission's main recommendation were a. to create the "Sistema Nacional de formación para el trabajo-SNFT (National Work Training System), which should articulate the different programs as well as the various institutions offering training programs, i.e., vocational high schools, HEIs, SENA and the company's training centers; and b. To organize the education by cycles, which ease the people's transition higher education-work-higher education.

With the advent of the new century, the relationship between higher education and work is widely recognized and promoted by the national development policies. The EDPs 2002-2006 and 2006-2010 propose different mechanisms to improve and consolidate this relationship; they are namely:

- The creation of the Labor Observatory for Education (hereafter OLE), which should monitor, analyze and transmit information about the labor

market as well as to carry out graduates' tracer studies. The goal was the creation of a database that can be used by HEIs in the process of tuning up the programs with the market needs and to provide information for policy makers.

- The creation of Centros Regionales de Educación Superior-CERES (Regional Centers of Higher Education) aim not only to enhance the higher education enrollments, but also to respond to the local requirements of qualifications at the higher education level. These centers were the result of alliances between the local governments, HEIs and the productive sector.
- Promoting the creation of programs pertinent to the needs of the labor market. For that, the training in labor competencies, in English language and IT is encouraged as a means to increase the country's competitiveness and the employability of graduates.

The proposed goals have been supported by changes in the higher education laws. The law 745-2002 sets the guidelines to organize undergraduate programs in cycles, from which the first cycle is particularly oriented to generate the competences, the knowledge and skills required to perform a job in specific activities of the productive and service sector (Art. 3).

Besides, among the minimum quality conditions that the higher education programs have to fulfill, the requirement of mentioning the real and potential opportunities of work and the trends in the professional practice is explicit. Moreover, programs should guarantee a comprehensive education that includes the development of competencies of each field, allowing their graduates working in different scenarios with the appropriate level of competency (Law 2566-2003). In addition to that, this Law mentions that HEIs should also provide the conditions for practical experience in those programs that are required and they should develop policies and strategies to follow-up their graduates as well as assess their performances in the labor market, so they can revise and make changes when needed.

The Documents CONPES 3189-2002 and 3527-2008 do show the need of strengthening the interactions between these two sectors and highlight this relationship as one of the pillars of the country's competitive policies. The Consejo Nacional de

Politica Económica y Social –CONPES (National Council on Economic and Social Policy) is the upmost authority for national planning. It advises the government about topics related to the country's social and economic development. It studies and approves all policy documents presented by the different government bodies.

In particular the CONPES 3189-2002 presents strategies to enhance the higher education enrolments and to improve the quality of programs, for instance, by increasing the programs pertinence to the needs of the labor market; whereas, the CONPES 3527-2008 presents the national policy on competitiveness and productivity, which underscores the importance of education and the training in labor competencies.

Finally, by the end of the decade, the relationship between non-university higher education and world of work gained importance. Alliances between these two sectors were created, particularly in the regions, with the aim of increasing the pertinence of programs and the graduates' employability. Most of these actions were specially promoted and developed under the framework of the competitiveness policies.

At the same time, the OLE has encouraged and supported HEIs in the development of tracer studies. It is considered a means to analyze the performance of graduates in the labor market and also to foresee possible trends in the demand of human capital, which could help HEIs to orient their programs to the market needs.

4.2. Synopsis and Final Considerations

This chapter attempted to explain the relationship between higher education and work in Colombia. With this purpose in mind, the general characteristics of the development of this relationship in Europe have been taken as a reference. Furthermore, it shows that linkages between these two sectors are diverse and are not limited to a supply-demand of qualified labor.

As mentioned earlier, the relationship between higher education and work is closely related to the technological and socioeconomic characteristics of the society under study. While in Europe, the promotion and support of this relationship took place since the late 1980s and openly promoted since the late 1990s with the Bologna declaration, whereas in Colombia it just gained importance and public support at the middle of the first decade of the twenty-first century.

Education as a motor of socioeconomic development has commonly been mentioned in the Colombia's development plans. However, the characteristics of the economy (closed economy) and the level of technological development focused this relationship on the development of work qualifications offered by non- degree awarding post-secondary institutions. At that time, this type of education fulfilled the needs of the industry and helped to mitigate certain social problems, i.e., high unemployment rates.

The opening of the economy and the incursion of the country in the international market, in the early 1990s, marked a change in this relationship. However, the education's development plans analyzed here show some ambiguity in the scope of this relationship and the role of higher education in it. This situation could be the result of differences in the terminology used from government to government in the developments plans during the 1990s.

Besides, unlike Europe, where employability has been widely included as one of the missions of overall higher education; in Colombia, this mission is clearly given to the non-university sector of higher education.

Last but not least, the current internationalization of markets could be considered as one of the factors molding the relationship higher education and work today. For instance, in Europe as in Colombia the search of international competitiveness could be mentioned as one of the aspects that have had effects on the changes of this relationship.

5. Methodology

In order to achieve the main goals of this research a mixed-method approach has been chosen. Quantitative as well as qualitative methods i.e., graduate survey, secondary analysis, documentary analysis and interviews will be used to produce comprehensive and relevant findings on the Colombian NUS and the relation of their graduates with the world of work.

In order to make a thorough characterization of the NUS, the educational laws, policy papers, national development plans and education development plans, national socio-demographic statistics, statistics from the ministry of education and other relevant literature about the topic, will be used.

For analyzing the relationship between non-university higher education and the world of work, a graduate survey along with interviews to certain experts of the non-university field was carried out in Atlántico-Colombia. This study is explorative in nature and contributes to the understanding of the higher education system, specially the NUS, and the relationship between their graduates and the world of work. Furthermore, the research findings are not generalisable to all NUGs and UGs in the country; however, they contribute to provide a factual perspective of higher education graduates and their relationship with the world of work in the country.

Additionally, in order to improve the understanding of socioeconomic and educational characteristics and the relationship between higher education and work, the data base of the graduate survey launched by OLE in 2007 has been used. The OLE is an information system that provides useful tools for analyzing the relevance of higher education and graduates' employability and it bases the analysis on graduates' surveys carried out on a year basis. Particularly, the information of those graduates who graduated in 2005 has been selected, because of the sameness of the time spam used in this investigation. Besides, the OLE data and the one analyzed here have certain common variables, .i.e., working status, occupational position and type of work contract, which help in providing a more concrete and realistic picture of the topic being analyzed. It is to point out that the data from the OLE refers to Colombia; whereas, the one from this study corresponds to Atlántico.

The upcoming sections will present in detail the different methods used in this research, namely, the graduate survey, the interviews of experts and documentary research. Each part aims to explain the different strategies for data collection that were employed, as well as the process used to analyze the data.

5.1. The Graduates' Survey

Graduate surveys also known as alumni surveys or graduate follow-up surveys "constitute one form of empirical study which can provide valuable information to evaluate the results of the education and training of a specific institution of higher education" (Schomburg, H., 2003; p.11).

Graduate surveys are an important source of information about the employment situation of the most recent graduates. They can also tell us about the relevance of study conditions and services provided by the higher education institution as well as information about the graduates' performance in the labor market. In fact, several authors have already highlighted the effectiveness of graduate surveys in providing diverse and valuable information to different audiences, e.g., HEIs, policy makers, parents and prospective students, (see Cabrera, 2005; GRADUA2, 2006; Melchiori, 1988).

Depending on the objectives of the graduate survey, it can also be used to assess the relevance and the quality of the academic curricula, to help students choose a degree, to assess graduates' satisfaction with regard to their education, to make better marketing decisions, to meet employer needs, to assess the appropriateness of graduates' education with regard to their work, etc. (GRADUA2, 2006). Thus, in the last twenty years, there has been an increasing interest of HEIs, mainly Unis, in conducting graduate surveys, especially due to accountability reasons, as well as because of the internationalization of higher education (market reasons).

Accountability has played an important role in the field of higher education and research, due to the fact that these areas are mainly financed by public funds. Therefore, governments have made accountability indicators one of their main allies to allocate their limited resources in the different fields. Under these circumstances, HEIs have developed different mechanisms to evaluate their performance and one of those methods is the graduate surveys. These surveys may provide information about

the pertinence of the study programs, information about the strengths or weaknesses of the curriculum and also specific information about the characteristics of the labor market.

Another reason for the increasing importance of the graduates' survey has been the internationalization of higher education in the last years. Nowadays, thanks to the development of new technologies, the advancements in the communications and the interdependence of countries, HEIs have lost their local and limited character and have been exposed to the very competitive world market.

In this context of national and international competition, graduate surveys play an essential role; they offer valuable information about the performance of graduates in the labor market, about the competences and skills the market is actually demanding, among others. Such information is not only useful for academic purposes but also for marketing purposes.

Knowing the advantages and the ample information that the graduate surveys may offer, different countries in Latin America have started to promote graduates surveys within the system, for instance, by establishing institutions to carry out their own surveys, by developing guidelines for HEIs as well as by providing HEIs with technical and in some cases financial support.

However, despite the increasing interest in the topic, Latin America is still backward in comparison with Europe or the United States. Martinez & Letalier (1997) affirmed that: "Latin America has not developed an evaluation culture. […] prevails an internal reasoning of auto-reproduction, with corporative or bureaucratic decisions, with no evaluative function and without external judgments concerning the aims of efficiency, pertinence, capabilities and quality of the activities and services offered by the universities"(p.4).

In the region, some HEIs, especially private Unis, have carried out graduate surveys, but not on a regular basis. Moreover, those surveys were based on simple questionnaires made with the aim of updating information about their graduates rather than with the purpose of evaluating the educational provision or getting information about the labor market. Graduate surveys were in most cases used with the goal of creating a bank of potential clients (Ramírez, 2007).

In Colombia the situation is not different to the one mentioned above; though, it is worth mentioning that the use of graduates' surveys has been gaining space across the country recently. This situation could be the result of actions undertaken by the government in the last eight years, which started with the creation of OLE and the implementation of graduates' surveys on a regular basis. For instance, for Atlántico, which has the fifth largest higher education system in the country, not only in terms of enrollments but also in terms of number of HEIs, the use of graduates' surveys is still under development.

The importance and broadened use that graduates' surveys are gaining among HEIs was confirmed during the field-work phase of this research. The next section will present in detail the main aspects of the graduates' survey that took place in Atlántico-Colombia in the year 2010.

5.1.1. The Graduate Survey Atlántico

As mentioned earlier, the use of graduate surveys still needs to be consolidated within HEIs, especially because there are still some issues concerning the availability of graduates' information. Some of the reasons for such a situation could be the non-existence of an alumna-office or similar office within HEIs or the vagueness of the role that such an office plays within the institution.

Particularly in Atlántico, by the time of the field phase (2010) nine HEIs out of eleven had an alumna office, out of which six were established in a period of less than a year; and two HEIs did not have such an office. Besides, in some HEIs the role of this office was not clear and therefore relevant information about graduates, which could be used for graduates' surveys, was either nonexistent or spread out in different departments within the institution.

As it can be seen, with such panorama, carrying out graduates' surveys is not an easy task. There is still work to do, even on basic issues like creating standardize graduates' databases. Despite this situation, there are some HEIs that have already had experiences carrying out graduate surveys on a regular basis. Specifically, two HEIs, one university and one NUI, have conducted a couple of times surveys including topics related to the assessment of the institution's academic provision as well as topics related to the relationship of their graduates and the labor market. Other

institutions have made certain approaches to graduate surveys, but are still in the process of development.

Having this situation in mind, the next sections will deal with the methodological aspects of the graduate survey conducted in the framework of this investigation, particularly, the decision about the target population, the sample frame, the method of data collection and the questionnaire, among others.

5.1.1.1. Target Population, Survey Population, Sampling Frame

According to Groves, Fowler, Couper, Lepkowski, Singer, & Tourangeau (2004, p. 67) the *target population* is the group of elements for which the survey investigator wants to make inferences. Target populations are finite in size, they have some time restriction and they are observable. Therefore, the target population of this research is graduates from HEIs registered in Atlántico who were awarded a technical, technological or professional degree in 2008 from any of the following knowledge areas: Fine Arts, Health Science, Economy-Administration-Accountancy and similar, and Engineering-Architecture-Urban planning and similar.

The next paragraphs present, in brief, the main characteristics of the target population as well as the rationales behind its selection:

- The department selected to carry out this research was Atlántico. Atlántico is located in the north coast of the country. It is the fourth largest department in Colombia with respect to the number of inhabitants and it is the most populated department in the Caribbean Region of Colombia. The economy is mainly based on the third sector and its capital city, Barranquilla, is the biggest higher education center in the region. Nowadays, the National Information System of Higher Education-SNIES, reports seventeen HEIs (6 Unis and 11 NUIs) registered in the department, though there are also campuses of other institutions located in Atlántico. Among the reasons to choose this department are the following: 1) it is located in one of the less developed regions in Colombia (c.f. Observatorio del Caribe Colombiano 2006), 2) it is the main higher education center in the region, 3) there are a few studies about the department's NUS, 4) the high growth of the NUS in the time period 2002-

2008. In terms of students' enrollments, the NUS surpasses the US; technical and technological programs' growth was 172% and 70% respectively; while for professional programs, it was 7%.

- The chosen graduates' cohort was the one which finished their studies in the fields of knowledge mentioned above in the year 2008.

In general, the last time when HEIs updated the information of their students is during the administrative process taking place before graduation; therefore, due to the relatively short period between the time of graduation and the time when the survey is launched (2010), the cohort 2008 was chosen. The likelihood of finding updated contact information from graduates is higher, as the time period between the two events is relatively close.

Besides, the fact that most graduates would have between one and two years of work experience could provide information about the characteristics of the relationship between the graduates and the world of work, particularly during the first years after graduation.

Last but not least, the graduates had to be from the areas of fine arts, health science, economy–administration-accountancy, and engineering-architecture-urban planning because these are the only fields in which NUPs and UPs are offered.

Having in mind the characteristics of the target population, 14 out of 16 HEIs registered in the Department fulfilled the criteria. From the potential 14 HEIs one was not included deliberately, as that institution is one of the HEIs of the Colombian Navy, which implies different study conditions as well as a different relation to the world of work as compared to the one from non-military HEIs.

As a result 13 HEIs were invited to participate in this research. Due to previous experiences, in which academic or administrative departments within HEIs had to consult the rector about participating or providing sensitive information, in this case, contact information from graduates; it was decided to contact directly the rector of each HEI. A letter of invitation was sent in which the basic information of the investigation, as well as the required assistance from their institution was explained.

Out of thirteen HEIs five replied affirmatively and expressed their interest in participating in the investigation.

The remaining institutions were contacted again, by bringing in person a letter to the rector office, which was followed up with call reminders. Moreover, they were encouraged to contact the researcher; so they could know from firsthand the aims of the investigation, resolve their doubts if any and most importantly the importance of their participation and the potential benefits from taking part in the investigation. In fact, certain HEIs contacted the researcher and asked for further information about the project. At the end 6 HEIs agreed to collaborate in the investigation. The remaining two HEIs either did not respond to the invitation or decided not to participate because the recently created alumna office did not have the information requested and was busy working in other tasks.

Hence, the *survey population*, which is not the intended target population but the actual population from which the survey data is collected (Groves et al., 2004) corresponds to the graduates of these 11 HEIs.

In general, during the administrative process of graduation students have to fulfill some forms and among those, there is one in which demographical data as well as their contact information is requested. From the researcher's field experience, this form was either requested by the alumna office, the registrar office or the faculty. The databases collected by the different departments within the HEIs would be used as the sampling frame to identify the elements of our target population; so, given the characteristics of the database, the sampling frame will cover all the survey population. Groves et al. also recommends using multiple frames in order to avoid undercoverage that could be caused by outdated data. However, in this research there is not such an option, HEIs only have one database of their graduates that include their contact detail and it is the one that was already given to the researcher.

It is worth mentioning that the state of the databases was different in each institution. Those HEIs that had consolidated alumna offices had more organized and updated databases than those of institutions that were either in the phase of being established or did not have such an office. However, all HEIs agreed in saying that their data base may not include the contact information of the survey population.

In particular for five HEIs, the researcher with the help of an assistant had to complement the information provided in the data bases. In this process different methods i.e., calls, social media and asking other graduates, were used to find the missing contact information of graduates

It is important to mention that 10 out of 11 HEIs provided graduates' database to the researcher; just one HEI did not. Therefore, in comparison to the other ten HEIs there were some differences in the data collection of this particular institution, which will be explained later in this chapter.

5.1.1.2. The Questionnaire

The questionnaire used in this research is mainly based on the questionnaire utilized in the project Careers after Higher Education a European Research Study (CHEERS). This project by using a graduate survey in eleven European countries and Japan in the late 1990s aimed at providing information on the relationship between higher education and employment four years after graduation.

In order to develop the said questionnaire pertinent to the reality of the country and the needs of this investigation, different surveys developed in Colombia and other Latin American countries were perused. To produce the final questionnaire, the guidelines for tracking graduates proposed by the Asociación Nacional de Universidades e Instituciones de Educación Superior-ANUIES (1998) and the questionnaire developed by the OLE, used between 2005 and 2007, was of special importance.

In order to test the validity and reliability of the survey, a group of experts were invited to review the questionnaire and give suggestions for its improvement. Additionally, a pilot survey was conducted for a small sample of graduates from different HEIs. These processes helped to redefine the survey, in terms of administration process (invitation, follow up, etc), it also revealed problems that could arise during the actual survey process, and it showed certain aspects that still needed to be redressed in the questionnaire. Therefore, certain questions were reformulated and others omitted from the final questionnaire

As a result, the final questionnaire consists of seven parts, namely (See Appendix A):

1. *Transition to the higher education*: this part deals with questions related to the characteristics of the secondary education and the period prior to their enrollment on a HEI.
2. *Characteristics of the higher education studies*: in this part questions are oriented to know about the characteristics of the studies, for instance: type of studies, duration of studies, funding methods, characteristics of the institution and the programs;
3. *Transition to work:* this section includes questions about job search mechanisms, the job search duration among others;
4. *Characteristics of employment*: it tackles questions related to the characteristics of the employer (size, economic activity), the contractual relation (salary, working hours/ dedication), occupational field, etc. It also includes questions for those graduates who were unemployed at the time of the survey.
5. *The relationship between higher education and work:* the questions in this part ask about how the field of studies and the level of studies with their work are related.
6. *Assessment and satisfaction with the job*: this part asks graduates to assess different characteristics of their jobs as well as evaluate their satisfaction with the job.
7. *Socio-biographic information:* this section includes general questions about graduates' socioeconomic background.

5.1.1.3. Survey Mode, Data Collection and Data Analysis

The online survey is the mode selected for this research. The main advantages of this type of survey are in terms of costs and time. Other advantages are absence of interviewer bias, convenience for respondents, and it enables a wider and much larger population to be accessed (Topp & Pawloski, 2002) (Van Selm & Jankowski, 2006) (Cohen, Lawrence, & Morrison, 2007). Furthermore, many studies have found that young people, especially students, prefer electronic surveys than the traditional form of surveying (Tomsic, Hendel, & Matross, 2000)

Some of the critics of using online surveys are the limited access to internet for some segments of the population or the inexperience of respondents with the internet; nonetheless the elements of our target population are graduates from the higher education system which implies that they are sufficiently familiarized with the use of computers and the internet. Moreover, the use of internet in Colombia is quite widespread; 74% of Colombians had internet access in 2010 (Ipsos MediaTC, 2012). Despite the fact that internet access problem may arise during the data collection process, this would not be very significant for the survey due to the characteristics of the population.

The program used to create and administrate the survey was on-line QTAFI- stands for Questions, Tables and Figures. Online QTAFI is a database supported by web-use, for simple building administration, and analysis of an online survey, which was developed in INCHER-Kassel.

Furthermore, it was decided to provide each graduate with a pin code to enter the survey. By doing this, the questionnaire was limited to individuals in the survey population and was flexible enough for the participants to continue the survey, if was not possible to finish at the same time they started.

Concerning the data collection, it was developed in various phases. In the first phase, HEIs sent a letter of invitation to their graduates, in which they were encouraged to participate in the investigation by filling out a questionnaire. The researcher asked HEIs to send this first letter of invitation to let graduates know that it was an investigation that counted with the approval of their former alma mater; thus, to avoid any doubts about the research character and earnestness of the survey.

In the second phase, the researcher contacted the graduates using a personalized e-mail message. According to Dillman (1978, 1991 cited in Shaefer and Dillman 1998) personalization shows the respondent that he or she is important and helps increase the response rate. The email sent to graduates, presented a brief overview of the investigation and showed the basic guidelines of how to access to the online survey. Besides, the message also explained about data management, so the respondents could be assured about their anonymity and the confidentiality of their responses.

For the special case of the HEI that did not provide the data base, the process was similar; though the HEI was the one in charge of sending the personalized e-mail. The researcher was provided a list with all the graduates from which the institution had contact information. That list included only an identification number given to each graduate and the name of the program they had graduated from. The researcher assigned to each of them a pin code, which was sent to the HEI; besides, the sample letter to be used for inviting the graduates to participate in the survey was also sent.

In the third phase requests in the form of emails were sent to graduates. These reminders were sent every 15 days during three months. At the end of the three months a letter was sent to thank the graduates for their participation.

The research field-work lasted in total ten months. Approximately three months were needed to contact the HEIs and persuade them to participate in the project, to organize, verify and update the databases provided. As mentioned above, there were not only remarkable difficulties to convince HEIs to participate in the project, but also there were some issues regarding the state of their graduates' databases. Therefore, the data collection and the updating from certain databases took place in parallel.

By the end of February 2010 the first group of graduates was contacted. In the meanwhile, the researcher and the assistant were working with certain HEIs in the update of their databases. There were three particular cases that the digitized data base was created by the author: it was possible thanks to the copies of the forms that the graduates had filled out during the graduation process. These data bases were finished by the end of April 2010 and the data collection finished by the 31st of July.

In order to ensure the consistency in the data collection process, the same survey protocol was applied to the graduates from all the HEIs participating in the study. The data was cleaned and analyzed using the Statistical Package for Social Sciences (SPSS), Version 17.0. The raw data was grouped by HEI to make the cleaning process manageable. The cleaning process started by making frequencies of all variables, and checking that the missing values are not included in the list of valid values, but in the missing list. By doing this it can be certain that missing data is not included in the analysis. Furthermore, responses that did not meet certain criteria were rejected and not used in the data analysis to avoid bias. These included blank

questionnaires, as well as questionnaires that had a reduced number of answered questions, less or equal to 5 percent.

As a result of these procedures a comprehensive database was created, with 1,040 observations, which was used for the analysis of this investigation. Descriptive and inferential statistics were employed to analyze the information. Initially, frequencies, mean, standard deviations as well as contingency tables were used to describe the population. Afterwards, inferential statistical analysis was conducted using the chi-squared test to assess the independence of key variables.

The crosstabulation analysis or contingency table analysis is most often used to analyze categorical variables and to study the relationship between variables. In this case, the higher education sector, namely, NUS and US, is used as the reference variable and it is contrasted with a list of variables that describe different aspects of graduates' socioeconomic characteristics, their educational background, their transition process from the higher education system to the labor market, work features, and characteristics of the relationship of their higher education studies and their work.

In this regard, the chi-squared test for independence has been employed to determine whether there is a significant relationship between two variables, out of which one is the higher education sector and the other is any other variable of interest.

According to Tanbakuchi (2009) the test for independence checks the null hypothesis that there is no association between the two variables in a contingency table where the data is all drawn from one population; therefore the hypotheses are:

H_0: variable A and variable B are independent, and

H_a: variable A and variable B are not independent.

The recommendation of Norusis (2006), which says that "If more than 20% of your cells have expected values less than 5, you should combine categories if that makes sense for your table, so that the more expected values are greater than 5" was followed. Hence, wherever feasible the said variables were recategorized.

Furthermore, the level of significance that has been chosen is $\alpha = 0.05$. To decide whether or not the null hypothesis is rejected or not, the P-value is compared to the significance level and the null hypothesis is rejected when the P-value is less than the significance level, i.e., P-value ≤ 0.05. Table 1 in Appendix B presents in brief the results of Chi-squared test of independence.

In addition to the chi-square test, binary logistic regressions were carried out to analyze graduates' career success. The methodology will be explained in more detailed in Chapter 8. For doing this analysis the statistical software package STATA, version 11.0 was utilized.

5.2 Interviews

Cannel & Kahn by Cohen & Manion define an interview to be a conversation initiated by an interviewer for the specific purpose of obtaining research relevant information and focused by him/her on content specified by research objectives (1985 cited in Watts & Ebbutt, 1987).

There are individual as well as group interviews. Watts & Ebbutt suggest that group interviewing is for groups with more than two interviewees, because the interactions developed when interviewing two people are similar to the one while doing individual interviews. Hence, group interviewing involves interviewing a number of people at the same time, the emphasis being on questions and responses between the researcher and participants (Gibbs, 1997).

In general, interviews may serve three purposes. First, it may be used as the principal means of gathering information having direct bearing on the research objectives. Second, it may be used to test hypothesis or to suggest new ones or as an explanatory device to help identify variables and relationships. Third, the interview may be used in conjunction with other methods in a research undertaking (Cohen, Lawrence & Morrison, 2007). In this study, interviews were used to complement the result obtained from the graduates' survey.

The next section describes in detail the process of interviewing that goes from the interview planning to the interview process and the analysis.

5.2.1. Type of Interview, Questionnaire and Interviewees

Semi-structured interviewing was the method chose to interview the experts. According to Bryman (2008, p. 196) "semi-structure interview refers to a context in which the interviewer has a series of questions that are in the form of an interview schedule but it is able to vary the sequence of questions. The questions are somewhat

general in their frame and the interviewer usually has some latitude to ask further questions in response of what is seen as significant replies".

The interview questionnaire was developed while taking into account the results obtained in the analysis of the survey data. As Kerlinger suggests, interviews may be used among others to follow up unexpected results and to go deeper into the motivation of the respondents and their reasons for responding as they do (1970, cited in Cohen et al., 2007).

Hence, after analyzing the data from the survey, there were certain issues that needed further explanations and for which the experts' perspective would be enlightening and would contribute to the comprehensive understanding of the NUS and the relationship of their graduates with the world of work. Having this in mind, the researcher prepared a list of core questions to be used in the interviews (See, Appendix C).

Concerning the interviewees, they were a small group of academic and administrative staff, who were considered well-informed on the subject matter in their HEI, i.e., rector, academic vice-rector, alumna office coordinators and programs' coordinators.

5.2.2. The Interview Process and Data Analysis

The researcher, keeping their commitment with the rectors participating in the investigation, sent the report with the main results of the survey. In particular, in the letter accompanying the report of the NUIs an interview was requested to know the institutional opinion about the results and to share with them certain questions resulting from the data analysis. One of the institutions answered positively to the researcher's request with the first contact. The remaining five institutions were contacted by phone and the interest of having an interview to know their opinion and comments about certain results was reiterated. At the end, after continual convincing efforts, three institutions agreed to participate.

After the letter was sent to the rector, he was the person who selected the staff to be interviewed. In one case was the academic vice-rector, in another institution was the rector accompanied by the coordinator of the alumna office and in the third

institution it was a committee made up of the programs' coordinator and the alumna office coordinator.

The interview took place at the location selected by the HEIs. The procedure used for the interviews as well as questionnaire was similar in the individual and group interviewing. The questions made during the individual interviews and the group interview followed the same guidelines, but they were adapted to the reality of each institution and the interactions during the interview, depending on the circumstances wherever applicable.

In general, the interview process was carried out as follows: the researcher introduced herself to the interviewees and gave a brief overview of the aims of the interview, then delivered a presentation explaining the investigation and sharing the main results. The presentation was divided in parts, showing the main results by topics, i.e., graduates' socioeconomic characteristics, their educational characteristics as well as the relationship between higher education and work.

Furthermore, all interviews were recorded electronically and at the end of each part the audience was asked the questions related to the presented topic. Interviewees were encouraged, particularly in the group interviewing, to give their opinion and comments on the issues treated, and the researcher in many cases asked follow-up questions, thereby reflecting a healthy participation by the interviewees. At the end of each interview, the researcher took notes of the main ideas resulting from the interview as well as the general characteristics observed during the process. This information would help contextualize and improve the understanding of the information collected.

Subsequently, each of the recordings was listened and the principal themes and main ideas of each interview were written down to make a comparison with the research objectives. The information was classified and organized according to the themes and questions discussed in the interviews. Finally, as suggested by Gerson and Horowitz, the said recordings were carefully listened numerous times and those portions that were useful or relevant were transcribed for further analysis (2002, p.211 cited in Bryman).

5.3. Secondary Analysis

Secondary analysis is the analysis of data by researchers who have not been involved in the collection of those data, for purposes that in all likelihood are not envisaged by those responsible for the data collection (Bryman, 2008). Moreover, it may entail the analysis of either quantitative data, such as official statistics or qualitative data like diaries, minutes of a meeting, policy documents, newspaper articles, books and articles.

The use of secondary data has some merits, for instance: a) it can enable the researcher to reach inaccessible persons or subjects; b) it may show how situation might evolve over time; c) it saves cost and time, as many data sets are available for the public in a central location or in the web; and d) it offer access to high quality data as the organizations have developed structures and procedures to check the quality of emerging data, not to mention the high coverage (national) that these data sets may have (Cohen, 2007 and Bryman, 2008).

As observed, secondary analysis has certain benefits which may encourage their use when doing research; however, while using it researchers may be confronted with certain situations that require their attention. For instance, the documents may be biased and selective as they were written for a different purpose; the documents may exist, but they are not available for the public or when working with data sets it may occur that they may not include all the key variables or if they include them, they may be coded in such a way that the researcher will need time to familiarize with the data. Therefore, in order to reduce validity and reliability issues, the researcher, whenever possible, used corroboration with other documents as suggested by Bailey (1994, p.318).

In this investigation quantitative as well as qualitative data were used. Mainly statistics and official documents, i.e. laws and decrees of education, development plans and reports from the Colombian national ministry of education, were examined. Furthermore, books, published and unpublished articles from national and international higher education researchers as well as official reports from various international organizations, i.e., World Bank, UNESCO, Inter-American Development Bank, OECD, Economic Commission for Latina America and the Caribbean among others were consulted.

5.4. Synopsis and Final Considerations

This chapter presents the research methodology and the procedures followed while doing the field work. The main method used to collect the information was a graduate survey carried out in Atlántico in the year 2010. In addition, interviews to certain experts in the field were used to complement the understanding of the topic under investigation, and to respond to certain questions that emerged during the analysis of the data collected. As a whole, the field work lasted approximately a year. Besides, the secondary analysis was also an important element to respond and to complement some of the objectives of this study. With regard to the field work, the researcher would like to mention certain aspects observed during this endeavor:

- Personal visits to the HEIs as well as calling may raise the possibility of having a response than sending letters.
- A moderate autonomy in the coordinators of alumna offices to provide information, i.e., alumna data bases, was observed. In all HEIs, coordinators needed the approval of a higher-up. However, the researcher cannot generalize this bureaucratic behavior, taking into account that the information requested, i.e., graduates databases, is confidential and sensitive information from HEIs.
- There is still work to do to develop alumna offices and to specify their tasks, but also to make public their existence and their role within the HEI. In a couple of institutions, the academic departments were not well informed about the existence and tasks of this office.
- Graduates, especially NUGs were collaborative during the process of updating the data bases and were interested in participating in the survey.
- There is a regional network of alumna-offices, to which certain HEIs, mainly Unis, belong. Despite having four years of being created at the time of the survey, it neither had studies nor projects about the graduates and their situation after leaving the HE system.

The next three chapters present the main findings that resulted from analyzing the data collected from the survey and the interview.

6. Socioeconomic an Educational Characteristics of Graduates

Chapter 6 and Chapter 7 aim to provide a picture of the main socioeconomic, educational and employment characteristics of graduates as well as the main aspects of the relationship between graduates' higher education and their work. With this in mind, the frequency distribution of the main variables has been analyzed; besides, the Pearson's chi-squared test has been used to test the independence of variables. Furthermore, the variable type of program, i.e., NUPs and UPs, has been chosen as a reference. As the main objective of this work is the NUS of higher education, the selected variable will provide a general vision of this sector in comparison to the US and as a consequence a general picture of the higher education system can be drawn.

The tables to be presented, in this as well as in the next chapter, consist of three columns, the first column shows the results of those graduates who finished a NUP, and it will be identified by the name NUS; the second column corresponds to the results of graduates from UPs, that is US, and the last column shows the total results.

In particular, this chapter focuses on graduates' socioeconomic and educational characteristics. The chapter is divided in three sections: graduates' socioeconomic characteristics, graduates' educational characteristics and final comments and synopsis. The first section analyzes variables such as gender, socioeconomic stratum as well as parents' education; while the second section deals with variables related to graduates' educational background, at both secondary and tertiary level. The third and last part presents in brief the main ideas of the chapter as well as some final comments.

6. 1. Socioeconomic Characteristics

The proportion of male respondents was slightly higher than that one of female respondents see Table 20. This situation may be explained by the students' gender composition of the knowledge areas studied here, i.e., engineering and related fields, business and related fields and health science.

In general, in engineering and related programs male students predominate over female students. In fact, the latest report from the Colombian Observatory of

Science and Technology (Salazar et al., 2010) states that between 2001 and 2009, six out of ten graduates who finished a higher education program in engineering and related fields, were male. Therefore, the result here obtained is not surprising; in fact, 346 out of 513 (66%) male respondents were from the engineering field.

Besides, the proportion of men and women is identical in both sectors; gender is not a factor associated with the higher education sector (X2 (1) =0.001, $p > 0.05$), that is, men and women do study NUPs or UPs indistinctly.

Table 20 Gender (percent)

	NUS	US	Total
Masculino	55	55	55
Femenino	45	45	45
Total	100	100	100
Count	212	670	882

Question H1: Gender

Facts remain that the duration of programs, i.e., NUPs and UPs is different; therefore the age of graduates at the moment of the survey is associated to the type of sector from which they graduated (X2 (2) =184.24, $p \leq 0.05$). The mean age at the time of the survey, in 2010, is quite similar for both groups of graduates; for NUGs it is 25 and for UGs, 26.

In general, NUPs last between 1.5 and 3 years and the average age for finishing high school is 17 years; therefore, it would be expected that NUGs would be in the early twenties at the time of the survey. Hence, the small difference between the mean ages of NUGs and UGs indicates that NUGs are graduating older.

Some of the possible explanations for this situation may be the relative longer transition periods from high school to tertiary education of NUGs when compared to UGs. Actually, 26% of NUGs enrolled in the higher education system after more than one year of finishing their high school, whereas 13% of UGs did so.

Similarly, working responsibilities may have had an effect on the study duration, either by increasing its duration or by delaying their transition to the higher education. In fact, a higher percentage of NUGs worked parallel to their higher education studies, 38% compared to 32% of UGs; likewise a higher proportion of

NUGs were working before entering the higher education system, 25% and 14% for NUGs and UGs respectively.

In regards to graduates' socioeconomic stratum, Table 21 shows that there is a remarkable difference between the two sectors. In fact, a relationship between socioeconomic stratum and graduates' higher education sector (X2 (2) =135.69, $p \leq 0.05$) is shown. As one might expect, UGs are from higher socioeconomic strata than NUGs. In fact, just 3% of NUGs are from high socioeconomic strata, compared to 21% of UGs.

Possible reasons that could explain this difference are students' financial restrictions and the initiatives to catch students developed by HEIs. It is worth reminding that in Atlántico the higher education provision is mainly private, which implies that the economic factor is decisive at the time of choosing the type of program to be studied. It is also determinant the fact that NUPs are of shorter duration and are practical oriented programs that could facilitate students transition to the labor market and of course to generate some earnings.

Table 21 Socioeconomic Stratum (percent)

	NUS	US	Total
Estrato bajo	64	23	33
Estrato medio	33	56	50
Estrato alto	3	21	17
Total	100	100	100
Count	215	673	888

Question H10.: What is the socioeconomic stratum of your current dwelling? (according to the electricity bill)

Besides, HEIs develop specific strategies to catch particular sectors of the population. Each higher education sector has specific target populations and they have indeed stressed their efforts to a particular group of students. For instance, the NUIs that participated in this study have developed actions to be more appealing to high school leavers from strata one, two and three. Hence, the apparent distinction between NUS and US by socioeconomic strata is not only the consequence of preferences from the demand side, but it is also the result of concrete actions carried out by the supply side.

Another variable included in this section is related to the graduates' parental educational attainment. In this regard, graduates were asked about their parents' highest level of education and the possible answers were the different degrees awarded by the Colombian system of education. For this analysis the answers to those questions were recategorized in two groups, namely, with higher education and without higher education.

From the responses it is clear that parents' highest level of education is another aspect that differentiates the two groups of graduates, as shown in Tables 22 and 23. In general, UGs' parents have relatively higher levels of education than parents of NUGs.

Table 22 Father's highest level of education (percent)

	NUS	US	Total
Sin educación terciaria	62	37	43
Con educación terciaria	38	63	57
Total	100	100	100
Count	213	672	885

Question H5.: What is the highest level of education attained by your father?

Table 23 Mother's highest level of education (percent)

	NUS	US	Total
Sin educación terciaria	71	46	52
Educación terciaria	29	54	48
Total	100	100	100
Count	215	674	889

Question H6.: ¿ What is the highest level of education attained by your mother?

38% of fathers and 29% of mothers of NUGs have a higher education degree compared to 63% and 54% of UGs' fathers and mothers respectively. Furthermore, these results coincide with the findings of Ramírez (n.d.) when analyzing the socioeconomic factors determining the academic performance of students of NUPs and UPs from electronic engineering, systems engineering and business. This study states that:"as a whole, parents' educational level varies according to student's level of studies (technical, technological or professional); moreover, the proportion of parents with some kind of higher education is higher for those students who pursue long programs than for those who study short programs".

6.2. Educational Background

This section deals with characteristics of two important periods of graduates' educational life, particularly the characteristics of their secondary and tertiary education.

Table 24 shows the graduates' place of residence at the time of high school graduation. The majority of NUGs and UGs finished their high school in Atlántico, approximately 80%. In general, the higher education system in Atlántico serves local graduates of secondary education. Furthermore, it shows that school leavers from Atlántico, North Coast and other cities attend in relatively similar proportions the NUS and US.

Table 24 Place of Graduation High School (percent)

	NUS	US	Total
Atlántico	84	80	81
Otro municipio costa	14	18	17
En otro municipio fuera de la costa	2	2	2
Total	100	100	100
Count	241	737	978

Question A1.: In which of the municipalities mentioned above did you finish the high school.?

Some differences in terms of high school character according to the higher education sector is shown in Table 25. In general, there is a higher percentage of UGs than NUGs who finished their secondary studies in an institution with an academic character, 77% and 59% respectively.

Table 25 Character High School (percent)

	NUS	US	Total
Académico	59	77	73
Técnico	41	23	27
Total	100	100	100
Count	240	741	981

Question A2.: What is the character of the high school you attended?

Due to the existence of technical and academic high schools, it is not surprising that the character of the high school, technical or academic, and the higher education sector, NUS or US, is associated ($X2\ (1) = 32.12$, $p \leq 0.05$). Therefore, it is likely that graduates whose high school was of technical character would tend to

pursue NUPs, and those whose high school was of academic character would rather choose UPs.

It is also worth mentioning that the relative higher number of NUGs with a technical high school background may also be the outcome of different initiatives promoted by HEIs. For instance, certain NUIs analyzed here have developed agreements with high schools, particularly with technical ones, to articulate their higher education programs with the secondary education. As a result of these agreements, students while in high school may have the opportunity to take some subjects that will later be recognized for their higher education studies; thus, their higher education selection may be influenced by this fact.

Besides, a higher number of graduates attended public high schools; though, some differences are perceived according to the higher education sector. While three quarters of NUGs finished their secondary education in public institutions, half of UGs finished in such institutions, see Table 26.

Furthermore, the origin of the high school is associated with the type of program graduates studied (X2 (1) =35.53, $p \leq 0.05$). Taking into account that NUGs are from relatively lower socioeconomic backgrounds than their counterparts this result is not surprising; in fact, educational preferences may often be determined by the economic factor. Therefore, it is very likely that because of costs, the graduates from low socioeconomic backgrounds have higher preferences for public institutions, for their secondary education and NUPs for their tertiary education (NUPs are considerably less costly than UPs).

Table 26 Origin of Secondary Institution (percent)

	NU	U	Total
Oficial	74	52	57
No Oficial	26	48	43
Total	100	100	100
Count	236	732	968

Question A4.: What is the sector of the high school you attended?

Additionally, the higher education - secondary education articulation programs developed by NUIs have been commonly signed with public schools. In fact, according to the latest report of the District's Secretary of Education (2012) slightly

more than 20,000 students from public high schools were taking part in any of these articulation programs in 2011. One of the reasons for this preference is that public high schools are one of the main sources of their target population, i.e., students from socioeconomic strata one, two and three.

In relation to the higher education characteristics, there are some evident differences in the type of HEI from which the respondents have graduated. The majority of UGs studied at universities (94%), whereas NUGs did at NUIs (93%), see Table 27.

Table 27 Type of Higher Education Institution (percent)

	NUS	US	Total
NUIs	93	6	28
Unis	7	94	72
Total	100	100	100
Count	241	743	984

Question B1.: Please indicate the higher education institution you graduated from?

A segmentation of HEIs according to the type of program is observed; UPs are mainly taught at Unis and NUPs at NUIs. In fact, the latest statistical report from the SNIES (2012) indicates that in 2010 just 23% of NUGs did graduate from Unis.

In general terms, the division of the HEIs by type of programs showed in Atlántico is similar to the one of the country; though it is more pronounced in the Department. Furthermore, this division is most likely the result of the development of the department's higher education market, rather than a consequence of educational regulations or actions promoted by the government.

Additionally, graduates were questioned about the principal funding source to finance their studies. In both groups, the three most used funding sources were parents/relatives, educational loans and graduates' own funds. It is to point out that parents/relatives funding was relatively more used by UGs (65%) than by NUGs (58%), and the use of own funds was relatively higher in the NUS (16%) than in the US (9%) (See Appendix D, Table 1).

Table 28 summarizes the main funding sources in two categories: *self funds*, which include self funding and parents/family funding; and *other funds*, which constitutes scholarships, loans and other types of funding. Contrary to what was expected, there are not major differences between graduates from the two sectors;

graduates from both sectors do use in similar proportions the different funding sources.

Table 28 Main Funding Source for Undergraduate Studies (percent)

	NUS	US	Total
Otro Medios	25	27	27
Medios Propios	75	73	73
Total	100	100	100
Count	241	740	981

Question B4.: Which was the main source of funding used to finance your studies? (Please choose the MAIN one)

For both types of graduates the use of *self funds* source of funding surpasses the *other funds* when financing their higher education studies. Actually, due to the evident differences between socioeconomic strata from both types of graduates, it was expected that a higher proportion of graduates, especially NUGs, finance their studies with *other funds*.

Some of the reasons that could explain the relative lower use of *other funds* could be either that students do not know about the different existing funding sources or that the requirements for such funds are of difficult fulfillment.

According to the members of the faculty interviewed the requirements to apply for those credits are beyond students' possibilities. In most cases, students and/or their families either do not have credit records, or do not have the required income to back up the credits. Therefore, in order to ease students' entrance and/or continuance in the higher education system, some HEIs, especially NUIs, have offered the possibility to pay the tuition fees in installments throughout the semester.

Furthermore, the government created a special credit line, ACCES (after its name in Spanish - Acceso con Calidad a la Educación Superior), to enhance the access to higher education and particularly to increase the enrollments in NUPs.

Among the criteria used by ACCES for granting the credits can be mentioned: the student's financial statement, the student's academic performance and also the type of institution chosen, for which accredited HEIs have priority. Here, once again another type of difficulty arises, accreditation is a voluntary process, and there are only twenty four HEIs accredited out of which only four are NUIs. Out of these four NUIs, one does not offer NUPs, two are military schools and just one is a private

NUIs which offer NUPs. Hence, the requirements set by the government, in this particular credit line, ACCES, are also of difficult fulfillment for many students who want to pursuit NUPs.

Another common result in both groups is related to graduates' interruption of studies; the same proportion of graduates, 15%, had to suspend their studies (See Appendix C, Table 2). This figure by its own does not say much, especially because there are no comparative indicators, for instance a re-entrance rate of higher education students; that is, an indicator of students who have interrupted their studies, but after a period of time enroll again in the higher education system.

In order to give some meaning to this figure, let use as an illustration the national higher education dropout rate in 2007. According to the Vice-Ministry of Higher Education (2009) the average higher education dropout rate in 2007 was of 49%, that is, almost half of the students enrolled in any program of higher education had to interrupt their studies; and by 2012, this figure had not changed.

Therefore, the fact that 15% of graduates who answered that they did once interrupt their studies, may indicate that the number of students that return to the HES is relatively low. However, as mentioned earlier, it cannot be given a final statement about this issue, *study's interruption – study's reenrollment,* because there are several factors, which are not studied here, that may influence the re-entering of students.

Table 29 shows that NUGs and UGs have similar reasons for interrupting the studies. The principal reason stated by graduates was economic difficulties, 56% for NUGs and 50% for UGs. The second reason among NUGs was health problems followed by pregnancy; whereas UGs indicated work and health problems as the second and third main reasons for interrupting their studies, respectively.

If the percentage of people who interrupted their studies due to work reasons, which could be considered as an economic reason, is added to the group that stated economic difficulties; the economic factor would be responsible for almost two thirds of the study interruptions in the course of their academic program.

Table 29 Reasons for interrupting studies (percent)

	NU	U	Total
Dificultades Económicas	56	50	51
Dificultades académicas	6	3	3
Problemas de salud	17	8	10
Calamidad Doméstica	0	5	3
Embarazo	8	5	6
Trabajo	6	12	10
Cambio de lugar de residencia	3	3	3
Pérdida de interés por la carrera	0	2	1
Otra	6	12	11
Total	100	100	100
Count	36	108	144

Question B8.: what were the reasons for interrupting your studies? (Please indicate only the MAIN one)

Additionally, it was surprising the fact that health problems were included in the top three reasons for interrupting the studies. When consulted with the faculty of different NUIs about this issue, they unanimously agreed that the economic factor is the foremost reason for interrupting studies, which may also explain the high incidence of health problems; therefore, in the last couple of years, most of HEIs have included health related campaigns within their institutional activities.

Interviewees also agree that problems of adaptability to the "higher education life" and vocation related issues are also among the reasons for students to interrupt their studies. Hence, most of HEIs have developed programs to follow-up their students, both academically and psychologically. The faculty also remarked the need of actions at the level of the higher education system, especially in those areas of vocational counseling and academic tutoring.

Other aspects included in the survey were related to the inclusion of certain courses or activities that would provide students with some basic qualifications, i.e., knowledge of a second language, use of basic informatics as well as work experience; see Tables 30-32.

Table 30 Inclusion of a Second Language in Study Plan (percent)

	NUP	UP	Total
Si	67	81	77
No	33	19	23
Total	100	100	100
Count	237	736	973

Question B13: Did your study program include the teaching of a second language?

Table 31 Inclusion of Basic Informatics during Studies (percent)

	NUP	UP	Total
Si	74	72	73
No	26	28	27
Total	100	100	100
Count	237	734	971

Question B15.: Was the use of basic informatics (e.g. word processor, spreadsheets) part of your study program?

In regard to the teaching of a second language, there is a clear difference between the two types of graduates. 81% UGs compared to 67% of NUGs stated that their academic program included the teaching of a second language. Concerning the inclusion of basic informatics in the study plan, the situation is similar for both types of programs; though, it is slightly higher in NUPs (74%) than in UPs (72%).

The inclusion of the two mentioned aspects in the study plans of NUPs has had some changes in the last couple of years. Recently, the teaching of a second language i.e., English, and the training on ICTs has been included in the core curriculum of each program. As for the inclusion of internships in the study programs, it is higher in NUPs (72%) than in UPs (66%), as expected. However, one would have anticipated that a higher percentage of graduates from the NUS, not to say all of them, would have had, at least, an internship throughout their studies. In this regard, the interviewees stated that all NUPs do include internships in their study plans; for that reason, they affirm that the most likely explanation for the result obtained here is that a good number of NUGs used to work in parallel with their studies, therefore their work was recognized as the internship.

Table 32 Inclusion of Internship(s) during Study Program (percent)

	NUP	UP	Total
Si	72	66	67
No	28	34	33
Total	100	100	100
Count	233	724	957

Question B16.: Did your study program include an internship?

Last but not least, graduates were asked to evaluate the higher education provision using a scale that ranged from one to five, where one was the lowest grade possible and five the highest. As a whole, in both sectors the assessment of education supply and study conditions is positive, see Table 33.

Graduates in general granted high grades to the evaluated aspects. According to the interviewees, the relative good grades, higher than three, given to all indicators may be a sign of a high sense of belonging to their program and HEI. Other reason that could explain the high grades, particularly of NUIs, may be the exclusiveness of certain NUPs i.e., electro-mechanic related programs, which make their graduates to have comparatively favorable conditions, in both socially and economically, than graduates from other less specific programs. This situation may influence graduates' opinions and assessment due to the direct association that they will do between their positive personal/professional achievements and the program from which they graduated.

Table 33 Assessment of Education Supply and Study Conditions (arithmetic mean)

	NUP	UP	Total
Asesoramiento académico en general	3,9	3,9	3,9
Ayuda/consejos para sus exámenes finales	3,7	3,6	3,6
Contenido básico de la carrera	4,1	4,1	4,1
Variedad de asignaturas ofrecidas	4,1	4,1	4,1
Diseño del plan de estudios	3,9	3,9	3,9
Sistema de exámenes	4,1	3,9	3,9
Oportunidad de elección de cursos y áreas de especialización	3,3	3,5	3,4
Énfasis en la enseñanza práctica	3,7	3,5	3,5
Calidad de la docencia	4,2	4,1	4,1
Oportunidades de participar en proyectos de investigación y desarrollo	3,7	3,5	3,6
Énfasis en la investigación dentro del proceso de enseñanza	3,9	3,6	3,7
Oferta de prácticas y otras experiencias laborales	3,4	3,1	3,2
Oportunidad de contactar al profesorado fuera de clases	3,9	3,7	3,8
Contacto con compañeros de estudio	4,4	4,4	4,4
Posibilidad de los estudiantes de influir en políticas universitarias	3,3	3,3	3,3
Equipamiento de la biblioteca	3,7	4,0	3,9
Disponibilidad de material adecuado para la enseñanza (proyectores, fotocopiadoras, etc...)	3,6	3,9	3,8
Calidad del equipo técnico (computadores, instrumentos de laboratorio, etc...)	3,7	3,9	3,9
Calidad de las instalaciones (aulas, laboratorios, baños. etc...)	3,6	4,0	3,9
Count	241	741	982

Question B18.: How would you rate the study provision and study conditions experienced during the course of the studies from which you graduated from in 2008?

Another reason stated by the interviewees was that HEIs' general environment, namely facilities, equipments, etc. is comparatively better than the one most of the people belonging to strata one, two and three may have had in their previous education institutes.

It is to point out that despite the relative high grades given to the issues evaluated here; both groups of graduates have given, on average, relatively lower scores, less than 3.5, to the three following aspects:

- *Provision of work placements and other work experience* (3,2), in general HEIs agree that sufficient work placements are difficult to find; therefore, it is common to request students to search for their own internship positions as well, and when possible they recognize the work of those students working as an internship.
- *Chance for students to have an impact on university policies* (3,3), concerning this aspect is important to remind that most of the HEIs are private, which certainly influences the institutional management and the role of students in the institutional life. Although, as per law all HEIs do have a student representative in the academic and administrative board; yet, its functions are not well known among students.
- *Opportunity to choose courses and areas of specialization* (3,4), despite the governmental encouragement for developing more flexible curriculums, there are still certain limitations in this regard; and the institution's finances is one of the factors that hinder these changes. Furthermore, as mentioned earlier NUIs are mainly private institutions, i.e., their main funding source are students' tuitions they are small-sized institutions, and their students are mostly from low socioeconomic strata; bearing this situation in mind, it may be difficult for them to offer a wide variety of courses and areas of specialization because of the higher cost they would represent for the institution.

6.3. Synopsis and Final Considerations

This chapter strived to present a general characterization of NUGs who finished their higher education studies in Atlántico in the year 2008.The following paragraphs summarize and comment the main socioeconomic and educational characteristics of graduates.

- In terms of socioeconomic characteristics, NUGs basically belong to the low and medium socioeconomic stratum; and their parents have, in general, lower levels of education than parents of UGs. It is to highlight that the educational attainment from parents was one of the few common variables that could be compared to from OLE survey 2007. When analyzing the results it was found that the fact that NUGs' parents have lower level of education than UG's parents is held.

On one hand, these results could be interpreted as a positive indicator that the NUS is enhancing the access to higher education for marginal groups, namely, from low socioeconomic households and from families whose parents have no higher education (more than half of NUGs parents have no higher education at all). This fact could indicate that one of the main goals of the national educational policies in the last years has started to bear fruit. However, on the other hand, it is also showing a clear segmentation between the two sectors in terms of socioeconomic stratum, and one could even come to think that having two sectors within the higher education system could maintain or even increase the socioeconomic inequalities in Colombia.

- In regard to their educational background, a considerable number of graduates are locals, that is, they finished the secondary school in Atlántico; roughly more than the half attended a high school with an academic character and two thirds went to a public institution.

It is also to remark that the majority of graduates who studied NUPs did attend NUIs. Concerning the latter aspect, it is worth mentioning that in Colombia, UIs, ITs as well as Unis are by law allowed to offer the three types of undergraduate programs existing in the system. Hence, the results show that there is segmentation in terms of programs taught at the HEIs.

- Regarding the funding method which the graduates used to finance their studies, both sectors show a similar behavior. In general, NUGs and UGs use *self*

funds to finance their studies. This situation is worrisome; higher education is an economic burden especially for NUG, who are generally from lower socioeconomic strata than UGs. Furthermore, this fact may help to understand the current high drop-out rates in NUPs (above 50 %) and the difficulty to re-enter the system; the economic burden of studying always exists.

Besides, the higher use of *self funds* to finance higher education studies, may also arise some questions about the real possibilities that the people from low-income households have to enter the higher education system; is it really accessible or is it only accessible for those with certain economic means? Also about the current funding mechanisms available, i.e., scholarships and loans; for instance, are there actually scholarships/ credit lines for students who choose to study a NUP? Is there sufficient available information about funding sources to pursue NUPs? In case of credits, are the conditions to get a loan biased towards a specific type of program? Or are graduates from the NUS averse to take financial risks, such as loans?

- In general, higher assessment of the higher education supply, grades over three in a scale from one to five. This calls the attention of two aspects that had the lowest assessment of the higher education supply, namely graduates' opinion about the provision of work placements and other work experience, and opportunity to choose courses and areas of specialization.

In particular, the first aspect, the graduates' opinion about the provision of work placements and other work experience, i.e., internships, is contrary to what people would expect in days where the most common motto and goal of the general higher education system are the employability of graduates and the relevance and pertinence of academic programs to the needs of the labor market.

This situation has a special importance for the NUS; the practical orientation of their programs, which, indeed, required a close relation to the industry, evidence a clear field in which work and efforts are to be made, especially to improve the pertinence of programs, which is one of the national objectives.

The second aspect, the relatively lower assessment to the item, opportunity to choose courses and areas of specialization, indicates that in general curriculums are still rather fix, which could have negative effects on various issues, for instance, in the research

field, in students mobility (horizontal as well as vertical mobility), and to some extent it may also hinder graduates' future working possibilities.

In a nutshell, the higher education is clearly segmented, NUS for students from low income families and US for medium or high income families. Despite the improvement that this situation may signify, namely the enhancement of higher education enrolments for disadvantaged groups, the economical aspect is still important to have success in the higher education studies, i.e., to graduate. Furthermore, it also determines the characteristics of HEIs which they may attend.

7. Graduates and their Relationship with the World of Work

This chapter presents the different characteristics of graduates' work as well as the characteristics of the relationship between graduates' studies and their current work. As mentioned in chapter 5, wherever possible the information will be contrasted to the country's results, which were obtained from the OLE graduates' survey 2007.

This section is divided in three parts. The first one presents the work characteristics of graduates' job, such as: wages, characteristics of the employers and job satisfaction; the second part deals with the relationship between higher education and work; and the third part presents some comments about the main aspects of this relationship and the characteristics of graduates' work.

7.1. Work Characteristics

Some clear differences in the working status of both groups of graduates are shown; being employed or unemployed is related to the graduates' higher education sector (X2 (1) =14.91, $p \leq 0.05$). At the time of the survey 75% of UGs were employed compared to 62% of NUGs; however, one would have expected that due to the scope and the broadly advertised employability benefits of NUPs over UPs, the proportion of employed NUGs would have been if not higher, at least the same as that of UGs, see Table 34.

Table 34 Current working status (percent)

	NUS	US	Total
Si	62	75	72
No	38	25	28
Total	100	100	100
Count	238	733	971

Question D1.: Are you currently working?

Nonetheless, in contrast to UGs, NUGs have the possibility to further their studies at other levels of undergraduate education, i.e. technological or professional levels, which could explain the relative lower percentage of NUGs being employed at the time of the survey.

Interviewees of specific fields, out of which not many providers are in the Department, agree unanimously that the most probable reason for their graduates to be unemployed was the one mentioned above. According to them, their skills and knowledge is highly demanded in the labor market; thus, the fact of being unemployed responds mostly to a personal decision rather than to a low demand in the labor market.

On the contrary, the faculty of students' highly demanded programs, for instance those from the business and related fields, provide two unexpected reasons that may help to explain the situation:

1) The high number of graduates in those fields increases the competition for jobs in the market; not to count with the additional difficulties that arise when graduates from these institutions have to compete for jobs with graduates from SENA, which is a public institution of education, especially continuing education that counts with high recognition in the industrial sector. In the last couple of years, due to some loopholes in the educational normative, the SENA started to offer technical and technological programs with shorter duration than that offered by HEIs; this situation has increased the supply of manpower in certain areas, hence the competition for existing jobs.

2) Private HEIs are the major providers of NUPs, which could have some influence on the institutional management. Hence, it would not be strange that in some cases their decision about the programs to be offered were based on institutional finances, rather than on the actual needs of the society. Under such a situation, an oversupply of relative low-cost programs, i.e. business related programs, is very likely. Even some of the interviewees said, while for engineering related programs a high investments in labs and equipments is needed; business related programs are "chalk and blackboard" like programs.

As observed, the relative higher percentage of NUGs unemployed responds to various reasons. Furthermore, it is possible that a good number of NUGs that were unemployed at the time of the survey took the decision of pursuing further studies driven by personal motivations; however, the interviewees' response also manifest

that such a decision could be the consequence of certain characteristics of the higher education market.

Concerning the graduates' current work situation, Table 35 shows that regardless of the higher education sector most of graduates are employees, 94% and 88% for NUGs and UGs respectively. Furthermore, just a relatively low percentage of graduates were independent (running their own business); it is to remark that this group was larger in the US (12%) than in the NUS (6%).

Table 35 Current Work Situation (percent)

	NUS	US	Total
Empleado	94	88	89
Trabajador independiente (no Tiene empleados a su cargo)	4	7	6
Empresario/Patrón (tiene empleados a su cargo)	2	5	4
Total	100	100	100
Count	144	537	681

Question D3.: How would you describe your current work situation?

Furthermore, the higher proportion of NUGs whose current work situation is employee indicates that, to some extent, the NUS is achieving one of its core missions: to supply trained human resource to the labor market. The latter aspect is important, but not the principal mission of the US as it is for the NUS.

Table 36 shows that in both groups of graduates, permanent jobs dominate over temporal ones; in general, about two thirds of NUGs and UGs have a permanent work. Furthermore, the sector from which people graduated may not make any difference to the industry when offering temporal or permanent jobs ($X2$ (1) =0.41, $p > 0.05$).

Table 36 Character of the Current work (percent)

	NUS	US	Total
Permanente	68	69	69
Temporal	32	31	31
Total	100	100	100
Count	143	537	680

Question D4.: What is the character of your current work?

In regards to the occupational position, there are no major differences between the graduates from the NUS and the US. Table 37 shows that a significantly larger number of graduates are working in the private sector, 90% and 87% for NUGs and UGs respectively.

Table 37 Occupational Position (percent)

	NUS	US	Total
Vinculado a una empresa privada	90	87	81
Empleado público	10	13	13
Total	100	100	100
Count	143	535	678

Question D5.: What is your current occupational position?

In order to describe simply the type of bond that the graduates have with their current employer, Table 38 has been created. It was made out of the information from Table 1 Appendix E.

Table 38 Type of bond with the Current Employer (percent)

	NUS	US	Total
Contrato a término fijo	25	24	24
Contrato a término indefinido	39	44	43
Contrato de prestación de servicios	19	21	21
Otros	18	11	12
Total	100	100	100
Count	142	536	678

Question D7.: What is the type of your work contact?

Table 38 shows that there are no major differences between NUGs and UGs; the most common and used contracts according to graduate's responses are namely unlimited contract, fix contract, service provision contract, and others, in that order. Furthermore, in terms of work contract, the labor market does not make any

distinction against graduates' higher education sector; it treats NUGs and UGs similarly (X2 (3) =4.96, $p > 0.05$).

As a matter of fact, almost half of the graduates have a type of limited contract, i.e., fix or service provision contract, and a not negligible percentage of graduates have other type of contract that in general have lesser work benefits than that of those having an unlimited or limited contract. This situation implies relatively lower job security for more than half of the graduates.

Concerning the economic sector of graduates' current work, some differences between the two higher education sectors are observed. Nevertheless, the highest number of both types of graduates is working on the business services sector, 15% and 13% for NUGs and UGs respectively. Other sectors in which NUGs are frequently employed are the following: consumers goods industry (13%), commerce (13%), and telecommunications (10%); in contrast, graduates of US are mainly employed in education and research fields (12%), health care (10%) and construction (9%).

The relatively higher number of UGs working in the health sector may be explained by the particular characteristics of this area, which demands human resources with specific qualifications that can only be acquired by studying programs in this field. Besides, those academic programs i.e. medicine, physiotherapy, nursing, etcetera, are mainly long lasting programs, i.e. UPs (Table 2 Appendix E shows the distribution of graduates by economic activity of current work).

Table 39 Economic Sector of Current Work (percent)

	NUS	US	Total
Sector Primario	1	1	1
Sector Secundario	28	26	27
Sector Terciario	71	73	72
Total	100	100	100
Count	136	518	654

Question D8.: What is the economic activity of your employer?

After regrouping graduates' current work by economic activity, it is clear that graduates work either in the secondary sector or in the tertiary sector of the economy, approximately 27% and 72% respectively; see Table 39.

It is also to highlight that the distribution of graduates by sector, corresponds in similar proportions to the importance of each sector to the Department's GDP. In fact, according to the departmental accounts the service sector contributes 72%, the secondary sector 17% and the primary sector 2% to the Atlántico's GDP in 2009 (DANE, n.d.). The low participation of graduates in the primary sector may be explained by the small representation of this sector in the department's economy.

Besides, graduates were also questioned about their monthly wages. Due to the sensitivity of the topic some ranges were provided. A clear difference between graduates' monthly wages depending on the type of program studied is observed (X2 (5) =120.03, $p \leq 0.05$). As expected, employers do make differences against employees' higher education sector when setting the wages.

Table 40 shows that approximately 80% of NUGs have a monthly wage that range from COP$ 500,000 to COP 1,000,000. The high concentration of graduates in such a modest range indicates that the variance in the wages of NUGs is little, which can mean that employers, in general, do value NUGs in the same way. In contrast, the situation observed for UGs is different; wages are more heterogeneous, which suggest that other factors, different to the educational degree, for instance: area of knowledge, type of HEI, family connections, work experience, among others, could be responsible for the difference in their wages.

Table 40 Monthly wages (percent)

	NUS	US	Total
Entre 500,000 y 800,000 pesos	50	15	22
Entre 801,000 y 1,000,000 pesos	29	15	18
Entre 1,001,000 y 1,500,000 pesos	13	24	22
Entre 1,501,000 y 2,000,000 pesos	4	21	17
Entre 2,001,000 y 2,500,000 pesos	4	13	11
Más de 2,501,000 pesos	1	13	10
Total	100	100	100
Count	136	528	664

Question D10: What is your monthly wage?

In regard to the graduates' work location there are some differences by higher education sector (X2 (4) =17.03, $p \leq 0.05$). Table 41 shows that more than half of

graduates work in the Atlantic region, principally in Barranquilla, 73% for NUGs and 61% for UGs.

Table 41 Place of Work (percent)

	NUS	US	Total
Barranquilla	73	61	63
En otras ciudades de la costa	19	18	18
Bogotá	1	12	9
En otras ciudades de Colombia	6	7	7
Fuera del país	1	3	3
Total	100	100	100
Count	144	537	681

Question D13.: In which from the cities mentioned above are you working?

Furthermore, a comparatively higher percentage of UGs work in the country's capital city, Bogotá (12%) and abroad (3%) than NUGs, with 1% in each location. This result may indicate that the NUS is responding positively to one of its core missions, to supply the local needs of human capital at that level of education.

Last but not least, the graduates' level of job satisfaction is relatively high in both sectors; although, it is slightly higher for NUGs, as sown in Table 42.

Table 42 Job Satisfaction (percent; arithmetic mean)

	NUS	US	Total
1 Muy insatisfecho	4	2	3
2	4	5	5
3	17	23	22
4	45	42	43
5 Muy satisfecho	29	26	27
Total	100	100	100
Count	126	486	612
Zusammengefasste Werte			
1,2	8	8	8
3	17	23	22
4,5	75	69	70
Arithmetic mean	3,9	3,8	3,9

Question G1.: To what extent are you satisfied with your current work?

75% of NUGs and 69% of UGs stated that they were satisfied or very satisfied with their job; while, less than 10% of graduates were dissatisfied or very dissatisfied with their job.

As for graduates who were unemployed at the time of the survey, they were asked about their situation after finishing their academic program. Table 43 shows that the three principal activities that the graduates undertook after graduation are the same for both, NUGs and UGs; in a different order, though.

Table 43 Situation of Unemployed Graduates after Finishing Studies (percent; multiple responses)

	NUS	US	Total
He estado siempre desempleado(a)	22	18	20
He tenido trabajos temporales relacionados con mis estudios	33	43	40
He tenido trabajos temporales sin relación con mis estudios	27	32	30
He realizado el servicio militar/ social	1	2	2
He seguido otros estudios	38	24	29
Dedicado(a) al hogar/ Crianza de hijos	3	5	5
Otro	7	10	9
Total	131	136	134
Count	89	182	271

Question D14.: If you are not currently working, what have been your situation after graduation? (multiple response possible)

NUGs indicated going for further studies (38%) in the first place, working on temporal jobs related with their previous studies (33%) in the second place, and in third place working in temporal jobs not related with their studies (27%). Whereas, UGs stated as the principal activity, working on temporal jobs related to their studies (43%) and it was followed by doing temporal jobs not related to their studies (32%) and going for further studies (24%), in the second and third place respectively.

In regard to the response option *furthering studies,* it was found that there is a relationship between pursuing further studies and the graduates' higher education sector ($X2$ (1) $=5.73$, $p \leq 0.05$). Therefore, considering that UPs are at the top of undergraduate programs, it is not surprising that the relatively higher percentage of NUGs undertake this activity after graduation.

To summarize, the fact that having worked on temporal jobs either related or not related with their previous studies is included in the top three of the activities undertaken by the unemployed graduates after graduation, indicates that there is a relative high job-mobility for both NUGs and UGs. This situation could mean that either the graduates do not fulfill the needs of the labor market that is a mismatch in knowledge, skills or expectations between the supply and demand sides may exist, or there is a high mobility due to the specific characteristics of the Colombian labor market i.e. hiring legislation, which favors the job-mobility.

7.2. Characteristics of the Relationship between Higher Education Studies and Work

Different aspects of the relationship between higher education and work were also addressed in the questionnaire, for instance, the use of knowledge and skills in the job, the appropriateness of the level of education and the graduate's job, among others.

Table 44 Use of Knowledge and Skills Acquired during Studies (percent; arithmetic mean)

	NUS	US	Total
1Muy Poco	2	2	2
2	2	4	4
3	15	16	16
4	31	32	32
5 En gran medida	50	46	47
Total	100	100	100
Count	131	505	636
Zusammengefasste Werte			
1,2	4	6	6
3	15	16	16
4,5	81	78	78
Arithmetic mean	4,3	4,2	4,2

Question F1.: If you consider your work altogether, to what extent do you use the knowledge and skills acquired in your course of study?

Concerning the use of the knowledge and skills in the current job, no major differences in the responses of both graduates are shown. Roughly four fifths of NUGs and UGs, use to a great extent the knowledge and skills learned during their studies (answers 4 and 5), see Table 44.

About half of graduates rated very high the use of knowledge and skills in their job, which could be explained by the specificity of certain fields of work, namely the health field and certain technical areas. Furthermore, this result suggests that undergraduate programs of both sectors respond to the labor market requirements on knowledge and skills.

Besides, graduates' opinion on the relationship between the field of studies and the field of work is similar; 55% of NUGs affirmed that their study field was the only field possible/most appropriate in comparison to 47% UGs, see Table 45. The relatively high percentage of graduates answering that their field of studies was the only possible/most appropriate could be explained by the presence of health graduates. In the health field a degree in the health science is a must requirement to perform a job; thereby showing the close relationship between the field of studies and area of work.

Table 45 Relationship Field of Studies and Field of Work (percent)

	NUS	US	Total
Mi campo de estudio es el único posible o el más indicado	55	47	49
Otros campos de estudio pueden ser apropiados para mi trabajo	33	41	40
Otro campo de estudio hubiese sido más apropiado	6	7	7
El campo de estudio no es importante	2	3	3
Ningún tipo de estudios superiores está relacionado	3	1	1
Otros	2	1	1
Total	100	100	100
Count	132	507	639

Question F2.: Is your current work related to the field of your studies?

In addition, 33% of NUGs and 41% of UGs stated that other fields of study could have also been appropriate. On one hand, this result shows that the labor market

is requiring apart from field specific skills, certain general knowledge and abilities; on the other hand, it may imply that graduates are flexible enough to work in different fields from those they graduated, which could be specially the situation of graduates from engineering fields and business related fields.

As for the relationship between higher education studies and the current job, about 75% graduates from both sectors stated that their previous higher education studies and their current work are related to a high extent, see table 46. The closeness of these two sectors is, in general, a positive sign for the higher education system of Atlántico; it suggests that the Department is able to respond, in a good extent to the requirements of the labor market.

Table 46 Relationship between higher education studies and current job (percent; arithmetic mean)

	NUS	US	Total
1 Muy poco	3	3	3
2	6	6	6
3	15	17	16
4	27	27	27
5 En gran medida	48	48	48
Total	100	100	100
Count	132	507	639
Zusammengefasste Werte			
1,2	9	8	9
3	15	17	16
4,5	76	75	75
Arithmetic mean	4,1	4,1	4,1

Question F4.: to what extent is your work related to your prior studies?

Concerning the more appropriate level of education for their current work, some clear differences, which are associated with the graduates' sector, NUS or US (X2 (1) =30.48, $p \leq 0.05$) are observed. In general, some mismatches were found; 66% of NUGs and 45% of UGs did jobs for which they considered another level of education, lower or higher, would have been more appropriate. At first sight this figure is worrisome, but it is worth mentioning that such mismatches do occur in other latitudes. Allen and van der Velden (2001) found that graduates from the Dutch higher education, both vocational graduates and university graduates do have level and/or

field mismatches being relatively higher for graduates from vocational programs than from university programs, 56% and 50% respectively.

Besides, it is to remark that more than half of NUGs, 61%, think that the more appropriate level of education for their current work would be a higher level than the one they actually have: in contrast, just 34% of US graduates agree with that statement, see Table 47.

Table 47 Appropriate Level of Education for Graduates Current Work (percent)

	NUS	US	Total
Un nivel más alto al que me gradué	61	34	40
El mismo nivel	34	55	50
No hacen falta estudios superiores	5	11	10
Total	100	100	100
Count	132	507	639

Question F3.: What is the most appropriate level of education for your current work?

This result is interesting; NUGs' opinion indicate that their level of education, either technical or technological, may not be the most appropriate to the job positions available in the market. However, it is opposite to what NUGs expressed when asked about the use of knowledge and skills in their current job (Table 44) and the relationship between the higher education studies and their current job (Table 46); questions which were positively assessed by NUGs.

Moreover, the interviewees agree that there is a manifested need of NUGs in the labor market; they affirmed that companies when recruiting personnel generally request their collaboration, for instance, sending the graduates' CVs. Therefore, it is possible that NUGs opinion may be influenced by other factors, for instance, the additional tasks, different from those technical ones, that the employees have to do when starting their working life, and for which they were not particularly prepared. Another aspect influencing their responses could be the better socioeconomic recognition of UPs in the society, which makes them underestimate their academic achievements.

7.3. Synopsis and Final Considerations

As it was mentioned earlier, in order to have a better understanding of the results, they were compared, when possible, to the results of the OLE survey 2007. After comparing the information some similar employment and work characteristics were found between Atlántico graduates 2008 who were working in 2010 and their country-fellowmen who had graduated in 2005 and had been working in 2007; see Table 1,2 and 3 Appendix F.

However, the type of bond with the employer was the work characteristic in which some differences were found. Although, the differences observed respond more to changes in the work legislation than to behavioral changes from the employers towards a particular group of graduates. The results obtained reflect the changes towards the relaxation of the contracting system in the country, which has been taking place to encourage the foreign investment in the last years. When comparing the results to that of the country in 2007, these changes are to be observed especially in two aspects: first, the considerable proportion of 2008 graduates who affirmed in 2010 to have other type of contract; and second, in the increasing percentage of graduates working under a service provision contract. Nevertheless, the most common type of bond with the employer is still the unlimited contract.

The fact that the work conditions of graduates in Atlántico are similar to the one that the country had in 2007, could indicate that the work conditions of NUGs and UGs have not changed during that period, 2007-2010; however, due to the impossibility to find, for most of the variables, comparable data for the period and the population studied here a conclusive statement cannot be given.

As for the characteristics of graduates' work and the relationship between their studies and their current work, they can be resumed as follows:

- The type of bond with the employer, the character of work and the occupational position is similar for both NUGs and UGs. However, a clear distinction between NUGs and UGs monthly wages and work placement is observed. NUGs as a whole have lower wages than UGs; and in terms of work placement, NUGs have relative lower mobility than UGs.

NUGs most common work placement is Atlántico. A great number of graduates staying in the Department show that their qualifications are required by the local market, which could be interpreted as an achievement for the NUS in Atlántico. Specially, because one of the main goals of the NUS is to supply the local needs of human capital at that level of education, i.e. technical and technological level. However, other factors not studied here may influence this situation as well.

- In general, a relative close relationship between higher education and work, principally in terms of use of knowledge and skills, relationship between work and previous studies and between the field of studies and the graduates' field of work, is observed. Nevertheless, they have different opinions about the most appropriate level of education to perform their current work.

From graduates' perspective, the higher education seems pertinent and fulfilling to the requirements of the labor market in terms of field knowledge and general knowledge and skills. However, it is interesting that a considerable proportion of graduates consider their level of education as not appropriate, particularly NUGs.

If the case of NUGs is only considered, the situation raises some questions. For instance, does the labor market not need this kind of qualifications, namely NUPs? Does the type of organization or the job position in which graduates work influence their perception in regards to the knowledge and skills needed to perform their job? In either situation it indicates that there is still work to do in terms of match between the level of education and current work tasks, because apart from the specific knowledge and skills, they might need other types of skills and knowledge to perform their job for which they have not being trained.

Beyond the technical and knowledge based reasons that can be considered as responsible of their answer; their response could have also been motivated by the distinguished socioeconomic status that UGs have within the society, which they might think is their goal to achieve in higher education. This idea is not at all weird, Colombians have a considerably preference for UPs and it is considered by many as the goal when entering higher education; NUPs are thought to be either for people with low academic conditions and/or financial resources. In fact, Colombians commonly use the term university-education when referring to higher education; even

it is possible to find certain official papers using this term, which denotes the need of consolidation of this sector within the higher education system.

In a nutshell, work characteristics are similar for NUGs and UGs, and as expected there is a difference in the monthly wages, which is in favor of UGs. As per graduates' opinion the major educational mismatch is related to the appropriate level of education for current job, which shows a clear difference between the two sectors.

8. Graduates' Career Success

This chapter presents the main results of the logistic regression analysis. This analysis was conducted to determine the factors associated to graduates' career success, one to two years after graduation. It is divided in three sections: the first part describes, in detail, the most important methodological aspects; the second analyses the results obtained from the logistics regressions; and the third and last part, presents the main conclusions and final remarks.

8.1. Methodological Aspects

The binary logistic regression analysis has been used to determine the factors that are associated to the probability of being professionally successful. In brief, it is a regression model for binary outcomes (finish or not finish the dissertation, develop or not develop a disease, being or not being successful), that allows researchers to explore how each explanatory variable affects the probability of the event occurring (Scott Long & Freese, 2006). In this case, the effect of the educational background, socioeconomic characteristics, job search characteristics, work conditions and the relationship between higher education and work on the probability of being professionally successful for graduates who finished their higher education studies in Atlántico in the year 2008, is analyzed.

Several authors (c.f. Norusis 2006, Long and Freese 2006, Cabrera 1994) recommend the use of the binary logistic regression analysis over the multiple linear regression analysis when the variable under investigation has two values. Furthermore, when there is a high presence of categorical variables in the model; the odds ratio provided by the logistic model is more meaningful than the information that the betas from the multiple linear regression models would provide (Norusis 2006, p.314). Therefore, based on the characteristics of the data and the goal of this analysis, the binary logistic regression has been chosen for analyzing the professional success of graduates who finished their higher education studies in Atlántico in the year 2008.

As for the career success, it is measured in terms of six indicators, which are grouped in *objective indicators*, i.e., monthly wages, job search duration; and

subjective indicators, i.e., job satisfaction, work autonomy, work status/recognition and the use of knowledge and skills.

Concerning the subjective indicators some considerations are the following:

1) For the variable *use of knowledge and skills* information from one question from the Section F of the questionnaire, *Relationship between Higher Education and Work* has been used. In this section, graduates were asked, according to their experience, about different characteristics of the relationships between these two sectors.

   Specifically, question F1 in the survey, which states: If you consider your work altogether, to what extent do you use the knowledge and skills acquired in the course of study? A scale from one to five was provided, so graduates could state the extent of use of their knowledge and skills in their current job, where one (1) indicated not at all and five (5) to a very high extent. Therefore, for this indicator the answers four and five has been set as success.

   2) The variable *job satisfaction* was determined using the question G1 of the questionnaire: altogether, to what extent are you satisfied with your current work? The possible answers ranged from one to five, where the value one indicated, very dissatisfied, and the value five, very satisfied. Answers four and five to this question were coded as one (1), success.

   3) In particular, the *work autonomy* and *status/recognition* indicators are index variables that were obtained after using factor analysis from the graduates' survey question G3: to what extent do the following characteristics of an occupation apply to your current professional situation? There were nineteen items, which graduates had to evaluate using a scale that ranged from 1= not at all to 5= to a very high extent.

   The factor analysis is a statistical technique used to identify a relatively small number of factors that explain observed correlations among variables. Furthermore, it can also be used to reduce a large number of correlated variables to a more manageable number of independent factors that can be used in subsequent analysis (Norusis, 2006). For this particular

analysis, SPSS 17.0 has been used. The factor analysis option has been accessed by using Analyze > Dimension Reduction > Factor.

To measure the sampling adequacy the Kaiser-Meyer- Olkin (KMO) has been used. It compares the sizes of the observed correlation coefficient to the sizes of the partial correlation coefficients. Small values of the KMO measure tells that a factor analysis of the variables may not be a good idea; in this case the overall KMO measure is 0.954, indicating that it is reasonable to proceed with the factor analysis (Appendix G, Table 1).

To determine the number of underlying factors the method of principal component analysis has been used. Following the eigen value-greater-than-one criterion, there are three factors, which explain the 63% of the total variance (Table 2 Appendix G). Finally, the Rotated Component Matrix shows the factor loadings for each variable to each factor (Table 3 Appendix G). According to Field (2000), factors loading higher than 0.4 are considered appropriate for interpretative purposes.

Furthermore, the Job Characteristics Model (JCM) by Hackman and Lawler (1971) has been used as basic reference for the common themes of the three factors. From the results of factor analysis and having the JCM as a reference, two new variables were created using the method of item parceling. This method was created by Cattel (1957) and it involves the summing or averaging of two or more items and using the result as the basic unit of analysis.

Variables which load highly to factor 2 appear to be related to the content of the occupation, and based on the JCM, this factor has been labelled as work autonomy factor. The variables which correlate highly with the third factor were denominated as status/recognition factor.

The first variable, *work autonomy,* includes the following items: largely independent disposition of work, opportunity of undertaking scientific/scholarly work, enough time for leisure activities, variety, and good time management for work and family tasks. Concerning the second variable, *status/recognition*, it is a compound of items: social recognition

and status, job security, high income, chances of influence and good career prospects.

Besides, it is also important to mention, that the categorical explanatory variables with more than two categories were recoded into a set of k dummy variables. Furthermore, the variable with the highest frequency has been chosen as the reference variable.

Bearing in mind the previous remarks, this section aims to systematically analyze the determinant of graduates' professional success (in the framework of the six selected indicators) in the early career stages i.e., one to two years after graduation. The population under study was graduates with long traditional programs and short cycle higher education programs, who finished their academic programs in the fields of engineering, business and health science in Atlántico (Colombia) in 2008.

To resume, the dependent variables take the value one (1) which indicates a positive outcome (i.e., the event did occur, success) and the value zero (0) that denotes a negative outcome (i.e., the event did not occur).

The independent variables are grouped into five categories (see Appendix H):

- Socioeconomic variables: gender, age, socioeconomic stratum, parents' highest level of education.
- Educational variables: character high school (academic or technical), sector of the high school (public or private), sector of the higher education institution (public or private), field of studies (engineering, business and health science) and assessment of HE provision (average grade, which ranges from 1 to 5).
- Transition to work: job search duration.
- Work Characteristic: job satisfaction, work autonomy and status/recognition.
- Relationship between Higher Education and Work: appropriateness of position with regard to the level of educational attainment and use of knowledge and skills.

The data that has been used consists of 1,040 graduates of short and long lasting academic programs that finished their studies in 2008 in Atlántico, Colombia.

For a better understanding and for the sake of determining the factors associated with professional success binary logistic regressions have been run for each of the professional success indicators for NUGs and UGs separately. The logistic regression analysis was carried out by the logistic procedure in STATA version 11.

To find the most appropriate model a backwards selection has been used. Hence, after running the full model, the variables with p-value > 0.1 were sequentially omitted until the best model was found.

The first model, full model, is made up of seventeen independent variables and it was compared to a second model, which did not include the variables with low levels of statistical significance, with the exception of those variables that were left in the model because of their relevance for this study.

Both models were tested and the model better fitted was selected. In the selection process, the likelihood ratio test (lrtest), which tests the coefficients, was taken into account. This test assess whether or not the omitted coefficients are equal to zero.

Finally, the selection of the better fitted model was made on the basis of the model with the more negative BIC statistic (Raftery 1995 cited in Long and Freese 2006). To see the results of the logistic regression and to see the output tables used to compare the models, please see Appendix I and Appendix J, the former shows the tables for the analysis of the US and the latter presents the tables related to the NUS.

8.2. Factors associated to Career Success

Before presenting the results of the logistic regression analysis, it is important to remark that in the analysis of the indicators of the NUS, the variable stratum is a dichotomous variable i.e., it has two values, low stratum (1) and medium stratum (0). This situation happened because of the low number of observations whose socioeconomic stratum was high; in total five NUGs stated to belong to this stratum. Therefore, and for not missing valuable information from these graduates, these observations were added to the middle stratum.

Besides, it is important to remind that due to the number of observations in certain variables, i.e., type of HEIs and appropriate level of education the analysis of NUGs' career success did not include them.

This subsection will be divided in six parts, which deal with each of the indicators of success, namely monthly wages, job search duration, job satisfaction, work autonomy, work status/recognition and use of knowledge and skills. Each part will analyze the results of the respective binary regression models, for both UGs and NUGs.

8.2.1. Monthly Wages

To determine the monthly wage that could be regarded as professional success among UGs has been used as reference the monthly wage stated by the OLE. According to the OLE, the average monthly wages for graduates of 2008 who finished professional programs and who were employed in Atlántico in the year 2010 was COP $ 1,349,716. Hence, in our model UGs' monthly wages equal or higher than the mentioned amount were coded as one (1) and wages under this amount coded as zero (0).

In order to establish the reference wage for NUGs a weighted mean of the monthly wage of graduates of technical professional and technological programs has been used. According to the OLE the monthly wage of technical professionals and technologists who finished their studies in 2008 and were working in 2010 was COP$ 919,526 and COP$ 1,068,894, respectively.

Taking into account the population of graduates of each type of program and the corresponding wage, the weighted mean is COP$ 958,572. This amount is the reference monthly wage to determine success in NUGs. Hence, the wages of NUGs that are equal or higher than COP$ 958,572 are coded as one (1) and wages under this amount as zero (0), respectively.

Table 48 shows the results of the logistic regressions for the monthly wage indicator. For both types of graduates the socioeconomic stratum, father's highest level of education, character of high school, job satisfaction and status/recognition are significant variables.

Table 48 Percent Change in the Odds of Monthly Wages for UGs and NUGs

logit (N=420): Percentage Change in Odds

Odds of: 1 vs 0

d10_1	b	z	P>|z|	%	%StdX	SDofX
h1	-0.17774	-0.639	0.523	-16.3	-8.5	0.4988
h2	0.05033	1.110	0.267	5.2	18.2	3.3260
low	-0.40893	-1.308	0.191	-33.6	-15.0	0.3969
high	1.47910	3.522	0.000	338.9	86.2	0.4204
eduF	0.53869	1.891	0.059	71.4	29.8	0.4844
eduM	-0.12407	-0.426	0.670	-11.7	-6.0	0.4988
a2	0.68079	2.167	0.030	97.5	31.0	0.3969
a4	-0.35872	-1.345	0.179	-30.1	-16.4	0.5005
proging	0.86352	2.677	0.007	137.1	52.9	0.4919
progsal	0.62741	1.409	0.159	87.3	24.8	0.3528
b1_0	0.21750	0.534	0.593	24.3	7.7	0.3403
b1_1	-0.62749	-1.268	0.205	-46.6	-14.5	0.2497
g1	1.00644	3.486	0.000	173.6	59.6	0.4648
faut	-0.48406	-1.472	0.141	-38.4	-20.0	0.4619
frecog	1.10518	3.475	0.001	202.0	73.9	0.5006
hle	0.14989	0.504	0.614	16.2	7.3	0.4720
nhe	-0.65441	-1.700	0.089	-48.0	-19.0	0.3214

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-est
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=95): Percentage Change in Odds

Odds of: 1 vs 0

d10_1	b	z	P>|z|	%	%StdX	SDofX
h1	-0.23288	-0.323	0.747	-20.8	-11.0	0.5004
h2	0.27393	2.732	0.006	31.5	331.9	5.3408
str	-1.46621	-2.263	0.024	-76.9	-51.4	0.4925
eduF	-1.43438	-2.050	0.040	-76.2	-49.9	0.4819
eduM	-0.18373	-0.263	0.793	-16.8	-7.8	0.4427
a2	1.23478	1.784	0.074	243.8	85.2	0.4993
a4	-0.50873	-0.768	0.442	-39.9	-20.2	0.4427
proging	0.90428	1.086	0.277	147.0	57.5	0.5024
progsal	0.62424	0.720	0.471	86.7	27.2	0.3853
b1_0	0.33253	0.355	0.722	39.4	17.8	0.4925
g1	1.23011	1.636	0.102	242.2	71.1	0.4368
faut	1.01613	1.489	0.136	176.2	63.7	0.4849
frecog	1.46076	2.062	0.039	330.9	105.3	0.4925

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

With the exception of character of high school and program's area of knowledge, the educational variables are not related to the monthly wage of graduates. Actually, for both NUGs and UGs, the character of high school is highly associated to this indicator, which denotes that employers do value the fact that their employees have an academic oriented secondary education.

Having graduated from high school with academic character has especially a great effect on NUGs' wages; it increases the odds of having a success wage by slightly more than 200% compared to those NUGs who finished in a technical oriented high school. One would have expected that graduates with technical high school background would have had higher possibilities for higher wages; especially because of their work experience. However, the situation presented here is not the case.

In a department like Atlántico whose predominant economic activity is the third sector it is not strange that jobs, for instance customer service related jobs, require in addition to specific knowledge and skills, other skills, i.e., interpersonal skills, analytical skills and cultural knowledge, which to some extent are provided in high schools with academic character. Therefore, a possible explanation for such a result could be that the labor market does require apart from the specific technical knowledge some other kind of knowledge and skills that could be provided in academic oriented high schools.

Regarding the program's area of knowledge, it was only significant for UGs, which implies that the graduates' program area of knowledge does have a distinct effect on wages. Furthermore, there is a high and positive correlation between the area of knowledge and the wages; having graduated from engineering or health related programs instead of a business related program increases the odds of having a success wage by 137% and 87% respectively, all other variables being equal.

These results concur to the information on graduates' wages provided by the OLE, in which graduates from the business field do have lower monthly wages (COP$ 1,578,118) than those earned by graduates from health science (COP$1,582,439) or engineering (COP$1,806,528) fields.

This situation is in accord with what could be expected when comparing graduates from these three knowledge areas; especially because among the different higher education programs, those from the business field are of the programs with the highest demand from students. Hence,

it is very likely that there is a greater supply of graduates of this area in the labor market, which may negatively affect their market price, i.e., lower wages. In fact, the total number of graduates in 2008 was 190,600, and from them 28% were graduates from this field as compared to 23% from engineering and 8% from health science (OLE, 2012).

Another possible reason to explain the relative higher odds of engineers to be successful, in terms of monthly wages, when compared to business graduates are the country's internationalization policies. In fact, in the last years several multinationals companies, particularly in the petroleum, mining and quarries, and manufacturing sector have been established in the country. According to PROEXPORT statistics, between the 2010 and 2011, the foreign direct investment grew 56% in Colombia, being the petroleum and mining sector, the one with highest growth, 55% (PROEXPORT, 2011). Hence, such an expansion calls for a higher demand of engineers, which could have contributed to increase their price in the market.

Additionally, it was found that the low socioeconomic stratum has a negative effect on the odds of being successful in terms of monthly wage for both type of graduates; in fact, the odds of having a *success monthly wage* decrease by 77% for NUGs and 33% for UGs when compared to NUGs and UGs who belong to the middle socioeconomic stratum, holding all other variables constant.

For the particular case of UGs, this situation may imply that people with the same level of education do have different prices in the labor market, and their socioeconomic strata may probably have an influence on this price.

Regarding work characteristics, it was found that graduates' job satisfaction (g1) and work status/recognition (frecog) have a great positive effect on the odds of having a success monthly wage; although, they have a higher impact on NUGs' wages than on UGs' wages.

Last but not least, the variable *appropriate level of education for their current job* is negatively associated to the UGs' success wage; the odds of having a success wage is reduced to 49% for those who stated that no higher education was needed when compared to the reference group, same level of education is appropriate. This situation is not strange taking into account that one of the characteristics of being overeducated/underemployed is the fact of having lower conditions than the set standards, for instance, in wages, working hours and occupational position.

This result agrees with that from Mora (2007) in which he affirms that those who are overeducated earn 2% less than those who have appropriate education.

8.2.2. Job Search Duration

Based on the average period that UGs and NUGs need to find a job the success time of job search duration was set. Hence, job search durations up to seven months for UGs and up to six months for NUGs were coded as one (1); periods longer than seven months and six months for UGs and NUGs respectively, were coded as zero (0).

There are some evident differences between the two groups of graduates. Moreover, it is to point out that, in general, the socioeconomic variables were not associated to successful job search durations. There is just one exception in each group, age (h2), which is moderately and negatively associated to UGs job search duration; and father's education (eduF), which is highly associated with successful job search durations for NUGs (See Table 49) .

In fact, the odds of having a successful job search duration is reduced by 12% for each additional year of age. Thus, younger graduates have higher chances of having shorter job search spells. This situation may be explained by the lower costs as well as by the greater disposition to learn for young graduates, which are appealing factors to companies (Rodríguez, 2008).

While for NUGs, father's education has the highest impact on the search duration; for those NUGs whose father has higher education studies the odds of having a shorter job search duration, less than six months, increase by more than 300% compared to those NUGs whose father has no tertiary education.

A possible reason for such a high effect could be the fact that a greater number of NUGs' fathers with higher education do also hold a non-university degree. In fact out of the total fathers with higher education, 57% hold a non-university degree; therefore, they may be familiar with the potential job market of their children and may help them in the job search process. Moreover, it is important to highlight that the method used mostly to find a job is family networks. Therefore, these two characteristics, fathers' level of education and the job search methods, could help to explain the high positive impact of fathers on the job search duration of NUGs.

Table 49 Percent Change in the Odds of Job Search Duration for UGs and NUGs

logit (N=377): Percentage Change in Odds

Odds of: 1 vs 0

jsd	b	z	P>|z|	%	%StdX	SDofX
h1	0.05162	0.176	0.860	5.3	2.6	0.4974
h2	-0.12676	-2.990	0.003	-11.9	-32.9	3.1440
low	0.01264	0.037	0.971	1.3	0.5	0.3936
high	0.51972	1.349	0.177	68.2	24.2	0.4167
eduF	-0.04032	-0.137	0.891	-4.0	-1.9	0.4809
eduM	0.62951	2.147	0.032	87.7	36.7	0.4971
a4	-0.47959	-1.737	0.082	-38.1	-21.3	0.4999
proging	0.36066	1.043	0.297	43.4	19.2	0.4878
progsal	0.27290	0.570	0.569	31.4	10.2	0.3561
b1_0	0.64531	1.414	0.157	90.7	24.3	0.3367
b1_1	1.01318	1.735	0.083	175.4	28.7	0.2492
d10_1	0.54080	1.831	0.067	71.7	28.0	0.4564
g1	0.57146	1.835	0.066	77.1	30.5	0.4654
faut	-0.55352	-1.661	0.097	-42.5	-22.6	0.4632
frecog	0.54524	1.617	0.106	72.5	31.4	0.5006
hle	-0.40224	-1.308	0.191	-33.1	-17.2	0.4695
nhe	-0.37915	-0.927	0.354	-31.6	-11.4	0.3183

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=79): Percentage Change in Odds

Odds of: 1 vs 0

jsd	b	z	P>|z|	%	%StdX	SDofX
h1	0.17694	0.246	0.805	19.4	9.2	0.4983
h2	0.06767	0.684	0.494	7.0	35.4	4.4833
str	0.51711	0.658	0.510	67.7	28.3	0.4814
eduF	1.48863	1.698	0.090	343.1	104.8	0.4814
eduM	-0.20578	-0.278	0.781	-18.6	-9.1	0.4628
a2	0.50456	0.750	0.453	65.6	28.3	0.4940
a4	-1.08118	-1.460	0.144	-66.1	-40.0	0.4729
b1_0	-1.35904	-1.830	0.067	-74.3	-49.5	0.5028
b_18	1.37725	2.760	0.006	296.4	150.3	0.6662
g1	0.87371	1.180	0.238	139.6	49.1	0.4572
frecog	0.05239	0.070	0.944	5.4	2.6	0.4914

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

Concerning the educational variables, those related to higher education, i.e., origin of the HEI (b1_0) and assessment of the higher education provision (b_18) are highly related to NUGs' job search duration.

Furthermore, the origin of the HEI does have a negative effect on the job search duration; the odds of being successful in terms of job search duration are reduced by 74% for those NUGs who graduated from public HEIs compared to those graduated from private HEIs, all other variables being equal. In general, in Colombia private education has higher social recognition than public education does, which could explain the negative impact of being graduated from a public HEI.

Other possible reason for this result is that graduates' from the public sector may be from more specialized programs than graduates from the private sector. In fact, the only public NUI in Atlántico offer a bunch of specialized programs that are not offer at any other HEI, i.e., Tecnología en Electromecánica, Tecnología en Equipos Biomédicos, Técnico Profesional en Producción Agroindustrial. These programs are very specific and so are the potential employers requiring such qualifications; therefore, it is possible that those graduates may need longer periods of time to find a job than graduates from more general programs.

In regards to the assessment of the HE provision (b_18), it has great positive effects on the odds of having success in terms of job search duration; the odds increase approximately by 300% for each additional grade that the graduates give to the assessment of the HE supply.

In contrast, for UGs the educational variable that has the greater impact on the job search duration is the type of HEI (b1_1). Actually, the odds of finding a job in periods shorter than six months increase by 175% for those UGs who studied long lasting programs in NUIs in comparison to those who graduated from Unis.

The possible reasons for this result may be:

1) Employers appreciate more the practical orientation that these types of institutions offer;

2) UGs of these NUIs might have already been working during their studies. Actually 40% of UGSs who studied at NUIs were working while studying; or

3) UGs who studied in NUIs may have a lower price in the market than UGs graduated from Unis. The *calculadora de salarios*, a tool of the web page

finanzapersonales.com.co, which provides information about the salaries graduates, may earn according to the geographic location, type of institution, type of program and gender confirms the above-mentioned. When comparing the salary of graduates of the program business administration in Atlántico the results are certainly different between the graduates of NUIs and Unis. For instance, graduates from the Corporación Universitaria de la Costa (NUI) would have on average a salary of about COP $ 1,340,000 whereas the salary ofa graduate from the Universidad Autónoma del Caribe (Uni) is about COP $ 1,700,000 (2012). Therefore, the difference of NUGs and UGs' price in the market could be considered an important aspect that influences graduates' job search spells.

Concerning the *work characteristic* related variables, for NUGs they are in general not associated to the fact of having success job search durations. However, the situation for UGs is different, the variables work autonomy, job satisfaction and monthly wages are found to be highly related to the success in job search duration.

In particular the work autonomy is negatively associated with the job search duration. This situation is understandable taking into account that posts with high degrees of autonomy are not commonly addressed to young graduates with low or no work experience, which is the main case here.

8.2.3. Job Satisfaction

For job satisfaction, answers four and five to the question: to what extent are you satisfied with your current work? were set as the indicator of success and coded as one (1); whereas, answers one, two and three, which indicated lower levels of job satisfaction were coded as zero (0).

Table 50 shows that neither socioeconomic variables nor educational variables are associated to the graduates' job satisfaction. However, for UGs, all variables related to *work characteristics* and *relationship HE and work* were found to be highly associated to their job satisfaction. Therefore, a subjective career success indicator like job satisfaction is, as Hughes stated, related to the people's personal values and their perception of their working environment rather than on variables like gender, socioeconomic stratum and parents' education.

Unfortunately, due to the lower number of observations it was not possible to see how those variables are related to the NUGs' job satisfaction.

The work related variables, namely wages (d10_1) and occupational status (frecog) are associated with high degrees of job satisfaction for UGs. In particular the status/recognition variable is the one with the highest effect on the odds of being successful in terms of job satisfaction; it increases the odds by six times when compared to graduates with jobs with lower levels of status/recognition. Meanwhile, having a monthly income higher than the average, COP $ 1,349,716, increases the odds of being highly satisfied with the job by 170%.

This result coincides with national and international investigations in which such variables, i.e., wages and occupational status were found to be positively associated with job satisfaction; from Colombia the investigations from Farné and Vergara (2007) and Olarte (2011) can be mentioned, and among the international studies the work by Nguyen, Taylor and Bradley (2003), Clark (1997) and Shields and Price (2002) can be cited.

Concerning the variables describing the *relationship HE and work*, they were highly associated to the job satisfaction success. For instance, graduates who use to a high extent the knowledge and skills acquired during higher education increase the odds of being satisfied with their job by 83% in comparison to those who use it to a lower extent.

The effect of the mismatch between the level of education acquired and the one appropriate for the job is significant; though, different for overeducated and for undereducated graduates, when compared to graduates who have the matching (appropriate) level of education.

In particular, overeducation has negative influence on the graduates' job satisfaction; the odds of being satisfied with their work are reduced by 80% for those graduates whose current work requires a lower level of education than the one they have. While those graduates whose jobs require a higher level than the one they posses, the odds are increased by 86% as compared to those graduate who have an appropriate level of education.

Table 50 Percent Change in the Odds of Job Satisfaction for UGs and NUGs

logit (N=433): Percentage Change in Odds

Odds of: 1 vs 0

g1	b	z	P>|z|	%	%StdX	SDofX
h1	-0.08844	-0.316	0.752	-8.5	-4.3	0.4987
h2	0.00915	0.185	0.854	0.9	3.3	3.5020
low	-0.11408	-0.314	0.753	-10.8	-4.4	0.3923
high	-0.26082	-0.767	0.443	-23.0	-10.4	0.4189
eduF	-0.45196	-1.469	0.142	-36.4	-19.7	0.4856
eduM	0.45050	1.481	0.139	56.9	25.2	0.4989
a2	-0.36978	-1.038	0.299	-30.9	-13.6	0.3959
a4	0.07764	0.291	0.771	8.1	4.0	0.5004
proging	0.15058	0.443	0.658	16.3	7.7	0.4913
progsal	-0.13026	-0.272	0.786	-12.2	-4.5	0.3507
b1_0	0.50303	1.150	0.250	65.4	18.3	0.3334
b1_1	0.41442	0.726	0.468	51.3	10.9	0.2503
d10_1	1.00667	3.424	0.001	173.6	58.1	0.4547
frecog	1.94725	6.698	0.000	600.9	165.0	0.5005
f1	0.60465	2.066	0.039	83.1	29.6	0.4291
hle	0.62011	2.023	0.043	85.9	34.0	0.4717
nhe	-1.71693	-4.036	0.000	-82.0	-42.3	0.3200

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=89): Percentage Change in Odds

Odds of: 1 vs 0

g1	b	z	P>|z|	%	%StdX	SDofX
h1	0.50004	0.847	0.397	64.9	28.2	0.4974
h2	-0.02830	-0.462	0.644	-2.8	-11.5	4.2988
str	-0.29529	-0.519	0.604	-25.6	-13.2	0.4791
eduF	-0.54814	-0.957	0.339	-42.2	-22.9	0.4754
eduM	0.52820	0.894	0.372	69.6	27.3	0.4573
a2	0.10022	0.192	0.848	10.5	5.1	0.4956
b1_0	0.27251	0.461	0.644	31.3	14.7	0.5020
b_18	-0.11356	-0.280	0.779	-10.7	-7.3	0.6717
jsd	0.85582	1.474	0.141	135.3	45.8	0.4403

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

These results are similar to the findings of Allen and van der Velden (2001) when analyzing the educational and skills mismatches and their effect on Dutch graduates' job satisfaction. They found that over education has a negative effect on the job occupant's satisfaction, while undereducation has a positive one.

In regards to the NUGs, none of the variables studied were significantly associated with graduates' job satisfaction. However, it is worth mentioning that four of them, i.e., assessment of the HE supply (b_18), socioeconomic stratum (str), father's level of education (eduF) and age (h2) have a negative effect on job satisfaction. In particular the last three variables do also have the same kind of influence on UGs job satisfaction.

Finally, it is very likely that the relative low number of observations may have influenced the results of the NUGs career success indicator, *job satisfaction*. Therefore, it is not appropriate to give a definitive statement about the fact that socioeconomic variables, educational variables and work related variable are not related to the NUGs' job satisfaction; instead, it is advisable to carry out more research on the topic.

8.2.4. Use of Knowledge and Skills

As mentioned earlier, the answers four and five were set as success, which was coded as one (1) and those answers from one to three were coded as zero (0).

The variables that resulted significant for UGs are gender (h1), mother's education (eduM), having studied an engineering program (proging) instead of a business program, the assessment HE supply (b_18), job's satisfaction (g1) and having a job that requires either a higher or lower level (hle/nhe) of education than the one the graduate holds. In contrast, for NUGs there were only two variables that were significant, the assessment HE supply (b_18) and the monthly wage (d10_1), see Table 51.

Furthermore, for both graduates the variable assessment of HE supply is positively associated with the use of knowledge and skills. Having studied in a high-ranked HEI instead of a lower ranked one, increases the odds of using the knowledge and skills by 121% for UGs and 230% for NUGs.

It is point out that the predominance of private HEIs in Colombia may contribute to the differences in quality among HEIs. Therefore the significance of the result

obtained, because it underscores the positive effects of the quality of provision on the future graduates performance, particularly in their use of knowledge and skills.

An interesting finding is related to UGs' field of knowledge; engineers are those who use their skills and knowledge the least and as expected due to the practicality and exclusiveness of the health field, their graduates are the ones using the knowledge and skills the most as compared to engineers and business related graduates.

In fact, for graduates of health related programs the odds of using to a high extent the knowledge and skills acquired during higher education studies increased by 180% compared to those who graduated from business programs.

While, having graduated from an engineering program instead of a business program reduced the odds of using the knowledge and skills by 58%. This situation could imply that either the labor market has other types of requirements for engineers in terms of skills and knowledge, or that the labor market does on purpose this selection that is; employers do hire engineers for non- engineering jobs. For instance, in the last years companies are hiring industrial engineers for their human resources department; before, psychologists or business administrators were generally hired for this post.

Similarly, in recent years, engineers have also started to occupy positions in the companies' finance and administrative departments. Furthermore, Ferné (2006) and Botero (2011) affirm that with the passage of time the profession of industrial engineering has changed its orientation towards an administrative and financial one, which makes them direct competitors of economists and business administrators for job positions, especially in the private sector.

Besides, the variable type of HEI has a different effect on the graduates' use of knowledge and skills; though, the effect is not significant. Having graduated from NUIs increases the odds of using the knowledge and skills acquired during the higher education studies by 123%, in comparison to those who graduated from universities. This result may indicate that NUIs do have, indeed, more practical orientation than Unis; furthermore, it also calls to promote and strengthen the institutional diversity in the Colombian higher education system.

Table 51 Percent Change in the Odds of Use of knowledge and Skills

logit (N=401): Percentage Change in Odds

Odds of: 1 vs 0

f1	b	z	P>|z|	%	%StdX	SDofX
h1	0.67545	2.392	0.017	96.5	40.1	0.4989
h2	0.04091	0.802	0.422	4.2	14.6	3.3401
low	0.43837	1.187	0.235	55.0	18.7	0.3904
high	0.03123	0.096	0.924	3.2	1.3	0.4242
eduF	-0.27693	-0.898	0.369	-24.2	-12.5	0.4811
eduM	0.61128	2.023	0.043	84.3	35.6	0.4980
a4	-0.20232	-0.757	0.449	-18.3	-9.6	0.5005
proging	-0.86677	-2.518	0.012	-58.0	-34.6	0.4892
progsal	1.02768	1.636	0.102	179.5	43.6	0.3522
b1_1	0.80409	1.387	0.165	123.5	22.4	0.2509
b_18	0.79473	3.757	0.000	121.4	68.1	0.6537
faut	0.53451	1.468	0.142	70.7	27.7	0.4574
frecog	0.41563	1.294	0.196	51.5	23.1	0.5006
g1	0.56011	1.867	0.062	75.1	29.7	0.4638
hle	0.25538	0.813	0.416	29.1	12.9	0.4740
nhe	-0.82296	-2.135	0.033	-56.1	-23.1	0.3191

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=88): Percentage Change in Odds

Odds of: 1 vs 0

f1	b	z	P>|z|	%	%StdX	SDofX
h1	0.38036	0.546	0.585	46.3	20.9	0.4996
h2	0.03088	0.291	0.771	3.1	14.2	4.3122
str	0.88108	1.136	0.256	141.3	52.7	0.4804
eduF	0.13394	0.166	0.868	14.3	6.5	0.4727
eduM	-0.65321	-0.906	0.365	-48.0	-25.9	0.4589
a2	0.75092	1.115	0.265	111.9	45.0	0.4945
b_18	1.19214	2.368	0.018	229.4	122.2	0.6697
d10_1	1.75300	2.085	0.037	477.2	137.9	0.4945
jsd	0.30261	0.447	0.655	35.3	14.9	0.4589

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

In regard to the NUGs, the variable monthly wage has a strong effect on the graduates' use of knowledge and skills. In fact, the odds of using, to a very high extent, the knowledge and skills increases by 400% for those graduates who have a monthly wage higher than the average one.

A possible reason, for the high impact of wages on the NUGs' use of knowledge and skills is the fact that there are certain specific NUPs, from which there are not many graduates in the labor market. Therefore, the lack of human resources with specialized qualifications may increase their price (wages) in the market. Some examples of such programs are: Technology in Management of Electro-mechanic Systems, Technology in Agro-industrial Management and Technology in Radiology. In particular, Technology in Radiology is offered by just one HEI in the entire Caribbean region of Colombia.

In general, higher earnings are associated with jobs that required a higher use of knowledge and skills; it suggests that the labor market recognize, in monetary terms, NUGs working in field specific jobs, with extensively use of knowledge and skills.

8.2.5. Work Autonomy

As mentioned earlier, this variable as well as the status recognition variable is an index variable that was obtained after using factor analysis. This variable, work autonomy, includes the following items: largely independent disposition of work, opportunity of undertaking scientific/scholarly work, enough time for leisure activities, variety, and good time management for work and family tasks.

The values four and five, jobs with a high autonomy, were coded as one (1) indicating success; whilst the other values, were coded as zero (0).

Despite the fact that there are no common significant variables in the two groups of graduates; in general, work related variables are positively associated to jobs with high degree of autonomy (see Table 52).

From the work related variables there are three variables that are significant for UGs, they are job search duration (jsd), use of knowledge and skills (f1) and status/recognition (frecog); whereas for NUGs the variables are job satisfaction (g1), and monthly wage (d10_1).

Table 52 Percent Change in the Odds of Work Autonomy

logit (N=383): Percentage Change in Odds

Odds of: 1 vs 0

faut	b	z	P>|z|	%	%StdX	SDofX
h1	0.18331	0.627	0.531	20.1	9.5	0.4965
h2	-0.00384	-0.092	0.927	-0.4	-1.2	3.1180
low	0.06609	0.176	0.861	6.8	2.6	0.3912
high	0.08405	0.253	0.801	8.8	3.6	0.4212
eduF	-0.10580	-0.346	0.730	-10.0	-5.0	0.4815
eduM	0.02018	0.067	0.947	2.0	1.0	0.4975
a2	0.27310	0.712	0.477	31.4	11.1	0.3870
a4	-0.07223	-0.262	0.794	-7.0	-3.5	0.4999
proging	0.40736	1.157	0.247	50.3	21.9	0.4869
progsal	0.68813	1.538	0.124	99.0	27.8	0.3564
b1_0	-0.51336	-1.050	0.294	-40.2	-15.8	0.3345
b1_1	-0.43816	-0.745	0.456	-35.5	-10.1	0.2427
jsd	-0.57336	-1.755	0.079	-43.6	-21.8	0.4293
frecog	2.17150	7.226	0.000	777.1	196.6	0.5006
f1	0.80375	2.216	0.027	123.4	41.9	0.4354
hle	0.28143	1.008	0.314	32.5	14.2	0.4714
nhe	-0.76618	-1.322	0.186	-53.5	-21.7	0.3193

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=71): Percentage Change in Odds

Odds of: 1 vs 0

faut	b	z	P>|z|	%	%StdX	SDofX
h1	0.44718	0.635	0.525	56.4	24.9	0.4975
h2	0.06132	0.759	0.448	6.3	33.1	4.6592
str	-0.41738	-0.590	0.555	-34.1	-18.2	0.4810
eduF	-1.34598	-1.760	0.078	-74.0	-47.7	0.4810
eduM	1.06287	1.534	0.125	189.5	64.1	0.4657
a2	-0.68373	-1.021	0.307	-49.5	-28.8	0.4975
b_18	0.79077	1.541	0.123	120.5	66.8	0.6468
jsd	0.33581	0.424	0.672	39.9	16.4	0.4530
d10_1	1.40398	1.978	0.048	307.1	102.1	0.5011
g1	1.58710	1.674	0.094	389.0	105.2	0.4530

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

It is to point out that short job search durations, up to seven months, are negatively associated with the job autonomy. For UGs whose job search duration is less than seven months, the odds of having an autonomous job are reduced by 44%, all other variables hold constant. This situation is not strange at all, as work autonomy is a very particular characteristic that relatively few job-posts may have; especially those posts addressed to graduates in their early years of career. Hence, being a fresh graduate, finding a job with such characteristics would imply longer periods of job search.

For this group of graduates the use of knowledge and skills is strong associated with the work autonomy; it indeed increases the odds of having more autonomous jobs by more than 100%.To some extent this situation may be explained by the presence of graduates of the health science among the group under analysis.

In fact, graduates of health related fields do have higher probabilities to have jobs with higher degrees of autonomy than graduates of the business and engineering field. Actually, the odds of having jobs with high autonomy increase by almost 100% for those who graduated from health science in comparison to those who graduated from business related fields.

The variable status/recognition has the strongest effect on UGs job autonomy. Having a job with a high status/recognition increases by seven times the odds of having a job with high autonomy, when compared to those UGs who have a job with lower levels of status/recognition. However, it is difficult to give a definite statement about this relationship because there may be a two-way relationship in so far that job-posts with high status/recognition have certain particular characteristics that may increase the job autonomy of the person holding that post. Besides, and equally important is the fact that the database collected does not contain sufficiently detailed information; therefore, it is difficult to state precisely about the type of relationship between these two variables.

Concerning the NUGs, the variables with the strongest effect on graduates' work autonomy are job satisfaction and monthly wage. Both of variables do have a positive effect on the work autonomy; they increase the odds of having jobs with higher levels of autonomy by more than three times. However, such great effect on the work autonomy variable is difficult to determine as there may happen a similar

situation like the one observed in the UGs between the status/recognition and the job autonomy.

8.2.6. Work Status/Recognition

The success indicator status/recognition is compound of the items: social recognition and status, job security, high income, chances of influence and good career prospects. The value one (1) represents the success in the accomplishment of having a job with high status/recognition; while zero (0) a job with relatively lower status/recognition.

Once again, none of the socioeconomic variables are significant for the graduates' job status/recognition; whereas the work related variables are. Specifically the variables monthly wage, job satisfaction, work autonomy and having a job for which a higher level of education is more appropriate were significant for the UGs; while, the variables monthly wage and use of knowledge and skills were significant for NUGs; see Table 53.

It is to point out that work related variables are not only significant but their effect on the work status/recognition indicator is strong and positive.

Furthermore, there is an evident difference in the role that practical experience has on graduates' work status/recognition success. For NUGs the use of knowledge and skills does have a substantial effect on the work status/recognition, which implies that according to NUGs' perspective, their knowledge and skills are needed and recognized by the market and the society.

In contrast, work related variables are not at all significant for UGs. Instead, variables related to personal feelings toward the job i.e. job satisfaction and job autonomy, are responsible for UGs success in terms of work status/recognition.

In addition to the work related variables, there are two educational variables that have a strong impact on UGs' work status/recognition success. They are namely having studied engineering or a health related program (proging/ progsal) instead of a business program, and the assessment HE supply (b_18).

Table 53 Percent Change in the Odds of Status/Recognition

logit (N=396): Percentage Change in Odds

Odds of: 1 vs 0

frecog	b	z	P>|z|	%	%StdX	SDofX
h1	0.20365	0.733	0.464	22.6	10.7	0.4994
h2	0.04110	0.864	0.388	4.2	14.8	3.3520
low	-0.03305	-0.093	0.926	-3.3	-1.3	0.3903
high	-0.09475	-0.282	0.778	-9.0	-3.9	0.4212
eduF	0.40315	1.341	0.180	49.7	21.4	0.4809
eduM	-0.47016	-1.552	0.121	-37.5	-20.9	0.4978
a4	0.32868	1.216	0.224	38.9	17.9	0.5005
proging	-0.56450	-1.673	0.094	-43.1	-24.2	0.4898
progsal	-0.04132	-0.087	0.931	-4.0	-1.4	0.3515
b1_0	-0.31456	-0.709	0.478	-27.0	-10.2	0.3409
b_18	0.47417	2.097	0.036	60.7	36.4	0.6539
d10_1	1.12986	3.513	0.000	209.5	67.3	0.4557
g1	1.94496	5.867	0.000	599.3	146.7	0.4644
faut	2.18383	6.587	0.000	788.0	170.5	0.4557
hle	0.54205	1.865	0.062	72.0	29.2	0.4729
nhe	0.40445	0.848	0.397	49.8	13.9	0.3208

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

logit (N=78): Percentage Change in Odds

Odds of: 1 vs 0

frecog	b	z	P>|z|	%	%StdX	SDofX
h1	0.35327	0.595	0.552	42.4	19.3	0.5006
h2	-0.05661	-0.929	0.353	-5.5	-22.5	4.5001
str	-0.71712	-1.094	0.274	-51.2	-29.3	0.4828
eduF	-0.00313	-0.005	0.996	-0.3	-0.1	0.4788
eduM	0.25155	0.419	0.675	28.6	12.4	0.4645
a4	0.49090	0.818	0.413	63.4	25.9	0.4697
b_18	0.37122	0.856	0.392	45.0	27.9	0.6638
jsd	-0.19016	-0.299	0.765	-17.3	-8.4	0.4589
d10_1	1.14557	1.953	0.051	214.4	77.1	0.4991
f1	1.53530	1.897	0.058	364.3	80.9	0.3862

b = raw coefficient
z = z-score for test of b=0
P>|z| = p-value for z-test
% = percent change in odds for unit increase in X
%StdX = percent change in odds for SD increase in X
SDofX = standard deviation of X

On one hand, having studied engineering or a health related program instead of a business program has a negative effect on UGs' work status/recognition. Though, the negative effect of having studied engineering is higher than the one of having studied health related programs, when compared to having studied business related programs. In fact, the odds of being successful in term of work-recognition decrease by 43% and 4% for engineers and health related graduates respectively, when compared to business related graduates.

This result is particularly interesting, in general, graduates from business related fields have lower wages than engineers and graduates from the health area. Therefore, it is possible that their higher status/recognition is associated with factors related to the recognition given to the administrative area within the society; for which the post titles used in the managerial or business related jobs, such as: director, manager, executive, etc. may help to create the idea that business related graduates have decision/ monetary power, having people under supervision and therefore status.

On the other hand, with each additional mark in the assessment of the HE supply the odds of having jobs with high work status/recognition increase by 60%. Once again, the assessment of HE supply was very significant, which remarks the importance of recognizing the impact that HEIs' physical and human characteristics may have in the career development of graduates.

7.3. Synopsis and Conclusions

This chapter aimed to present the determinants of career success one to two years after graduation for students who graduated in Atlántico in 2008; furthermore, each indicator was analyzed for NUGs and UGs separately.

To summarize, the indicator *wages* was found to be less responsive to the variable used here for NUGs than for UGs, whose indicator was clearly affected by socioeconomic, educational and work related variables. Additionally it was found that the socioeconomic stratum is associated to both graduates' wages; a higher socioeconomic stratum increases the probability of having a success wage, while a low stratum reduce it. As for the *job search duration*, some clear differences for UGs and NUGs are shown; graduates' job search may be different depending on the

higher education sector. Nevertheless, the socioeconomic variables, i.e., age, gender, socioeconomic stratum seems not to be determinant in the duration of job search.

For the analysis of the subjective variables, i.e., job satisfaction, use of knowledge and skills, work autonomy and work status/recognition some difficulties arose for NUG; mainly because of the short number of observations in some variables. However, it can be said that work related variables were positively associated to this type of indicators. Similarly, the variable assessment of the higher education provision had positive effects on several of these indicators.

After analyzing the results from NUGs and UGs, the main conclusions are, in brief, the following:

- To determine graduates' success in terms of work related aspects, i.e., job satisfaction, use of knowledge and skills, work autonomy and work status/recognition, the work related variables are of better help than socioeconomic and educational variables. These results concur with Hughes, who highlights the greater effect of work related variables over the socioeconomic variables when analyzing subjective indicators of career success
- Gender is in general not a determinant factor for graduates' early career success. As a whole, gender was not significant in most of the indicators studied; this situation could imply that the labour market, particularly in the first years after graduation, does not make noticeable preferences, for instance in wages, and work characteristics between male and female graduates.
- The assessment of the higher education supply is the only common educational variable, which is significant for both graduates. Furthermore, it is strong and positively associated to the use of knowledge and skills of NUGs and UGs. Therefore, it is worth and necessary to keep a track and promote the physical and human developments of HEIs as they may either facilitate or hinder their insertion in the labor market and the graduates' career prospects.
- Socioeconomic and educational variables do have a greater impact on the objective indicators of career success than on the subjective indicators. From these variables the socioeconomic stratum is of special importance, which has

a clear strong effect on the monthly wages of UGs and NUGS. In fact, belonging to low strata have a negative effect on the probability of being successful in terms of monthly wage.

In general, this situation indicates that changes in the social structure and the income distribution are rather difficult tasks to be achieved by only higher numbers of higher education graduates.

9. Conclusions and Recommendations

Since the creation of the NUS, its development has experienced periods of expansion, others of stagnation and even of shrinkage; however, for the last ten years the higher education system and particularly the NUS has been called to play an active role in the achievement of the socioeconomic development and the internationalization goals that the country has set for the coming years. Bearing this situation in mind, this research strived to offer a comprehensive analysis of certain aspects of the higher education system and specifically about the NUS; especially, it dealt with its development, its current situation and also with their graduates and certain aspects of their relationship with the world of work.

This chapter aims to present the main findings and concluding statements about the different aspects of the NUS and the world of work analyzed throughout this document; furthermore, in the end some prospective topics of research will be proposed.

9.1. Main Research Findings

- *The role and scope of the NUS within the system is still ambiguous favoring academic drift*

At one point, the system started to make some steps towards its organization, particularly in the 1960s when the types of HEIs and their scope was determined. At that moment the NUS was supposed to some extent resemble the multipurpose model, which is widely spread in the United States.

The NUS was specifically in charge of supplying NUPs, training programs for mid-level technicians, and UIs (a type of NUI) were able to offer bridge courses to help the transition into Unis. Furthermore, the tasks were not interchangeable between sectors; explicit tasks were given to US and NUS.

However, as the years passed, this organization and boundaries between sectors started to blur; in the 1970s a new type of NUP and NUI was established, i.e. technological programs and ITs. The new type of program was like a hybrid of the two existing types, i.e., vocational and academic oriented education. Furthermore,

the conceptual and occupational framework of technological education was not clearly differentiated from technical education; the only difference between them was the programs' duration. As a consequence of these loopholes, the institutional and programs heterogeneity, in terms of quality and occupational profiles, increased.

Besides, the higher education normative, i.e., Decree 80 -1980 and the Law 30-1992 has not contributed to clarify this situation; rather offered additional sources of ambiguity. For instance, HEIs differentiation seems to be based on the type of program that they offer rather than in their vocation, giving the impression of a ranking within the NUS (see Decree 80-1980).

As for the current regulation (Law 30-1992) Unis are also allowed to offer any type of programs, and NUIs have the possibility to change their character, to "upgrade". Therefore, ITPs by fulfilling certain requirements can change their character to ITs, these can also change to IUs and they can convert into Unis and by doing this they can enhance the offer of programs vertically speaking. Furthermore, recently, in 2002, the Law of the NUS authorized ITPs and ITs to offer professional programs in specific areas under the fulfillment of certain conditions. For instance, programs have to be delivered in cycles; out of which the first cycle would be the equivalent to technical education, the second cycle to technological education and the third cycle would correspond to the professional education. The idea of organizing the programs in cycles is to make the system more flexible, to give students the opportunity to gain some qualification to enter the labor market, as well as to open students' possibility to reenter the system for furthering their studies if desired.

Despite the NUS has been widely promoted in the recent years, its role and scope has not been clearly defined and the existing normative is not so encouraging. Instead, it may be suggested that the *should be* in higher education are UPs and Unis type of HEIs. In this framework it is not strange that NUIs, just for the sake of looking more alike to what is considered good, change their orientation towards a more academic one, thereby favoring the academic drift within the system, which is opposed to the national speech that is supporting the development of the NUS.

As a whole the NUS call for specific actions towards its consolidation. It is not enough to be shown as the key method to increase access in higher education and

with those fulfilling national/international educational indicators; concrete actions are required to achieve its consolidation and social recognition in the country. It is especially necessary to clarify the role of the NUS within the system, its scope and fields of actions. In this connection, it is important to discuss and decide whether the NUS should focus on the usage and development of the technique and technology differentiating it from the academic orientation of the US, or for instance organizing the undergraduate programs by cycles, and giving the responsibility to the NUS to provide NUPs, which would correspond to cycles prior to UPs (cycles that should have a comprehensive character, that is academic and technical).

However, for doing this, it is necessary to eliminate the terminal character of NUPs and to promote the mobility within programs and HEIs, for instance, by setting standardize qualification recognition frameworks.

- *Private interests and the development of the NUS (a double-edged sword)*

In Colombia, private HEIs surpass in number the public ones, and till recently more than half of students were enrolled in private HEIs. Despite it cannot be generalized, it is necessary to consider that personal interests are also behind the higher education development. For instance, private HEIs have to take into account, in addition to the societal needs, their own needs when deciding the type of programs to be offered; they consider carefully the financial aspect as their main source of funding is students. In fact, some of the interviewees explicitly manifested that developing programs oriented to the technique and technology is expensive as good labs and special academic staff is required. Not to count that in some areas the students' demand for such programs is relative lower than the one for programs related to more traditional knowledge areas like business and related fields.

Similarly, the fact that UPs are more socially and economically recognized than NUPs, and that HEIs have the possibility of "upgrading" may arise the desire for some private NUIs to change their character from a vocational to a more academic one, to look more alike than UNIs, which could grant them access to larger markets, thus potential higher incomes.

The great participation of the private sector in the NUS and the relatively higher costs that the NUPs in certain specialized areas might have, could be playing against the development of a pertinent NUS.

- *Quality issues are still a stumbling block in the NUS*

Despite that different quality assurance methods have been developed since the mid 1990s; they have mainly been focus to the US and the situation in the NUS is still incipient.

As mentioned in Chapter 3, higher education programs in Colombia need to count with a "registro calificado" to be able to be offered in the market. However, some international studies have already affirmed that the minimum requirements of quality established by the government are low when compared to international standards.

In addition to that, institutional and program accreditation of excellence and the SABER-PRO exam have been developed as further methods of quality assurance. In the case of the SABER PRO, the exams for NUPs have not totally been defined; just for determined number of programs from some specific knowledge areas i.e., business, electronics and systems and related areas, have been developed. As for the accreditation of excellence, the number of NUPs accredited is derisory when compared to UPs.

Starting from programs with relative low quality foundations and the lack of enough methods to evaluate NUPs and the minimal amount of NUIs and NUPs accredited for their excellence; the quality of the NUS leaves much to be desired. Quality assurance in the NUS is an issue that calls for specific actions to be taken; a growing number of Colombians with higher education does not necessary implies improvement in the socioeconomic welfare of the population.

- *Higher education diversity and the promotion of equity in higher education*

One of the rationales behind the diversification of higher education systems is to be able to respond to the students' diverse background, interests and needs; hence, it is not strange to see the increasing support that have received the NUS recently.

Throughout the last decade, in the framework of the national program towards the strengthening and promotion of the NUS, NUPs have been widely promoted and offered as an alternative option that is vocational oriented and highly required by the labor market, which would offer Colombians access to the higher education system. In particular, the promotion given to the NUS has been oriented to support the systems' expansion and to allow a higher number of high school graduates, particularly from low-income families, to enter the higher education system, which would increase the equity in the system and the society.

At first glance it can be said that the promotion of the NUS is paying off; indeed, certain indicators have improved, i.e. higher education enrollments and access for students from low income households; however, they do not necessary mean that the equity has also increased in the system.

In general, the Colombian higher education system is diverse, vertically and horizontally; however, diversification should provide, in addition to different study options and types of HEIs, the opportunity to have access to most, for not say all of the options available in the market; of course, under the fulfillment of the set requirements. However, after analyzing the graduates' socioeconomic and higher education characteristics, namely: socioeconomic strata, parent's education, methods to finance studies and characteristics of the higher education provision, certain findings suggest that the system is divided in two sectors, one for the "poor" and the other for the financially affluent. This situation may raise some questions about the improvements in equity that one may think when observing the increase of the indicators mentioned above.

For instance, the low use of credits and subventions to finance studies by graduates may imply that either that higher education is affordable for low-income families or that those entering higher education count with certain minimal financial characteristics that make them possible to further pursue their studies at the level of higher education. From the reply given by the faculty that was interviewed it can be said that both situations are somehow presented; however, the latter option is the more likely reason for the low use of credits.

It is true that NUPs have relative lower prices as compared to UPs, thus more financially accessible for families; nevertheless, the faculty affirmed that the low use

of credits is because of their prerequisites, which are generally of difficult fulfillment; education is a burden that falls on families. This is not only the case of credits from private sources, but also from the public ones; particularly, the credit ACCES, a line credit especially created to increase students' access into the NUS.

The conditions to get an ACCES credit are also not an easy achievement, i.e., preference of accredited HEIs and solidary co-debtor. As mentioned earlier, the number of NUIs and NUPs accredited is minimal in comparison to Unis and UPs, and having a solidary co-debtor with financial records and/or patrimony, are two relatively difficult conditions to accomplish for "real" low-income families. According to this situation, and taking into account that a large part of the higher education provision is private, higher education is not for all; people who enter and graduate from higher education system do count with some kind of financial resources. Being financially sound is a determinant factor to succeed in higher education.

Another aspect in which differences between the two sectors is shown is the characteristics of the higher education provision, particularly facilities. In general, the higher education provision was well assessed by graduates; according to interviewees, the students' surpassed expectations and the sense of belonging may help to explain to some extent the relatively high assessment. Nevertheless, the grades to facilities are lower in the NUS than in the US, which indicates that the NUIs educational conditions are another differentiating factor between sectors.

All in all, some positive steps towards the improvement of equity issues are observed in the higher education system. Equity is not a simple subject which can be limited to the fact of having higher numbers of students enrolled in the system; several angles need to be considered for the achievement of this goal. Furthermore, financial restrictions should not be an obstacle to those who have the merits to enter or stay in the system. Similarly it is important to have in mind that while diversity of programs and HEIs advocates for social inclusion, diversity in the quality might help achieve the opposite. Therefore, in order to avoid higher education becoming a source of differentiation for Colombians, work in aspects such as financing sources for the very poor, improving academic quality, and pertinence of programs is needed. Moreover, for NUS, in particular, it is vital to strengthen their link with the industry,

which is its differentiating characteristic that makes them and their graduates unique in the market.

- *Close relationship between higher education and work*

Regardless of the higher education sector, graduates' opinion suggests that a close relationship between higher education and work exists; particularly in those aspects related to the use of knowledge and skills in the work, and the relationship between their studies and their work.

Similarly, it can be said that graduates in general have certain general skills and knowledge which allow them to work in fields different from which they graduated, especially in the case of UGs. For NUGs as expected, because of the vocational orientation of programs, the field of knowledge and the field of work are more related.

The only aspect in which graduates, specifically NUGs, show a potential source of concern is related to the graduates' level of education that would be the most appropriate for graduates' work. A large group of NUGs expressed the existence of a mismatch, either they considered themselves to be overeducated or undereducated (being particularly larger this group) for their current work.

As it was mentioned in the respective chapter, it is interesting that on one hand NUGs rated high and very high aspects like use of knowledge and skills and the relationship between higher education studies and current job. On the other hand they affirm that other level of education, particularly higher, would be more appropriate for their work. This response could be the result of shortages in either academic and/or technical knowledge that the graduates may have when entering the labor market, but it also could correspond to the NUGs' believe that their higher education lacks something, e.g., duration of studies, knowledge, which they think may only be able to achieve by studying an UP. The conventional wisdom and the organization of the higher education system may help reinforce this believe.

In general, Colombians have a lower appreciation for the NUS and NUPs, it is considered higher education for those with lower academic and socioeconomic conditions. Sadly, the structure and the organization, especially of the undergraduate education do not help to combat this believe. NUPs are initially terminal programs,

but with the emergence of the cycles, NUPs are considered the cycles prior to enter a UP; in the educational ladder they are below the longer traditional programs. They possibly develop the belief that they are undereducated as the society does not recognize the NUS in the same way as it does with the US. This situation could have effects on NUGs and in their assessment as it is very likely that they have the aspiration of being UG and fulfill what is socially accepted.

Based on graduates' opinion one would say that, in general terms, higher education programs in the areas studied, i.e., health science, engineering and business, are relevant and pertinent to the requirements of the local labor market, especially for NUGs. However, it is worth to determine the rationales behind the NUGs' opinion on educational mismatch.

- *Graduates' socioeconomic stratum does not only contribute to shape their educational path; it also has an effect in graduates' future earnings.*

When the socioeconomic characteristics of the graduates were analyzed, it was clear that the socioeconomic stratum played a significant role in the educational choices of graduates; for instance, it may have influenced the decision on the type of program studied, i.e., NUP or UP, the type of HEI, and the HEI's sector among others. Similarly, while analyzing the career success in graduates of Atlántico, it was found to be one of the few common variables that resulted to be strongly associated to graduates' monthly wages success. While being from a low socioeconomic stratum reduces the probability of having a successful monthly wage, belonging to a high stratum increases it.

Employers are still able to recognize differences among graduates, including within the higher education sector, i.e., NUS or US, and they behave accordingly; helping to maintain the differences existing. This situation was evident when results showed that fellow men have different probability to have a success wage based on their stratum. Holding a higher education degree per se does not blur the borders between the "poor" and the "rich". This situation suggests that other factors, like the graduates' economic or social capital may have an impact on their future work perspectives.

- *The higher education provision is related to graduates' use of knowledge and skills*

As it was mentioned previously, the quality in the higher education system, but particularly in the NUS is an issue that calls for further actions towards its improvement. The characteristics of the higher education provision, in broaden terms its quality, do have an effect in graduates early working life, especially in the use of knowledge and skills.

The survey questionnaire included one section dealing with different aspects of the higher education provision, i.e. quality of facilities, research activity, quality of the academic staff, and characteristics of the student life which graduates had to evaluate. Their assessments offered a general picture of the characteristics of the higher education supply and bid an idea of its quality.

In general, NUGs and UGs rated very well the education provision; though some differences were found between sectors, especially within sectors. When considering the data in more detailed, i.e. by type of HEI, the characteristics of the provision/ quality within sectors was found to be less homogeneous.

The existence of differences within sectors could be argued to be essential for guaranteeing the diversity in the higher education system. However, diversity in quality is an issue that cannot be taken lightly, especially when these differences may have effects on the peoples' personal and professional life, which at the end affect the society as whole. This situation was evident, while analyzing the indicator use of knowledge and skills in graduates. The diversity of characteristics/quality in the higher education provision resulted to be positively related to the success of graduates in terms of use of knowledge and skills; the probability of being successful in terms of use of knowledge and skills grows as the HEI ratings increase.

Once again, the need for improvements in the higher education quality arises. Its importance is required, not only to fulfill the directives of international organizations and/or escalate in the international rankings, but also because it could work as a differentiating factor for Colombians and could hinder the goals set for the educational system, i.e., increasing the systems' pertinence, improving the

employability of graduates and reducing the social inequality; and the country, i.e., reducing the social gaps and increasing the country's international competitiveness.

- *Increase of the relationship between the NUS and the productive sector*

In Colombia and throughout the world the role of higher education has been in continuous transformations encouraged by the internationalization and globalization trends taking place in the last decades. Those changes have aimed to respond the people's, industry's and the country's needs, mainly those concerning with the training/qualification of the human capital, which should help, among others, to increase the people's employability, to improve their quality of life and to increase the countries' competitiveness.

In this framework, the relationship between higher education and world of work has occupied a relevant role in the country's development policies and it is being widely promoted by the government, especially in the last 10 years. The encouragement to increase the pertinence of NUPs by orienting them to the productive vocation of the region, the establishment of HEIs (CERES) in remote areas, and the creation of the OLE are some of the examples that show the relevance gained by this relationship in the education policies. Furthermore, the representation of the productive sector is required in the country's main higher education bodies. Likewise, it is possible to see the role given to the NUS in the country's socioeconomic and internationalization policies, in which the training in labor competencies, in foreign languages and IT is encouraged as a means to increase the graduates' employability and the country's competitiveness.

- *The NUS and the Graduates' tracing studies are emerging fields of research*

While doing this investigation it was noticed and in this document manifested the difficulties to find bibliography that addressed the NUS in particular. Most of the work on higher education deals with the US, and those works on the higher education system, mentioned briefly certain aspects of the NUS. There are a few documents and researchers that approached the topic in depth.

However, in the last couple of years the situation has changed, especially because of the role it plays for the country's development goals and the current

circumstances the country is going through. The growing interest in the NUS has explicitly been showed on the discussions dealing with the reform of the country's higher education system, which has been taking place since the failure of the attempt of reform in 2011. Furthermore, the peace dialogues with the Revolutionary Armed Forces of Colombia-People's Army (Spanish: Fuerzas Armadas Revolucionarias de Colombia-Ejército del Pueblo, FARC-EP), the establishment of free trade agreements with certain countries, as well as the interest in making part of the OECD, may contribute to increase the attention on the NUS and support its development.

In this framework, structuring and defining the fields of actions of higher education is vital, not only to fulfill the set commercial, educational and socioeconomic goals, but also to be able to respond to the challenge that a peace negotiation with the FARC means. For instance, in case the FARC and the government come into an agreement the educational system in general and the higher education in particular will play a decisive role in the social reintegration of the FARC ex-combats.

The different circumstances the country have been through in the past years, has rouse the awareness and interest on the NUS and on its analysis. Especially in the framework of the higher education reform, some documents dealing with the topic and its role in the reform are starting to be found. In the short and medium run, the NUS shows itself not only as an attractive field of research, but also a mandatory one.

As for the Graduates' tracer studies, it was expressed in Chapter five that the topic is not new in Colombia, but is still recent and in the process of development. There are some institutional initiatives on the topic; however, they are restricted to very specific populations which do not allow having a general vision of the country's graduates. Nevertheless, the creation of OLE and the development of its own survey is a big step in the analysis of graduates and their relationship with the labor market. However, if considered the NUS solely, some hardships are found as the number of NUGs participating is still low, and the few NUGs participating are mainly from Bogota. This situation makes difficult not only to have a picture of the NUS and its graduates, but also limits the possibilities of comparison between and within sectors.

Despite these circumstances, the topic is gaining space in the institutional settings and it is additionally being promoted by the government, which is making possible to increase the research on the topic, not only at institutional level, but also among higher education researchers.

9.2. Conclusions

Based on the facts mentioned above there are certain aspects that can play on favor of the development and consolidation of the NUS; while others that deserve special attention. They are the following:

- ***Strengths***

Throughout this investigation it has been shown that the higher education system and in particular the NUS has several strong points. The NUS is diverse in types of institutions as well as in types of programs, which has contributed to support the enrollment expansion that the government has promoted in the last years and has opened the possibility of having higher education to under-represented groups of the population. The government is conscious that the expansion of the NUS, is not by itself sufficient to achieve those goals; hence, at the same time, aims for its quality improvement and the increase of its pertinence.

Furthermore, these goals could not have been achieved if is not for the support that it has received from the national government and the different bodies that make up the system. Some actions and characteristics of the system that are worth mentioning are for instance, the promotion for the creation of CERES to provide higher education in the remote regions; the creation of the credit-lines ACCES to allow students with financial difficulties to enter the higher education system; the development of SABER PRO for NUPs; and the establishment of cycles to increase the vertical mobility within the system. Likewise, the further development of the SNIES, which offers key information and statistics for students and their families to get to know the different characteristics of the programs and institution in the market, and for the researchers, makes it easier to keep a track of the development of the sector through the time.

- ***Aspects that require attention***

Along the strengths that were mentioned earlier, some aspects need further development or transformations to be able to achieve not only the government's expectation, but also the people and the society ones.

The NUS needs to be consolidated and recognized as an alternative of higher education and not as a "second class" option for those with less academic/socioeconomic conditions as it is presently the case. For doing this, certain aspects required special attention, they are namely:

1. Definition of the NUS, it mission, fields of actions, etc. as this situation was mentioned above. The current law of higher education is not sufficiently clear on this aspect and at some points could be interpreted to be biased towards the US. The public discourse promotes the NUS and NUPs as the key instrument to achieve certain socioeconomic goals; however, such clarity is not observed in the higher education normative.
2. Regarding quality, three main features are to be considered:
    - Accreditation is a voluntary process with about ten years of existence in Colombia; however, just till recently a few NUIs and NUPs have undergone the accreditation process. It is important to determine the reasons for which they are not so keen to undergo the process and motivate them to do it. Furthermore, is necessary to make sure that the process and requirements are flexible enough to adapt to the reality of the NUS. Evaluating all HEIs and programs using the same benchmark, would be harmful for the NUS, not to count what otherwise would be implicitly promoting taking distance from its practical vocation.
    - Improvement in the quality of the higher education provision. NUPs due to their vocational orientation require certain specific facilities and academic staff. This aspect is important to take into account, because one of the purposes of this sector is to provide practical education which would be pertinent to the needs of the market.

- In the same way that SABER-PRO exams were developed for the majority of UPs, the same is required for the NUPs. For the society and the higher education system it is necessary to have objective criteria to compare among NUPs and based on that take their decisions.

  Without a quality improvement, the positioning of the NUS within the system and in the Colombian society will not be easy. On the contrary, it may increase the reservations that the society have towards this kind of education and instead of bridging the socioeconomic gaps among Colombians could be increasing them.

3. The credit ACCES was created to allow students from low-income households to enter the higher education systems, especially to study NUPs; however, it is mainly financing students pursuing UPs and not necessary from the mentioned target population. Some of the reasons for this situation to happen are the credit requirements, which in many cases are not of easy fulfilment for this population group.
4. The high participation of the private sector in the NUS, if not controlled and supported technically and financially from the government, could play against the sector's development and the pertinence of the system. It was mentioned earlier that developing programs in certain areas require high investments, which cannot be always afforded by the NUIs, particularly privates NUIs, whose principal source of funding are the students' fees. Therefore, there will be cases that NUIs take the decision about the programs to be offered based on their financial needs, rather than the real needs of the respective society. The government should be stricter controlling the creation and functioning of programs, in order to avoid this situation to happen.

As for the NUS and its relationship with the world of work, some positive progress towards its strengthening has been shown in the last years; nevertheless, some aspects do need some consideration.

- ***Strengths***

Regardless of the higher education sector, employed graduates have similar work characteristics during the first years after graduation. Moreover, the higher education system, particularly the NUS is responding to the needs of labor market, in terms of skills and knowledge, satisfactorily. Besides, the creation of the OLE and the information provided by their graduate's tracer studies is certainly one of the remarkable achievements in this field. In addition to the statistical information it offers, its technical experience is of a big help for HEIs starting such type of studies. Furthermore, the government as well as the society's awareness on the need to close the links between higher education and the world of work has increased in the last years; it has been clearly expressed in the higher education policies, specifically in those towards the improvement of programs' quality and pertinence as well as those promoting the employability. All these circumstances certainly play in favor of the healthy development of this relationship and provide all i.e., government, family, schools, etc. the means to take a more objective based decision on the subject.

- ***Aspects that require attention***

Despite the relative close relationship between higher education and work existing; certain aspects need attention, they could either generate positive changes or threaten this relationship.

1. The OLE is a great source of information about the graduates, their work experiences and the labor market. However, some issues regarding the information availability and the surveyed population could be improved. It is to highlight the improvements the OLE has had in the last years in the both mentioned aspects; nevertheless, their data bases are still of difficult access for the public and the information about the NUGs is still low. Efforts to gather information about these graduates are needed. The NUS is a growing sector within the higher education system and the point of view of their graduates is required to make a fair evaluation of the system and to have the necessary tools to determine their future.

2. Quality of the higher education provision is again one of the issues that deserve attention, especially in the NUS. If employability is considered as one of the most significant goals to achieve for the NUS; NUPs should be pertinent, in terms of fields as well as in terms of knowledge and skills. Due to the characteristics of NUPs, that is practical and specialized orientated programs, specific training and facilities are required. Hence, the government should keep a strict control on HEIs, specially verifying that they count with the required human and physical resources to offer the programs. This aspect is particularly important to attain, as the characteristics of the higher education provision have effects later on in graduates working life.
3. The social recognition of the NUS should be increased within the society and the labor market. Among the objectives of this sector is to help to enhance the social equity in Colombia; however, if the society does not have information about the NUS, and/or if the characteristics of the provision and its quality is not at least at the same level of that of the US; graduates of this sector will have a disadvantage when entering in the labor market. This situation would promote the use of other selection methods, different from the education and merits, to enter and stay in the labor market.

9.2. Recommendations for Further Research

Despite of the national support granted to the higher education system and the actual expansion the NUS experienced in the last years; work to consolidate this sector within the higher education system and the society is still needed. The circumstance the country is going through i.e., peace dialogues with the FARC-EP, the establishment of free trade agreements with certain countries, as well as the interest in making it a part of the OECD offers a good scenario for the development of the higher education system and particularly the NUS.

Nevertheless, information is needed to understand the situation and to be able to foresee the possible challenges the system may be facing in their development. Information per se is not sufficient, it would be much better if comprehensive

analysis, from different perspectives and addressing different subjects of the higher education system, especially on the NUS where the information is comparatively scarce are being analyzed. They will provide all Colombians, i.e., the government, the families, students and HEIs valuable information to take decisions and to draw the path to be followed.

During this investigation it was particularly evident the need for research on the NUS, especially on the pertinence of the system, its quality and its graduates. The system has been growing in the last decade, therefore the importance to analyze the pertinence of the offered programs, for which surveys to graduates and employers would be of great help providing information about the knowledge and skills the market needs and to assess to what extent the higher education system is fulfilling them.

The quality of the system has been a topic of concern for the national government and it has been a significant part of the EDPs in the last decade. Therefore, comparative research (US-NUS) on the topic is necessary to improve the general quality of the system; for instance, research on quality assessment methods, factors determining programs' quality, the effect of quality on students' acquisition of knowledge and in their future working life. Similarly, research on the relationship between higher education and work, financing of higher education and dropout is required. Other examples of research topics that could provide a broad and more rich information about the system and from which there is not much information available are about the HEIs-industry relationship and the method used to promote it, the graduates' studies and their perspective on the world of work and about the graduates' career, and the match/mismatch between what is learned and what is needed in the market, students and funding methods, students' adaptability in the higher education system, and mechanisms to combat dropouts in higher education.

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APPENDICES

Appendix A Survey Questionnaire

Encuesta a Graduados de 2008 del Departamento del Atlántico

Estimado(a) Graduado(a):

Atentamente les solicito participen en la siguiente encuesta, dirigida especialmente a los graduados de 2008 de algunos programas técnicos profesionales, tecnológicos y universitarias del departamento del Atlántico.

Este trabajo de investigación es realizado con el apoyo de sus respectivas instituciones de educación superior, y el International Center for Higher Education Research- INCHER, de la Universidad de Kassel, Alemania.

El objetivo principal de este estudio es conocer los diferentes aspectos de la relación de estos graduados con el mundo del trabajo. Las experiencias personales a lo largo de sus estudios, y actualmente como graduado, son una fuente valiosa de información que sin duda contribuirá a un mayor conocimiento de estas relaciones.

Pueden estar tranquilos que sus respuestas sólo se usarán en este proyecto de investigación y los resultados finales se harán de tal forma que no será posible la identificación individual.

SU INFORMACIÓN SERÁ ESTRICTAMENTE CONFIDENCIAL.

De antemano se les agradece su tiempo y colaboración en este proyecto.

Muy cordialmente,

Carla E. Ramírez Torrado.

Coordinadora del Proyecto.

Notas Explicativas:

¿Cuánto tiempo tardará completar el cuestionario?

Depende principalmente de la experiencia laboral alcanzada hasta el momento.
El cuestionario utiliza principalmente preguntas tipo selección múltiple, de tal forma que solo sea necesario escoger la respuesta más adecuada; sin embargo, hay ciertas preguntas abiertas donde es necesario mayor explicación.

Para tener en cuenta al momento de responder:

* En su mayoría las preguntas son de selección múltiple con única respuesta

* Algunas preguntas son de selección múltiple con posible respuesta múltiple, es decir, Usted puede escoger más de una respuesta. En el enunciado de la pregunta se especificará si la pregunta es de respuesta múltiple

* En ciertas preguntas se le pide calificar o dar su valoración acerca de alguna situación determinada; en ese caso, 1 será la calificación/valoración más baja y 5 la calificación/valoración más alta.

* En las secciones donde se trata el tema Trabajo (Secciones D, E, F y G), por favor, concentrarse solo a su trabajo actual. En el caso de tener más de un trabajo, por favor, referirse solo al trabajo principal

IMPORTANTE: La encuesta fue diseñada de tal forma que en algunos casos no se sigue la secuencia numérica, esto es debido a que dependiendo de la respuesta dada, Usted será dirigido automáticamente a la pregunta que aplica en su situación.

A. Transicion a la Educación Superior	
A1.	**¿En cuál de los siguientes municipios Usted terminó el Bachillerato ?**

1	Barranquilla	5	Baranoa
2	Soledad	6	Sabanalarga
3	Malambo	7	Otro

A2.	**¿Cuál es el carácter de la institución donde terminó el bachillerato?**

1	Académico	5	Técnico comercial
2	Técnico Industrial	6	Técnico agropecuario
3	Técnico pedagogic		

A3.	**¿Cuál es la jornada de estudios de la institución donde terminó su bachillerato?**

1	Completa (mañana y tarde)	5	Noche
2	Mañana	6	Fin de semana
3	Tarde		

A4.	**¿Cuál es el origen de la institución donde terminó su bachillerato?**

1	Público	2	Privado

A5.	**¿ A qué edad terminó el bachillerato?**

1	Años

A6.	**Desde el momento que se graduó de bachiller, ¿cuánto tiempo transcurrió antes de matricularse en una institución de educación superior?**

1	Menos de 3 meses	4	Mas de un año
2	Entre 3 y 6 meses		
3	Entre 7 meses y 1 año		

A7.	**Durante el tiempo transcurrido después de terminar el bachillerato y antes de matricularse en una institución de educación superior ¿qué actividades realizó? (posible respuesta múltiple)**

1	Trabajó	8	Atendió problemas de salud
2	Buscó trabajo	9	Viajó al exterior
3	Estudio Idiomas	10	Se presentó a una o varias instituciones de educación superior
4	Realizó cursos no formales		
5	Descansó	11	Otra
6	Trabajó con la familia		
7	Prestó servicio militar/ servicio social		

B. Características de los Estudios Superiores			
B1.	**Por favor indique de qué institución de educación superior se graduó?**		
1	Corporación Educativa el Litoral	Por favor indique el programa del que se graduó:	
		1	Técnico profesional en administración de empresas
		2	Técnico profesional en contaduría
		3	Técnico Profesional en mercadotecnia
		4	Técnico profesional en publicidad y diseño publicitario
		5	Técnico profesional en comercio exterior
		6	Técnico profesional en administración portuaria
		7	Técnico profesional en salud ocupacional y protección ambiental
		8	Tecnica Profesional en análisis y programación de computadores
2	Corporación Universitaria de la Costa	Por favor indique el programa del que se graduó:	
		1	Tecnología en informática y telecomunicaciones
		3	Arquitectura
		4	Ingeniería Civil
		5	Ingeniería Eléctrica
		6	Ingeniería Electrónica
		7	Ingeniería Industrial
		8	Ingeniería Ambiental
		9	Ingeniería de Sistemas
		10	Contaduría
		11	Administración

3	Corporación Universitaria Latinoamericana	Por favor indique el programa del que se graduó:	
		1	Técnico Profesional en laboratorio
		2	Técnico Profesional en Mantenimiento Electrónico industrial
		3	Técnico Profesional en salud ocupacional
		4	Técnico Profesional en Instrumentación quirúrgica
		5	Técnico Profesional en análisis y programación de computadores
		6	Técnico Profesional en administración y finanzas
		7	Técnico Profesional en contaduria
		8	Técnico Profesional en Secretariado ejecutivo
		9	Técnico Profesional en formación judicial y criminalística
		10	Técnico Profesional en administración de recurso humano
5	Corporación Universitaria Salamanca	Por favor indique el programa del que se graduó:	
		1	Tecnología en Sistemas
		2	Administración de Empresas
		3	Contaduría
7	CORSALUD	Por favor indique el programa del que se graduó:	
		1	Tecnología en radiología
		2	Técnico Profesional en radiología e imágenes diagnósticas
		3	Técnico Profesional en laboratorio de prótesis dental
		4	Técnico Profesional en Instrumentación quirúrgica
		5	Profesional en Instrumentación quirúrgica

		Por favor indique el programa del que se graduó:	
8	Instituto Tecnológico Soledad-Atlántico, ITSA	1	Técnico Profesional en telecomunicaciones
		2	Técnico Profesional en electromecánica
		3	Técnico Profesional en electrónica
		4	Técnico Profesional en informática
		5	Técnico Profesional en producción agroindustrial
		6	Técnico Profesional en comercio exterior y negocios internacionales
		7	Técnico Profesional en gestión empresarial
		8	Técnico Profesional en procesos industriales
		9	Tecnólogo en telecomunicaciones
		10	Tecnólogo en electromecánica
		11	Tecnólogo en electrónica
		12	Tecnólogo en informática
		13	Tecnólogo en producción agroindustrial
		14	Tecnólogo en equipos biomédicos
		Por favor indique el programa del que se graduó:	
9	Universidad Autónoma del Caribe	1	Tecnología en diseño de interiores
		2	Tecnología en diseño de modas y alta costura
		3	Tecnología en Diseño Gráfico
		4	Administración de Empresas
		5	Contaduría
		6	Negocio y finanzas Internacionales
		7	Administración de Empresas Turísticas y Hoteleras
		8	Ingeniería Mecánica
		9	Ingeniería Industrial
		10	Ingeniería Electrónica y de Telecomunicaciones
		11	Ingeniería de Sistemas
		12	Arquitectura

10	Universidad Simon Bolivar	Por favor, indique el programa del cual se graduó: 1 Administración de empresas 2 Contaduría Pública 3 Fisioterapia 4 ingeniería de Mercados 5 Ingeniería industrial
11	Universidad del Norte	Por favor, indique el programa del cual se graduó: 1 Medicina 2 Enfermería 3 Administración de Empresas 4 Economía 5 Negocios Internacianales 6 Ingeniería Industrial 7 Ingeniería Electrónica 8 Ingenieríia Electrónica 9 Ingeniería Mecánica 10 Ingeniería de Sistemas y Computación 11 Ingeniería Civil
13	Universidad Libre	Por favor, indique el programa del cual se graduó: 1 Contaduría Pública 2 Medicina 3 Instrumentación Quirurgica 4 Microbiología 5 Fisioterapia 6 Bacteriología 7 Ingeniería Industrial

14 Universidad del Atlántico

Por favor, indique el programa del cual se graduó:

1 Artes plásticas
2 Administración de empresas
3 Contaduría
4 Economía
5 Ingenieria Industrial
6 Ingeniería Mecánica
7 Ingeniería Química
8 Arquitectura

B2.	¿Cuál fue la fecha de ingreso al programa del cual se graduó?

1 Enero
2 Febrero
3 Marzo
4 Abril
5 Mayo
6 Junio
7 Julio
8 Agosto
9 Septiembre
10 Octubre
11 Noviembre
12 Diciembre

1 2000
2 2001
3 2002
4 2003
5 2004
6 2005
7 2006
8 2007

B3.	Por favor indique su fecha de grado

1 Enero
2 Febrero
3 Marzo
5 Abril
6 Mayo
7 Junio
8 Julio
9 Agosto

10 Septiembre

11 Octubre

12 Noviembre

13 Diciembre

3 2008

B4.	¿ Cuál fue la principal fuente de recursos para financiar el costo de su carrera? (escoja solo la PRINCIPAL fuente)

1 Usted mismo

2 Padres/acudientes

3 Hermanos/Otros parientes

4 Beca
- 1 ICETEX
- 2 Institución donde curso su carrera
- 3 Gobierno Nacional o Departamental
- 5 Gobierno municipal
- 6 Otra institución Pública
- 7 Institución Publica donde Usted o un familiar trabaja
- 8 Institución privada donde Usted o un familiar trabaja
- 9 Otra institución privada

5 Crédito Educativo
- 1 ICETEX
- 2 Otra Institución Pública
- 3 Entidad Financiera
- 5 Entidad Cooperativa
- 6 Institución donde cursó su carrera

6 Otro

B5.	¿ Interrumpió alguna vez los estudios de la carrera de la que se graduó? entiéndase por interrupción periodos prolongados de tiempo que obligaron a aplazar su carrera / que impidieron la libre continuidad de su carrera

1 Si

2 No (Por favor dirigirse a la pregunta B7)

B6.	¿Cuáles fueron las razones para interrumpir su carrera? señale la razón PRINCIPAL

1 Dificultades Económicas

2 Dificultades académicas

3 Problemas de salud

5 Calamidad Doméstica

6 Embarazo

7 Trabajo

8 Cambio de lugar de residencia

9 Pérdida de interés por la carrera

10 Otra

B7.	La jornada en la que realizó sus estudios fué:

1 Diurna

2 Nocturna

B8.	**¿Trabajaba paralelamente cuando cursaba su carrera ?**

1 Si 2 No (Por favor, dirigirse a la pregunta B10)

B9.	**¿Trabajó en un campo relacionado con su carrera?**

1 Si 2 No

B10.	**¿ Cuánto tiempo le tomó terminar el programa del cual se graduó? (en meses, e.g. 2 años= 24 meses; 2.5 años = 30 meses)**

1 meses

B11.	**¿ La enseñanza de un segundo idioma fue parte de su plan de estudios?**

1 Si 2 No (Por favor, dirigirse a la pregunta B13)

B12.	**¿ Cuál fue el segundo idioma incluido en su plan de estudios?**

1 Inglés 2 Otro

B13.	**¿ La enseñanza de herramientas básicas de informática (ej. procesador de texto, hojas de cálculo) fue pate de su plan de estudios?**

1 Si 2 No

B14.	**¿Realizó una o más prácticas en empresas cómo parte de su carrera? Si responde afirmativamente, por favor, escriba el número de meses que duró la(s) práctica(s)**

1 Si, durante _____ meses 2 No

B15.	**Cómo valora la oferta educativa y las condiciones de estudio que tuvo durante la carrera en que se graduó en 2008?**

	Muy malo				Muy bueno	
	1	2	3	4	5	
1						Asesoramiento académico en general
2						Ayuda/consejos para sus examenes finales
3						Contenido básico de la carrera
4						Variedad de asignaturas ofrecidad
5						Diseño del plan de estudios
6						Sistema de exámenes
7						Oportunidad de elección de cursos y áreas de especialización
8						Énfasis en la enseñanza práctica
9						Calidad de la docencia
10						Oportunidades de participar en proyectos de investigación y desarrollo
11						Énfasis en la investigación dentro del proceso de enseñanza
12						Oferta de prácticas y otras experiencias laborales

13	Oportunidad de contactar el profesorado fuera de clases
14	Contacto con compañeros de estudio
15	Posibilidad de los estudiantes de influir en las políticas universitarias
16	Equipamiento de la biblioteca
17	Disponibilidad de material adecuado para la enseñanza (proyectores, fotocopiadoras, etc...)
18	Calidad del equipo técnico (computadores. instrumentos de laboratorio, etc...)
19	Calidad de las instalaciones (aulas, laboratorios, bañs. etc...)

C. Transición al Trabajo

C1. Desde que acabó la carrera hasta la fecha, ¿Ha buscado trabajo alguna vez?

1 Si 2 No (Por favor, dirigirse a la pregunta D1)

C2. ¿Durante cuánto tiempo estuvo haciendo diligencias para conseguir el trabajo actual? (menos de un mes escribir 0)

1 meses

C3. ¿Qué medios de búsqueda le permitieron conseguir el empleo actual? por favor, seleccione el método (solo uno) que Ud. considere más importante

1 Familiares y/o amigos
2 Compañeros de Carrera
3 Llevar hoja de vida a las empresas
4 Llevar hojas de vida a las bolsas de empleo
5 Participar en convocatorias
6 Poner avisos clasificados
7 Internet
8 Servicio público de empleo del SENA
9 Bolsa de empleo de la institución donde se graduó
10 Prácticas empresariales
11 Responder Clasificados
12 Otro

C4. En su opinión ¿Cómo fueron valorados por su empleador los aspectos que ahora se detallan?

	Pocp Valorado	Muy Valorado
1	Reputación de la institución de donde egresó	
2	Área o campo de estudio	
3	Titulación específica	
4	Rendimiento académico durante la carrera	
5	Experiencia laboral/práctica adquirida antes de la carrera	
6	Experiencia laboral/práctica adquirida durante la carrera	
7	Conocimiento de idiomas extranjeros	
8	Conocimientos de informática	

9	Juventud
10	Recomendaciones/referencias de terceras personas
11	Ayuda de políticos
12	Personalidad
13	Por ser hombre
14	Por ser mujer

D. Características del Trabajo Actual

D1. ¿Se encuentra trabajando actualmente?

1	Si	2	No (Por favor, dirigirse a la pregunta 9)

D2. ¿ Cómo describiría su situación laboral actual?

1	Empleado	3	Empresario/Patrón
2	Trabajador independiente		

D3. ¿Este trabajo es de carácter permanente o temporal? Por favor, indique la duración del mismo en meses?

1	Permanente	2	Temporal

D4. ¿Cuál es su posición ocupacional?

1	Vinculado a una empresa privada	5	Patrón o empleador
2	Empleado público	6	Trabajador familiar sin remuneración
3	Trabajador por cuenta propia		

D5. La labor que desempeña actualmente está respaldada por un contrato de trabajo:

1	Escrito	4	Soy trabajador independiente
2	Verbal		

D6. ¿Qué tipo de vinculación tiene con esta empresa/institución?

1	Contrato a término fijo		
2	Contrato a término indefinido	6	Contrato de aprendizaje
3	Contrato de Prestación de servicios		Soy Trabajador independiente
5	Contrato por empresas intermediarias (bolsas de empleo)	7	

D7. ¿Cuál es la actividad económica de la empresa donde trabaja?

1	Agricultura, Ganadería y Silvicultura		depuración y Distribución de agua
2	Pesca y psicultura	4	Industria de bienes intermedios(Extracción y transformación de minerales no energéticos; y Productos químicos
3	Energía y agua (Extracción y transformación de minerales enrgéticos; y Captación,		

5	Industria de Bienes de Capital (Fabricación de productos metálicos, máquinas, equipos mecánicos y material de transporte
6	Industria de bienes de consumo (Producción de manufacturas,alimentos, madera, textil, etc)
7	Construcción
8	Transportes
9	Correo y Telecomunicaciones
10	Comercio
11	Servicios de recuperación y reparación
12	Hosteleria y restauración
13	Instituciones financieras
14	Seguros
15	Servicios a empresas
16	Servicios de alquiler de bienes muebles
17	Servicios de alquiler de bienes inmuebles
18	Educación e investigación
19	Sanidad
20	Administración
21	Servicios públicos
22	Servicios Sociales
23	Servicios recreativos y culturales
24	Servicios personales
25	Servicios domésticos
26	Representación internacional

D8.	**¿Cuál es su salario mensual?**
1	Entre 500,000 y 800,000
2	Entre 801,000 y 1,000,000
3	Entre 1,001,000 y 1,5000,000
4	Entre 1,501,000 y 2,000,000
5	Entre 2,001,000 y 2,500,000
6	Más de 2,500,000

D9.	**Si en estos momentos no se encuentra trabajando ¿Cuál ha sido la situación desde que acabó su carrera? (posible respuesta múltiple)**
1	He estado siempre desempleado(a)
2	He tenido trabajos temporales relacionados con mis estudios
3	He tenido trabajos temporales sin relación con mis estudios
4	He realizado el servicio militar/ social
5	He seguido otros estudios
6	Dedicado(a) al hogar/ Crianza de hijos

D10.	**¿Cuál de los siguientes aspectos considera Ud. han sido la causa de su situación de desempleo? (posible respuesta múltiple)**
1	No he puesto excesivo interés en buscar empleo
2	He buscado activamente empleo, pero no lo he encontrado
3	Deberes familiares me lo han dificultado
4	Posibles empleos supondría cambios de residencia que no deseo
5	Mi titulación es inadecuada para los trabajos que se ofrecen
6	Carezco de formación adicional imprescindible para los puestos de trabajo que se ofrecen
7	Los empleos que me han ofrecido no cumplían mis expectativas (salariales, etc...)

F. Relación Educación Superior y Trabajo	
F1.	**Si tiene en cuenta las tareas de su actual trabajo, en qué medida creer Usted utiliza el conocimiento y las habilidades adquiridas durante sus estudios?**

Muy Poco En gran medida

1 2 3 4 5

F2.	**¿Cómo caracterizaría la relación entre su campo de estudios y su área de trabajo?**

1 Mi campo de estudio es el único posible/ o el más indicado

2 Otros campos de estudio pueden ser apropiados para mi trabajo

3 Otro campo de estudio hubiese sido más apropiado

5 El campo de estudio no es importante

6 Ningún tipo de estudios superiores está relacionado con mi área de trabajo

7 Otros

F3.	**Teniendo en cuenta su nivel de estudios ¿Cuál considera Usted es el nivel de estudios más apropiado para su trabajo actual?**

1 Un nivel más alto al que me gradué

2 EL mismo nivel

3 No hacen falta estudios superiores

F4.	**¿En qué medida Usted considera su trabajo está relacionado con su estudios previos?**

Muy poco En gran medida

1 2 3 4 5

F5.	**Si considera su trabajo como escasamente apropiado y no relacionado con su educación, ¿por qué lo acepto? (posible respuesta multiple)**

1 No, aplica pues mi trabajo corresponde con mis estudios

2 Todavía no he encontrado un trabajo más apropiado

3 Haciendo este trabajo tengo mejores perspectivas profesionales

4 Prefiero un trabajo que no esté estrechamente relacionado con mis estudios

5 Fui ascendiendo a una categoría que estaba menos relacionada con mis estudios que mi categoría anterior

6 Consigo ingresos más altos con mi trabajo

7 Mi trabajo actual me ofrece seguridad

8 Mi trabajo actual es interesante

9 Mi trabajo actual proporciona la oportunidad de jornada parcial/horarios flexibles, etc.

10 Mi trabajo actual me permite trabajar en la ciudad de mi preferencia

11 Mi trabajo actual me permite atender las obligaciones familiares

12 Al principio de la carrera profesional era previsible tener un trabajo a penas ligado a mis estudios

13 Otro

G. Valoración y Satisfacción del Trabajo

G1. Hasta qué punto está satisfecho con su trabajo actual?

Muy insatisfecho[Muy satisfecho

1 2 3 4 5

G2. Qué tan importante considera Usted las siguientes características de una ocupación?

Poco importante Muy importante

	1	2	3	4	5	
1						Disfrutar de un trabajo independiente
2						Oportunidad de realizar trabajo científico/académico
3						Tareas claras y bien ordenadas
4						Posibilidad de utilizar el conocimiento y habilidades adquiridas
5						Estabilidad laboral
6						Reconocimiento, status social
7						Oportunidad de aplicar mis propias ideas
8						Buen ambiente de trabajo
9						Oportunidad de aprendizaje continuo
10						Ingresos altos
11						Oportunidades de ser influyente
12						Realizar tareas que supongan un reto
13						Buenas perspectivas profesionales
14						Tiempo suficiente para actividades de ocio
15						Coordinación y tareas de dirección
16						Posibilidad de trabajar en equipo
17						Oportunidad de hacer algo útil para la sociedad
18						Variedad
19						Buenas oportunidades para combinar empleo con tareas familiares

G3. ¿En qué medida aplican las siguientes características ocupacionales en su trabajo actual?

En ninguna medida En gran medida

	1	2	3	4	5	
1						Disfrutar de un trabajo independiente

2	Oportunidad de realizar trabajo científico/académico
3	Tareas claras y bien ordenadas
4	Posibilidad de utilizar el conocimiento y habilidades adquiridas
5	Estabilidad laboral
6	Reconocimiento, status social
7	Oportunidad de aplicar mis propias ideas
8	Buen ambiente de trabajo
9	Oportunidad de aprendizaje continuo
10	Ingresos altos
11	Oportunidades de ser influyente
12	Realizar tareas que supongan un reto
13	Buenas perspectivas profesionales
14	Tiempo suficiente para actividades de ocio
15	Coordinación y tareas de dirección
16	Posibilidad de trabajar en equipo
17	Oportunidad de hacer algo útil para la sociedad
18	Variedad
19	Buenas oportunidades para combinar empleo con tareas familiares

H. Información Sociobiográfica	
H1.	**Género:**

1	Masculino	2	Femenino

H2.	**¿ Cuál es su año de nacimiento?**
1	AAAA

H3.	**¿ Cuál es su estado civil?**

1	Soltero	2	Casado

H4.	**De acuerdo con su cultura, pueblo, rasgo físico Usted se identifica como:**

1	Indígena	6	Mestizo
2	Palenquero	7	Rom
3	Negro	8	Blanco
5	Raizal del Archipielago de San Andres y Providencia	9	Otro

H5.	¿Cuál es el nivel máximo de educación alcanzado por sus padres? Por favor, seleccionar el nivel de educación para cada uno de los padres (Padre columna izquierda y Madre columna derecha)

Padre	Madre	
1	2	
1		Sin estudios
2		Primaria incompleta
3		Primaria completa
4		Básica secundaria incompleta
5		Básica secundaria completa (hasta 9no/4to de bachillerato)
6		Educación media incompleta
7		Educación media completa (hasta 11vo/6to de bachillerato)
8		Técnico profesional
9		Tecnoólogo
10		Profesional
11		Posgrado

H6.	La vivienda donde vive actualmente es:

1	En arriendo	3	Vivienda de un familiar
2	Vivienda propia		

H7.	Estrato socioeconómico de la vivienda donde reside actualmente (definido según recibo de cobro energía eléctrica)

1	No aplica	6	Estrato4
2	Estrato 1	7	Estrato 5
3	Estrato 2	8	Estrato 6
5	Estrato 3		

H8.	¿ En salud, Usted es aportante/cotizante o beneficiario?

1	Aportante/cotizante	2	Beneficiario

H9.	¿ Usted cotiza a pensiones?

1	Si
2	No

Muchas gracias por tomarse el tiempo para contestar esta encuesta.
Comentarios, sugerencias

Appendix B Result of Independence Tests

Table 1. Detailed Results of Independence Tests

Topic	Variable	Statistic	DF	P-Value	Indepen-Dence**
Socioeconomic characteristics	Gender	0,001	1	0,982	n.dp.
	Socioeconomic stratum	135,699	2	0	dp.
	Highest level education father	38,433	1	0	dp.
	Highest level education mother	40,896	1	0	dp.
Educational Background	Place of graduation High School	2,502	2	0,286	n.dp.
	Character high school	32,121	1	0	dp.
	Type of secondary institution	35,533	1	0	dp.
	Type of HEI	689,196	1	0	dp.
	Main funding source for undergraduate studies	0,274	1	0,601	n.dp.
Transition from HE to the Labor Market	Job seek after graduation	21,61	1	0	dp.
	Most important method to find current job	5,126	2	0,77	n.dp.
Work characteristics	Current working status	14,916	1	0	dp.
	Current Work situation	3,609	1	0,57	n.dp.
	Character of the current work	0,041	1	0,84	n.dp.
	Occupational position	1,247	1	0,264	n.dp.
	Type of bond with the current employer	4,966	3	0,174	n.dp.
	Economic sector of current work	0,444	2	0,801	n.dp.
	Monthly wage	120,039	5	0	dp.
	Place of Work	17,036	4	0,002	dp.
	Job Satisfaction	3,335	4	0,503	n.dp.
	Situation of Unemployed Graduates after Finishing Studies				
	being always unemployed	0,716	1	0,398	n.dp.
	working in temporal jobs related to their studies	2,9221	1	0,87	n.dp.
	working in temporal jobs not related to their studies	0,681	1	0,409	n.dp.

	military/social service	0,381	1	0,537	n.dp.
	pursuing further studies	5,737	1	0,017	dp.
	housekeeping and child-rearing	0,59	1	0,442	n.dp.
	other reason	0,976	1	0,323	n.dp.
Characteristics of the relationship between graduates' higher education studies and graduates' job	Use of knowledge and skills acquired during studies	2,753	4	0,6	n.dp.
	Relationship field of studies and field of work	9,054	5	0,107	n.dp.
	Appropriate level of education for graduates current work	30,481	2	0	dp.
	Relationship between HE studies and current job	0,227	4	0,994	n.dp.

Appendix C Guiding Questionnaire Interview

Características transición a la educación superior

- ¿Cuáles son las posibles razones que explican la diferencia en el periodo de transición de la educación media a la educación superior de estos dos grupos de graduados (39% GPNU vs 21% GPU)?
- Clara diferencia en las características de los graduados en términos de estudios secundarios.
  - ¿Tienen programas de articulación con la educación media?
  - ¿Tienen programas orientados a captar estudiantes? ¿Están dirigidos a una población específica?

Características de la Educación Superior

- El 15% de los graduados alguna vez interrumpieron sus estudios
  - ¿Qué piensan de esta cifra? Cómo es el tema de la deserción en su institución, cuáles consideran son las causas principales?
  - ¿Tienen Uds algún tipo de programas para evitar la deserción o dado el caso programas para fomentar su reingreso al sistema?
  - Acciones contra la deserción
    - ¿Tienen algún programa en los frentes mencionados campañas de salud masiva, seguimiento académico?
- Similar comportamiento con respecto al financiamiento de estudios, aprox. 25% de los graduados utilizaron otros medios (becas y créditos).
  - ¿A qué se debe el relativo bajo número de personas que opta por otros medios?
  - ¿Cuál es el papel de los créditos ICETEX, ACCES en la financiación de los estudios de sus estudiantes?

- Enseñanza de idiomas e informática: ¿Está incluido dentro del plan de estudios la enseñanza de una segunda lengua y de conocimiento básicos de informática? ¿ pide el mercado estas destrezas?

- Prácticas profesionales**:** la cifra es alta y relativamente mayor a la de los graduados universitarios, 72% vs 66% ¿no debería ser más alta? ¿incluyen sus programas (todos/algunos) prácticas dentro del plan de estudios?

- Valoración de la oferta educativa**:** En general las respuestas fueron buenas y muy buenas, con notas que en promedio superaban 3,5 en una escala de 1 a 5. A qué cree Usted se debe estos altos puntajes evaluados?

Características del empleo

- ¿A qué se debe la diferencia en los porcentajes de búsqueda de trabajo después del grado?

- Métodos utilizados para encontrar el trabajo:

  - los medios institucionales ocuparon el segundo lugar con un 21% ¿corresponde esta cifra a los esfuerzos hechos por Ustedes en esta actividad?

- Un porcentaje menor de NUGs al momento de la encuesta se encontraban empleados, 62% vs 75% ¿cuáles piensan Uds son las razones para esta diferencia?

- Emprendimiento: ¿consideran importante y fomentan actividades de emprendimiento dentro de sus programas?

Relación Educación Superior y Empleo

¿Cuáles son las razones de que un poco más de la mitad de los graduados de PNUs (61%) considere que un nivel de estudios superior al que ellos tienen sería más apropiado para su trabajo actual?

Appendix D Additional Tables Chapter 6

Table 1 Main Funding Source for Undergraduate Studies (percent)

	NUP	UP	Total
Usted mismo	16	9	10
Padres/acudientes/Otros parientes	58	65	63
Beca	7	4	5
Crédito Educativo	17	22	21
Otro	0	1	1
Total	100	100	100
Count	241	740	981

Question B4.: ¿ Cuál fue la principal fuente de recursos para financiar el costo de su carrera?(escoja solo la PRINCIPAL fuente)

Table 2 Interruption of studies (percent)

	NUP	UP	Total
Si	15	15	15
No	85	85	85
Total	100	100	100
Count	239	741	980

Question B5.: ¿Interrumpió alguna vez los estudios de la carrera de la que se graduó? Entiéndase por interrupción periodos prolongados de tiempo que obligaron a aplazar su carrera / que impidieron la libre continuidad de su carrera

Appendix E Additional Tables Chapter 7

Table 1 Type of bond with the Current Employer (percent)

	NUS	US	Total
Contrato a término fijo	25	24	24
Contrato a término indefinido	39	44	43
Contrato de Prestación de servicios	19	21	20
Contrato por empresas intermediarias (bolsas de empleo)	7	7	7
Contrato de aprendizaje	10	1	3
Soy Trabajador independiente	1	4	3
Total	100	100	100
Count	142	536	678

Question D6.: ¿Qué tipo de vinculación tiene con esta empresa/institución?

Table 2 Economic Activity of Current Work (percent)

	NUS	US	Total
Agricultura, Ganadería y Silvicultura	1	1	1
Pesca y psicultura	0	0	0
Energía y agua (Extracción y Transformación de minerales energéticos; y captación, depuraciónydistribución de agua	7	5	5
Industria de bienes intermedios (extracción Y transformación de minerales no energéticos; y productos químicos)	2	2	2
Industria de Bienes de Capital (Fabricación de productos metálicos, máquinas, equipos mecánicos y material de transporte)	4	3	3
Industria de bienes de consumo (Producción de manufacturas, alimentos, madera, textil, etc.)	13	7	8
Construcción	1	9	7
Transportes	4	4	4
Correo y Telecomunicaciones	10	5	6
Comercio	13	8	9
Servicios de recuperación y reparación	1	1	1
Hostelería y restauración	1	1	1
Instituciones financieras	1	4	4
Seguros	1	1	1
Servicios a empresas	15	13	14
Servicios de alquiler de bienes muebles	1	0	0
Educación e investigación	5	12	11
Sanidad	2	10	8
Administración	1	3	3
Servicios públicos	7	4	5
Servicios Sociales	3	3	3
Servicios recreativos y culturales	1	1	1
Servicios personales	2	1	1
Representación internacional	1	0	0
Total	100	100	100
Count	136	518	654

Question D8.: ¿Cuál es la actividad económica de la empresa donde trabaja?

Appendix F Comparative Tables Based on the Data from the OLE Survey 2007

Table 1 Current working status (percent)

	NUS	US	Total
Si	71	79	77
No	29	21	23
Total	100	100	100
Count	638	2869	3507

Table 2 Occupational Position (percent)

	NUS	US	Total
Vinculado a una empresa privada	89	89	89
Empleado público	11	11	11
Total	100	100	100
Count	4502255	2705	

Table 3 Type of bond with the Current Employer (percent)

	NUS	US	Total
Contrato a término fijo	28	25	24
Contrato a término indefinido	62	58	43
Contrato de prestación de servicios	10	17	21
Total	100	100	100
Count	450	2253	2703

Appendix G Results Factor Analysis

Table 1.KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,954
Bartlett's Test of Sphericity	Approx. Chi-Square	689 7,657
	df	171
	Sig.	,000

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9,625	50,656	50,656	9,625	50,656	50,656	5,517	29,037	29,037
2	1,372	7,222	57,878	1,372	7,222	57,878	3,612	19,008	48,046
3	1,007	5,299	63,177	1,007	5,299	63,177	2,875	15,131	63,177
4	,860	4,527	67,704						
5	,755	3,972	71,675						
6	,610	3,208	74,883						
7	,572	3,008	77,892						
8	,532	2,801	80,693						
9	,464	2,441	83,134						
10	,448	2,360	85,494						
11	,424	2,233	87,727						
12	,401	2,110	89,838						
13	,357	1,878	91,716						
14	,342	1,799	93,514						
15	,286	1,503	95,017						
16	,279	1,467	96,484						
17	,242	1,276	97,760						
18	,224	1,177	98,937						
19	,202	1,063	100,000						

Table 3. Rotated Component Matrix[a]

	Component		
	1	2	3
Posibilidad de utilizar el conocimiento y habilidades adquiridas	,792		
Realizar tareas que supongan un reto	,771		
Oportunidad de aprendizaje continuo	,763		
Oportunidad de aplicar mis propias ideas	,714		
Posibilidad de trabajar en equipo	,664		
Buenas perspectivas profesionales	,640		,461
Tareas claras y bien ordenadas	,627		
Oportunidad de hacer algo útil para la sociedad	,560	,450	
Buen ambiente de trabajo	,552		,463
Variedad	,552	,516	
Coordinación y tareas de dirección	,540		,436
Disfrutar de un trabajo independiente		,778	
Oportunidad de realizar trabajo científico/académico		,718	
Tiempo suficiente para actividades de ocio		,650	
Buenas oportunidades para combinar empleo con tareas familiares		,645	
Oportunidades de ser influyente	,488	,503	,464
Estabilidad laboral			,812
Ingresos altos			,668
Reconocimiento, status social		,461	,544

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Appendix H List of Variables Employed in the Logistic Regression Analysis

Variables		ID	Categories/ Values
Dependent Variables	Job search duration	**(JSD)**	1= Up to 6 months (Nouni); 1= Up to 7 months (Uni)
			0= More than 6 months (Nouni) 0= More than 7 months (Uni)
	Wages	**(D10_1)**	1= Wages above 958 572 (Nouni); 1= Wages above 1 349 716 (Uni)
			0=wages equal an lower than COP $ 958 572 0=wages equal or lower than COP $ 1 349 716
	Use of knowledge and skills	**(F1)**	1= Great use of knowledge and skills
			0= No great use of knowledge and skills
	Appropriateness level of Education and Work	**(F3)**	1= Higher or same level is appropriate
			0=No need of HE studies

	Occupation status (high wages, social status and good career prospects)	**(Frecog)**	1=High status
			0=Not high status
	Work Autonomy	**(Faut)**	1=High work autonomy
			0=Not high status
	Job satisfaction	**(G1)**	1=High
			0=Not high
Variables			
Independent Variables			**Categories/ Values**
Sociobiographic	Gender	**(H1)**	1=Male
			0=Female
	Age	**(H2)**	Metric
	Socioeconomic stratum	**(H10)**	1= Low
			2= Middle
			3=High
	Father's highest level of education	**(EduF)**	1= Higher education
			0= Without higher education

	Mother's highest level of education	**(EduM)**	1= Higher education
			0= Without higher education
Educational Background	Character highschool	**(A2)**	1= Academic
			0= Technical
	Origin of secondary institution	**(A4)**	1=Public
			0=Private
	Type of higher education institution	**(B1_1)**	1=Nouni
			0=Uni
	Program Knowledge Area	**Bprogac**	1=Business and similar (progadm)
			3=Engineering and similar (proging)
			4= HealthScience (progsal)
	Origin HEIs	**(B1_0)**	1=Public
			0=Private
	Assessment higher education supply	**(B_18)**	Scale from 1-5 (where 5 is the highest grade)

Transition to Work	Job search duration	**(JSD)**	1= up to 6 months (Nouni) 1= up to 7 months (Uni)
			0= More than 6 months (Nouni) 0= More than 7 months (Uni)
Work Characteristics	Wages	**(D10_1)**	1= wages above COP $ 958 572 (Nouni); 1= wages above COP $ 1 349 716 (Uni) 0=wages equal an lower than COP $ 958 572 0=wages equal or lower than COP $ 1 349 716
	Occupation status (high wages, social status and good career prospects)	**(Frecog)**	1=High status
			0=Not high status
	Work Autonomy	**(Faut)**	1=High work autonomy
			0=Not high status
	Job satisfaction	**(G_1)**	1=High
			0= Not high
Relationship HE and current work	Use of knowledge and skills	**(F_1)**	Scale from 1-5 (where 5 is the highest grade)
	Appropriateness level of Education and Work	**(F_3)**	1= Higher level is appropriate (HLE)
			2= Same level is appropriate (SLE)
			3= No need of HE studies (NHE)

Appendix I Results Logistic Regression Analysis for University Graduates

1. Indicator Monthly Wage

```
. logit d10_1 h1 h2 low high eduF eduM a2 a4 proging progsal b1_1 g1 faut frecog hle
nhe, nolog

Logistic regression                                     Number of obs   =        420
                                                        LR chi2(16)     =     109.87
                                                        Prob > chi2     =     0.0000
Log likelihood = -198.14527                             Pseudo R2       =     0.2171

------------------------------------------------------------------------------
       d10_1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |  -.1690013   .2776714    -0.61   0.543    -.7132272    .3752246
          h2 |   .0545844   .0452586     1.21   0.228    -.0341208    .1432895
         low |  -.3976841   .3119367    -1.27   0.202    -1.009069    .2137005
        high |   1.445321   .4144799     3.49   0.000     .6329556    2.257687
        eduF |   .5346493   .2847678     1.88   0.060    -.0234853    1.092784
        eduM |  -.1369302   .2903515    -0.47   0.637    -.7060086    .4321482
          a2 |    .662415   .3124489     2.12   0.034     .0500265    1.274804
          a4 |  -.3489453   .2658577    -1.31   0.189    -.8700167    .1721262
     proging |   .8138716    .308682     2.64   0.008     .2088659    1.418877
     progsal |   .5610909     .42777     1.31   0.190    -.2773228    1.399505
        b1_1 |   -.678254   .4858579    -1.40   0.163    -1.630518      .27401
          g1 |   1.016226   .2880642     3.53   0.000     .4516301    1.580821
        faut |  -.4939782   .3280554    -1.51   0.132    -1.136955    .1489987
      frecog |   1.091837   .3169513     3.44   0.001      .470624     1.71305
         hle |   .1332173   .2953042     0.45   0.652    -.4455684    .7120029
         nhe |  -.6769929   .3830859    -1.77   0.077    -1.427827    .0738416
       _cons |  -2.573986   1.315782    -1.96   0.050    -5.152871    .0048988
------------------------------------------------------------------------------
```

Measures of Fit for logit of d10_1

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-213.445	-213.445	0.000
Log-Lik Full Model:	-169.261	-167.618	-1.642
D:	338.522(331)	335.237(328)	3.285(3)
LR:	88.369(17)	91.653(20)	-3.285(-3)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.207	0.215	-0.008
McFadden's Adj R2:	0.123	0.116	0.006
Maximum Likelihood R2:	0.224	0.231	-0.007
Cragg & Uhler's R2:	0.317	0.327	-0.010
McKelvey and Zavoina's R2:	0.371	0.379	-0.008
Efron's R2:	0.223	0.233	-0.010
Variance of y*:	5.227	5.294	-0.067
Variance of error:	3.290	3.290	0.000
Count R2:	0.745	0.739	0.006
Adj Count R2:	0.152	0.133	0.019
AIC:	1.073	1.081	-0.008
AIC*n:	374.522	377.237	-2.715
BIC:	-1599.507	-1585.227	-14.281
BIC':	11.167	25.448	-14.281

Difference of 14.281 in BIC' provides very strong support for current model.

TEST OF MULTIPLE COEFFICIENTS

```
. test low high

 ( 1)  [d10_1]low = 0                                  chi2(  2) =   15.79
 ( 2)  [d10_1]high = 0                               Prob > chi2 =  0.0004


. test hle nhe

 ( 1)  [d10_1]hle = 0                                  chi2(  2) =    3.63
 ( 2)  [d10_1]nhe = 0                                Prob > chi2 =  0.1626


. test proging progsal

 ( 1)  [d10_1]proging = 0                              chi2(  2) =    7.18
 ( 2)  [d10_1]progsal = 0                            Prob > chi2 =  0.0276
```

2. Indicator Job Search Duration

```
Logistic regression                                     Number of obs   =        377
                                                        LR chi2(17)     =      46.28
                                                        Prob > chi2     =     0.0002
Log likelihood = -182.89617                             Pseudo R2       =     0.1123

------------------------------------------------------------------------------
         jsd |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .0516179   .2935953     0.18   0.860    -.5238183    .6270541
          h2 |  -.1267569   .0423874    -2.99   0.003    -.2098346   -.0436791
         low |   .0126386   .3424442     0.04   0.971    -.6585398    .6838169
        high |   .5197232   .3852782     1.35   0.177    -.2354081    1.274855
        eduF |  -.0403207   .2946698    -0.14   0.891    -.6178629    .5372216
        eduM |   .6295079   .2932303     2.15   0.032      .054787    1.204229
          a4 |  -.4795929   .2761523    -1.74   0.082    -1.020841    .0616555
     proging |   .3606632   .3458631     1.04   0.297    -.3172161    1.038542
     progsal |   .2729047   .4791021     0.57   0.569    -.6661181    1.211927
        b1_0 |   .6453102   .4565167     1.41   0.157    -.2494461    1.540066
        b1_1 |   1.013184   .5840255     1.73   0.083    -.1314846    2.157853
       d10_1 |   .5408022    .295428     1.83   0.067     -.038226     1.11983
          g1 |   .5714564   .3114008     1.84   0.066    -.0388781    1.181791
        faut |  -.5535161   .3331503    -1.66   0.097    -1.206479    .0994466
      frecog |   .5452426   .3371757     1.62   0.106    -.1156096    1.206095
         hle |  -.4022444   .3074302    -1.31   0.191    -1.004796    .2003077
         nhe |  -.3791483   .4089761    -0.93   0.354    -1.180727    .4224301
       _cons |   3.313075   1.205759     2.75   0.006     .9498316    5.676319
------------------------------------------------------------------------------
```

Measures of Fit for logit of jsd

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-185.423	-185.423	0.000
Log-Lik Full Model:	-166.366	-165.479	-0.887
D:	332.731(331)	330.958(328)	1.773(3)
LR:	38.114(17)	39.887(20)	-1.773(-3)
Prob > LR:	0.002	0.005	-0.003
McFadden's R2:	0.103	0.108	-0.005
McFadden's Adj R2:	0.006	-0.006	0.011
Maximum Likelihood R2:	0.103	0.108	-0.005
Cragg & Uhler's R2:	0.158	0.165	-0.007
McKelvey and Zavoina's R2:	0.178	0.186	-0.008
Efron's R2:	0.119	0.124	-0.005
Variance of y*:	4.004	4.043	-0.039
Variance of error:	3.290	3.290	0.000
Count R2:	0.791	0.782	0.009
Adj Count R2:	0.064	0.026	0.038
AIC:	1.057	1.069	-0.012
AIC*n:	368.731	372.958	-4.227
BIC:	-1605.298	-1589.506	-15.792
BIC':	61.422	77.214	-15.792

Difference of 15.792 in BIC' provides very strong support for current model.

3. Indicator Job Satisfaction

```
Logistic regression                                     Number of obs   =        433
                                                        LR chi2(17)     =     152.09
                                                        Prob > chi2     =     0.0000
Log likelihood = -191.84101                             Pseudo R2       =     0.2839

------------------------------------------------------------------------------
          g1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |  -.0884372   .2802091    -0.32   0.752    -.6376368    .4607625
          h2 |   .0091528   .0495785     0.18   0.854    -.0880192    .1063248
         low |  -.1140842   .3628944    -0.31   0.753    -.8253441    .5971757
        high |  -.2608237   .3398824    -0.77   0.443     -.926981    .4053336
        eduF |  -.4519633   .3075765    -1.47   0.142    -1.054802    .1508756
        eduM |   .4504976   .3041542     1.48   0.139    -.1456336    1.046629
          a2 |  -.3697795   .3562475    -1.04   0.299    -1.068012    .3284527
          a4 |   .0776425   .2666382     0.29   0.771    -.4449588    .6002437
     proging |   .1505847   .3398227     0.44   0.658    -.5154556    .8166249
     progsal |  -.1302561   .4797183    -0.27   0.786    -1.070487    .8099744
        b1_0 |   .5030307   .4373626     1.15   0.250    -.3541842    1.360246
        b1_1 |   .4144241    .570541     0.73   0.468    -.7038157    1.532664
       d10_1 |   1.006668   .2939841     3.42   0.001     .4304695    1.582866
      frecog |   1.947251   .2907394     6.70   0.000     1.377412     2.51709
          f1 |   .6046489   .2926748     2.07   0.039     .0310168    1.178281
         hle |   .6201096   .3065727     2.02   0.043     .0192382    1.220981
         nhe |  -1.716926   .4254423    -4.04   0.000    -2.550778   -.8830747
       _cons |  -1.009437   1.419569    -0.71   0.477     -3.79174    1.772866
------------------------------------------------------------------------------
```

Measures of Fit for logit of g1

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-218.262	-218.262	0.000
Log-Lik Full Model:	-166.391	-164.446	-1.945
D:	332.783(331)	328.893(328)	3.890(3)
LR:	103.741(17)	107.631(20)	-3.890(-3)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.238	0.247	-0.009
McFadden's Adj R2:	0.155	0.150	0.005
Maximum Likelihood R2:	0.257	0.265	-0.008
Cragg & Uhler's R2:	0.360	0.372	-0.012
McKelvey and Zavoina's R2:	0.376	0.393	-0.017
Efron's R2:	0.275	0.285	-0.011
Variance of y*:	5.273	5.416	-0.144
Variance of error:	3.290	3.290	0.000
Count R2:	0.748	0.771	-0.023
Adj Count R2:	0.207	0.279	-0.072
AIC:	1.057	1.063	-0.006
AIC*n:	368.783	370.893	-2.110
BIC:	-1605.246	-1591.571	-13.675
BIC':	-4.205	9.470	-13.675

Difference of 13.675 in BIC' provides very strong support for current model.

4. Indicator Use of Knowledge and Skills

```
Logistic regression                                     Number of obs   =        401
                                                        LR chi2(16)     =      84.39
                                                        Prob > chi2     =     0.0000
Log likelihood = -186.27203                             Pseudo R2       =     0.1847

------------------------------------------------------------------------------
          f1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .6754498   .2823304     2.39   0.017     .1220924    1.228807
          h2 |   .0409053   .0509939     0.80   0.422     -.059041    .1408516
         low |    .438368   .3691997     1.19   0.235    -.2852501    1.161986
        high |   .0312292   .3266969     0.10   0.924     -.609085    .6715434
        eduF |  -.2769295   .3084279    -0.90   0.369    -.8814371    .3275782
        eduM |   .6112788   .3020918     2.02   0.043     .0191896    1.203368
          a4 |  -.2023246   .2671365    -0.76   0.449    -.7259024    .3212533
     proging |  -.8667657   .3442581    -2.52   0.012    -1.541499   -.1920323
     progsal |   1.027683   .6281174     1.64   0.102    -.2034047     2.25877
        b1_1 |   .8040895   .5797637     1.39   0.165    -.3322265    1.940405
        b_18 |   .7947271   .2115387     3.76   0.000     .3801188    1.209335
        faut |   .5345127   .3640537     1.47   0.142    -.1790195    1.248045
      frecog |   .4156266   .3212374     1.29   0.196    -.2139871     1.04524
          g1 |   .5601099   .2999503     1.87   0.062     -.027782    1.148002
         hle |   .2553775   .3141627     0.81   0.416    -.3603701    .8711251
         nhe |  -.8229622   .3855239    -2.13   0.033    -1.578575   -.0673492
       _cons |  -3.649329   1.753958    -2.08   0.037    -7.087024   -.2116348
------------------------------------------------------------------------------
```

Measures of Fit for logit of f1

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-201.303	-201.303	0.000
Log-Lik Full Model:	-163.454	-162.942	-0.512
D:	326.909(332)	325.884(328)	1.025(4)
LR:	75.697(16)	76.722(20)	-1.025(-4)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.188	0.191	-0.003
McFadden's Adj R2:	0.104	0.086	0.017
Maximum Likelihood R2:	0.195	0.197	-0.002
Cragg & Uhler's R2:	0.285	0.288	-0.003
McKelvey and Zavoina's R2:	0.340	0.342	-0.002
Efron's R2:	0.194	0.199	-0.005
Variance of y*:	4.987	5.001	-0.014
Variance of error:	3.290	3.290	0.000
Count R2:	0.756	0.759	-0.003
Adj Count R2:	0.076	0.087	-0.011
AIC:	1.034	1.054	-0.020
AIC*n:	360.909	367.884	-6.975
BIC:	-1616.975	-1594.580	-22.395
BIC':	17.984	40.379	-22.395

Difference of 22.395 in BIC' provides very strong support for current model.

TEST OF MULTIPLE COEFFICIENTS

```
. test progsal proging

 ( 1)  [f1]progsal = 0                                chi2(  2) =   14.98
 ( 2)  [f1]proging = 0                              Prob > chi2 =    0.0006



. test low high

 ( 1)  [f1]low = 0                                    chi2(  2) =    1.44
 ( 2)  [f1]high =0                                  Prob > chi2 =    0.4876


. test hle nhe

 ( 1)  [f1]hle = 0
 ( 2)  [f1]nhe = 0

           chi2(  2) =    6.11
         Prob > chi2 =    0.0472
```

5. Indicator Work Autonomy

```
Logistic regression                                     Number of obs   =        383
                                                        LR chi2(17)     =     109.26
                                                        Prob > chi2     =     0.0000
Log likelihood = -182.70187                             Pseudo R2       =     0.2302

------------------------------------------------------------------------------
        faut |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .1833122    .292574     0.63   0.531    -.3901223    .7567467
          h2 |  -.0038372   .0418887    -0.09   0.927    -.0859376    .0782632
         low |   .0660907   .3762134     0.18   0.861     -.671274    .8034555
        high |   .0840499   .3326303     0.25   0.801    -.5678935    .7359932
        eduF |  -.1057961   .3059777    -0.35   0.730    -.7055014    .4939092
        eduM |   .0201837   .3010158     0.07   0.947    -.5697965    .6101639
          a2 |   .2730955   .3836402     0.71   0.477    -.4788254    1.025016
          a4 |  -.0722323   .2762155    -0.26   0.794    -.6136047    .4691402
     proging |   .4073638   .3521963     1.16   0.247    -.2829282    1.097656
     progsal |   .6881275   .4474488     1.54   0.124    -.1888561    1.565111
        b1_0 |  -.5133597   .4890702    -1.05   0.294     -1.47192    .4452002
        b1_1 |   -.438161    .587759    -0.75   0.456    -1.590147    .7138255
         jsd |  -.5733575   .3266544    -1.76   0.079    -1.213588    .0668733
      frecog |   2.171498    .300528     7.23   0.000     1.582474    2.760522
          f1 |   .8037474   .3626889     2.22   0.027     .0928902    1.514605
         hle |   .2814326   .2792463     1.01   0.314    -.2658801    .8287453
         nhe |  -.7661818   .5796323    -1.32   0.186     -1.90224    .3698767
       _cons |   -2.82909   1.312112    -2.16   0.031    -5.400782   -.2573976
------------------------------------------------------------------------------
```

Measures of Fit for logit of faut

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-209.963	-209.963	0.000
Log-Lik Full Model:	-163.873	-162.561	-1.312
D:	327.746(331)	325.123(328)	2.624(3)
LR:	92.179(17)	94.803(20)	-2.624(-3)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.220	0.226	-0.006
McFadden's Adj R2:	0.134	0.126	0.008
Maximum Likelihood R2:	0.232	0.238	-0.006
Cragg & Uhler's R2:	0.332	0.340	-0.008
McKelvey and Zavoina's R2:	0.362	0.374	-0.012
Efron's R2:	0.243	0.249	-0.006
Variance of y*:	5.159	5.259	-0.100
Variance of error:	3.290	3.290	0.000
Count R2:	0.762	0.748	0.014
Adj Count R2:	0.178	0.129	0.050
AIC:	1.042	1.052	-0.010
AIC*n:	363.746	367.123	-3.376
BIC:	-1610.283	-1595.341	-14.942
BIC':	7.357	22.299	-14.942

Difference of 14.942 in BIC' provides very strong support for current model.

TEST OF MULTIPLE COEFFICIENTS

```
. test proging progsal

 ( 1)  [faut]proging = 0
 ( 2)  [faut]progsal = 0

           chi2(  2) =    2.49
         Prob > chi2 =    0.2875


. test low high

 ( 1)  [faut]low = 0
 ( 2)  [faut]high = 0

           chi2(  2) =    0.08
         Prob > chi2 =    0.9594

. test hle nhe

 ( 1)  [faut]hle = 0
 ( 2)  [faut]nhe = 0

           chi2(  2) =    3.46
         Prob > chi2 =    0.1772
```

6. Indicator Status/Recognition

```
Logistic regression                               Number of obs   =        396
                                                  LR chi2(16)     =     175.48
                                                  Prob > chi2     =     0.0000
Log likelihood = -186.72563                       Pseudo R2       =     0.3197

------------------------------------------------------------------------------
      frecog |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .2036504   .2778534     0.73   0.464    -.3409323    .7482332
          h2 |   .0411002   .0475816     0.86   0.388     -.052158    .1343585
         low |  -.0330529   .3573109    -0.09   0.926    -.7333695    .6672636
        high |  -.0947491   .3354205    -0.28   0.778    -.7521612     .562663
        eduF |   .4031481   .3006958     1.34   0.180    -.1862048     .992501
        eduM |   -.470164   .3029252    -1.55   0.121    -1.063887    .1235584
          a4 |   .3286787   .2703836     1.22   0.224    -.2012634    .8586207
     proging |  -.5645011   .3374545    -1.67   0.094      -1.2259    .0968975
     progsal |  -.0413198   .4739011    -0.09   0.931    -.9701489    .8875093
        b1_0 |  -.3145591   .4434993    -0.71   0.478    -1.183802    .5546835
        b_18 |   .4741679   .2260752     2.10   0.036     .0310687    .9172672
       d10_1 |   1.129856   .3215891     3.51   0.000      .499553    1.760159
          g1 |   1.944963   .3315189     5.87   0.000     1.295198    2.594728
        faut |   2.183833   .3315331     6.59   0.000      1.53404    2.833626
         hle |   .5420483   .2906496     1.86   0.062    -.0276145    1.111711
         nhe |   .4044478   .4770722     0.85   0.397    -.5305966    1.339492
       _cons |  -5.765985   1.837688    -3.14   0.002    -9.367788   -2.164182
------------------------------------------------------------------------------
```

Measures of Fit for logit of frecog

	Current	Saved	Difference
Model:	logit	logit	
N:	349	349	0
Log-Lik Intercept Only:	-241.792	-241.792	0.000
Log-Lik Full Model:	-164.349	-162.691	-1.658
D:	328.699(332)	325.382(328)	3.317(4)
LR:	154.886(16)	158.203(20)	-3.317(-4)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.320	0.327	-0.007
McFadden's Adj R2:	0.250	0.240	0.010
Maximum Likelihood R2:	0.358	0.364	-0.006
Cragg & Uhler's R2:	0.478	0.486	-0.008
McKelvey and Zavoina's R2:	0.512	0.524	-0.012
Efron's R2:	0.393	0.405	-0.012
Variance of y*:	6.744	6.909	-0.165
Variance of error:	3.290	3.290	0.000
Count R2:	0.782	0.788	-0.006
Adj Count R2:	0.553	0.565	-0.012
AIC:	1.039	1.053	-0.013
AIC*n:	362.699	367.382	-4.683
BIC:	-1615.185	-1595.082	-20.104
BIC':	-61.205	-41.101	-20.104

Appendix J Results Logistic Regression Analysis for Non-University Graduates

1. Indicator Monthly Wage

```
. logit d10_1 h1 h2 str eduF eduM a2 a4 proging progsal b1_0 g1 faut frecog, nolog

Logistic regression                                     Number of obs   =         95
                                                        LR chi2(13)     =      45.90
                                                        Prob > chi2     =     0.0000
Log likelihood = -42.893084                             Pseudo R2       =     0.3486

------------------------------------------------------------------------------
       d10_1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |  -.2328797   .7216294    -0.32   0.747    -1.647247    1.181488
          h2 |   .2739324   .1002621     2.73   0.006     .0774224    .4704424
         str |   -1.46621   .6477907    -2.26   0.024    -2.735857   -.1965638
        eduF |  -1.434376   .6997268    -2.05   0.040    -2.805815   -.0629362
        eduM |  -.1837265   .6987277    -0.26   0.793    -1.553208    1.185755
          a2 |   1.234775   .6922939     1.78   0.074    -.1220961    2.591646
          a4 |  -.5087323   .6622972    -0.77   0.442    -1.806811    .7893463
     proging |   .9042757   .8326806     1.09   0.277    -.7277483      2.5363
     progsal |   .6242425    .866784     0.72   0.471    -1.074623    2.323108
        b1_0 |   .3325265   .9361948     0.36   0.722    -1.502382    2.167434
          g1 |   1.230109   .7520594     1.64   0.102    -.2439002    2.704118
        faut |   1.016134   .6822203     1.49   0.136    -.3209931    2.353261
      frecog |   1.460757   .7085046     2.06   0.039     .0721136    2.849401
       _cons |  -8.626416   3.165714    -2.72   0.006     -14.8311   -2.421731
------------------------------------------------------------------------------
```

Measures of Fit for logit of d10_1

	Current	Saved	Difference
Model:	logit	logit	
N:	88	88	0
Log-Lik Intercept Only:	-60.974	-60.974	0.000
Log-Lik Full Model:	-39.412	-39.391	-0.022
D:	78.825(74)	78.781(73)	0.044(1)
LR:	43.124(13)	43.167(14)	-0.044(-1)
Prob > LR:	0.000	0.000	-0.000
McFadden's R2:	0.354	0.354	-0.000
McFadden's Adj R2:	0.124	0.108	0.016
Maximum Likelihood R2:	0.387	0.388	-0.000
Cragg & Uhler's R2:	0.517	0.517	-0.000
McKelvey and Zavoina's R2:	0.644	0.643	0.001
Efron's R2:	0.416	0.417	-0.001
Variance of y*:	9.235	9.218	0.017
Variance of error:	3.290	3.290	0.000
Count R2:	0.807	0.807	0.000
Adj Count R2:	0.605	0.605	0.000
AIC:	1.214	1.236	-0.022
AIC*n:	106.825	108.781	-1.956
BIC:	-252.498	-248.064	-4.434
BIC':	15.082	19.515	-4.434

Difference of 4.434 in BIC' provides positive support for current model.

2. Indicator Job Search Duration

```
. logit jsd h1 h2 str eduF eduM a2 a4 b1_0 b_18 g1 frecog, nolog

Logistic regression                                     Number of obs   =         79
                                                        LR chi2(11)     =      21.21
                                                        Prob > chi2     =     0.0313
Log likelihood = -34.092788                             Pseudo R2       =     0.2372

------------------------------------------------------------------------------
         jsd |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .1769369   .7178258     0.25   0.805    -1.229976     1.58385
          h2 |   .0676747   .0989915     0.68   0.494     -.126345    .2616943
         str |   .5171053   .7856477     0.66   0.510    -1.022736    2.056946
        eduF |   1.488626   .8768065     1.70   0.090    -.2298837    3.207135
        eduM |  -.2057807   .7404417    -0.28   0.781     -1.65702    1.245458
          a2 |   .5045644   .6728872     0.75   0.453    -.8142703    1.823399
          a4 |  -1.081179   .7403947    -1.46   0.144    -2.532326    .3699678
        b1_0 |  -1.359042   .7428286    -1.83   0.067     -2.81496    .0968749
        b_18 |    1.37725    .499024     2.76   0.006     .3991811    2.355319
          g1 |   .8737121   .7406849     1.18   0.238    -.5780036    2.325428
      frecog |   .0523856   .7451302     0.07   0.944    -1.408043    1.512814
       _cons |  -6.052892   3.565622    -1.70   0.090    -13.04138     .935598
------------------------------------------------------------------------------
```

Measures of Fit for logit of jsd

	Current	Saved	Difference
Model:	logit	logit	
N:	69	69	0
Log-Lik Intercept Only:	-39.604	-39.604	0.000
Log-Lik Full Model:	-30.472	-30.433	-0.039
D:	60.945(57)	60.867(55)	0.078(2)
LR:	18.262(11)	18.340(13)	-0.078(-2)
Prob > LR:	0.076	0.145	-0.069
McFadden's R2:	0.231	0.232	-0.001
McFadden's Adj R2:	-0.072	-0.122	0.050
Maximum Likelihood R2:	0.233	0.233	-0.001
Cragg & Uhler's R2:	0.341	0.342	-0.001
McKelvey and Zavoina's R2:	0.393	0.395	-0.002
Efron's R2:	0.218	0.220	-0.002
Variance of y*:	5.419	5.435	-0.016
Variance of error:	3.290	3.290	0.000
Count R2:	0.725	0.739	-0.014
Adj Count R2:	-0.056	0.000	-0.056
AIC:	1.231	1.288	-0.057
AIC*n:	84.945	88.867	-3.922
BIC:	-180.399	-172.009	-8.390
BIC':	28.313	36.703	-8.390

Difference of 8.390 in BIC' provides strong support for current model.

3. Indicator Job Satisfaction

```
. logit g1 h1 h2 str eduF eduM a2 b1_0 b_18 jsd, nolog

Logistic regression                                     Number of obs   =         89
                                                        LR chi2(9)      =       4.37
                                                        Prob > chi2     =     0.8858
Log likelihood = -50.665579                             Pseudo R2       =     0.0413

------------------------------------------------------------------------------
          g1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |    .500045   .5905387     0.85   0.397    -.6573896    1.657479
          h2 |  -.0283023    .061321    -0.46   0.644    -.1484894    .0918847
         str |  -.2952893   .5694033    -0.52   0.604    -1.411299    .8207207
        eduF |  -.5481446   .5730406    -0.96   0.339    -1.671284    .5749944
        eduM |   .5281992    .591091     0.89   0.372    -.6303179    1.686716
          a2 |   .1002176   .5218635     0.19   0.848    -.9226161    1.123051
        b1_0 |   .2725074    .590571     0.46   0.644    -.8849905    1.430005
        b_18 |  -.1135607   .4056047    -0.28   0.779    -.9085313      .68141
         jsd |    .855823    .580716     1.47   0.141    -.2823595    1.994005
       _cons |   1.268063   2.224464     0.57   0.569    -3.091807    5.627934
------------------------------------------------------------------------------
```

Measures of Fit for logit of g1

	Current	Saved	Difference
Model:	logit	logit	
N:	88	88	0
Log-Lik Intercept Only:	-52.516	-52.516	0.000
Log-Lik Full Model:	-50.071	-50.021	-0.050
D:	100.142(78)	100.043(77)	0.100(1)
LR:	4.890(9)	4.990(10)	-0.100(-1)
Prob > LR:	0.844	0.892	-0.048
McFadden's R2:	0.047	0.048	-0.001
McFadden's Adj R2:	-0.144	-0.162	0.018
Maximum Likelihood R2:	0.054	0.055	-0.001
Cragg & Uhler's R2:	0.078	0.079	-0.002
McKelvey and Zavoina's R2:	0.080	0.082	-0.002
Efron's R2:	0.064	0.064	-0.000
Variance of y*:	3.574	3.583	-0.008
Variance of error:	3.290	3.290	0.000
Count R2:	0.739	0.739	0.000
Adj Count R2:	0.080	0.080	0.000
AIC:	1.365	1.387	-0.022
AIC*n:	120.142	122.043	-1.900
BIC:	-249.090	-244.712	-4.378
BIC':	35.406	39.784	-4.378

Difference of 4.378 in BIC' provides positive support for current model.

4. Indicator Use of Knowledge and Skills

```
. logit f1 h1 h2 str eduF eduM a2 b_18 d10_1 jsd, nolog

Logistic regression                               Number of obs   =         88
                                                  LR chi2(9)      =      21.23
                                                  Prob > chi2     =     0.0117
Log likelihood = -32.577256                       Pseudo R2       =     0.2457

------------------------------------------------------------------------------
          f1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .3803562   .6967631     0.55   0.585    -.9852744    1.745987
          h2 |   .0308768   .1062567     0.29   0.771    -.1773825    .2391361
         str |   .8810754   .7754311     1.14   0.256    -.6387417    2.400892
        eduF |   .1339417   .8061223     0.17   0.868    -1.446029    1.713912
        eduM |  -.6532075   .7208558    -0.91   0.365    -2.066059    .7596439
          a2 |   .7509158   .6734282     1.12   0.265    -.5689793    2.070811
        b_18 |    1.19214   .5034512     2.37   0.018     .2053934    2.178886
       d10_1 |   1.752998   .8406982     2.09   0.037     .1052593    3.400736
         jsd |   .3026104   .6769538     0.45   0.655    -1.024195    1.629415
       _cons |  -5.472898   3.492105    -1.57   0.117     -12.3173    1.371502
------------------------------------------------------------------------------
```

```
. fitstat, using (f)

Measures of Fit for logit of f1

                           Current            Saved       Difference
Model:                       logit            logit
N:                              88               88                0
Log-Lik Intercept Only:     -43.191          -43.191            0.000
Log-Lik Full Model:         -32.577          -32.159           -0.418
D:                           65.155(78)       64.318(77)        0.837(1)
LR:                          21.227(9)        22.064(10)       -0.837(-1)
Prob > LR:                    0.012            0.015           -0.003
McFadden's R2:                0.246            0.255           -0.010
McFadden's Adj R2:            0.014            0.001            0.013
Maximum Likelihood R2:        0.214            0.222           -0.007
Cragg & Uhler's R2:           0.343            0.355           -0.012
McKelvey and Zavoina's R2:    0.397            0.412           -0.015
Efron's R2:                   0.228            0.245           -0.017
Variance of y*:               5.459            5.595           -0.135
Variance of error:            3.290            3.290            0.000
Count R2:                     0.807            0.818           -0.011
Adj Count R2:                 0.000            0.059           -0.059
AIC:                          0.968            0.981           -0.013
AIC*n:                       85.155           86.318           -1.163
BIC:                       -284.078         -280.437           -3.641
BIC':                        19.069           22.710           -3.641

Difference of    3.641 in BIC' provides positive support for current model.
```

5. Indicator Work Autonomy

```
. logit  faut h1 h2 str eduF eduM a2 b_18 jsd d10_1 g1


Logistic regression                                     Number of obs   =         71
                                                        LR chi2(10)     =      24.82
                                                        Prob > chi2     =     0.0057
Log likelihood = -33.651281                             Pseudo R2       =     0.2694

------------------------------------------------------------------------------
        faut |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .4471814    .703803     0.64   0.525    -.9322471     1.82661
          h2 |   .0613204   .0807745     0.76   0.448    -.0969947    .2196355
         str |  -.4173753   .7075016    -0.59   0.555    -1.804053    .9693022
        eduF |  -1.345977   .7647145    -1.76   0.078     -2.84479    .1528362
        eduM |   1.062869   .6929192     1.53   0.125    -.2952273    2.420966
          a2 |  -.6837336   .6697775    -1.02   0.307    -1.996473    .6290063
        b_18 |   .7907657   .5132922     1.54   0.123    -.2152685      1.7968
         jsd |   .3358098   .7929142     0.42   0.672    -1.218274    1.889893
       d10_1 |   1.403985   .7098163     1.98   0.048     .0127705    2.795199
          g1 |   1.587095   .9481915     1.67   0.094     -.271326    3.445516
       _cons |  -7.114849   3.226925    -2.20   0.027    -13.43951   -.7901929
------------------------------------------------------------------------------
```

```
. fitstat, using (f)

Measures of Fit for logit of faut

                           Current            Saved       Difference
Model:                       logit            logit
N:                              70               70                0
Log-Lik Intercept Only:     -45.623          -45.623            0.000
Log-Lik Full Model:         -33.396          -32.912           -0.484
D:                           66.793(59)       65.824(57)        0.969(2)
LR:                          24.453(10)       25.422(12)       -0.969(-2)
Prob > LR:                    0.006            0.013           -0.006
McFadden's R2:                0.268            0.279           -0.011
McFadden's Adj R2:            0.027           -0.006            0.033
Maximum Likelihood R2:        0.295            0.305           -0.010
Cragg & Uhler's R2:           0.405            0.418           -0.013
McKelvey and Zavoina's R2:    0.473            0.494           -0.020
Efron's R2:                   0.284            0.298           -0.013
Variance of y*:               6.246            6.496           -0.250
Variance of error:            3.290            3.290            0.000
Count R2:                     0.714            0.700            0.014
Adj Count R2:                 0.200            0.160            0.040
AIC:                          1.268            1.312           -0.043
AIC*n:                       88.793           91.824           -3.031
BIC:                       -183.869         -176.340           -7.528
BIC':                        18.032           25.560           -7.528

Difference of    7.528 in BIC' provides strong support for current model.
```

6. Indicator Status/Recognition

```
. logit frecog h1 h2 str eduF eduM a4 b_18 jsd d10_1 f1 , nolog

Logistic regression                                     Number of obs   =         78
                                                        LR chi2(10)     =      16.30
                                                        Prob > chi2     =     0.0913
Log likelihood = -44.260734                             Pseudo R2       =     0.1555

------------------------------------------------------------------------------
      frecog |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          h1 |   .3532726    .593289     0.60   0.552    -.8095524    1.516098
          h2 |   -.056614   .0609668    -0.93   0.353    -.1761067    .0628788
         str |   -.717122   .6555328    -1.09   0.274    -2.001943    .5676987
        eduF |  -.0031272   .6387578    -0.00   0.996     -1.25507    1.248815
        eduM |   .2515494   .6000392     0.42   0.675    -.9245059    1.427605
          a4 |   .4909003   .6002306     0.82   0.413      -.68553    1.667331
        b_18 |   .3712233   .4339119     0.86   0.392    -.4792285    1.221675
         jsd |  -.1901645   .6362848    -0.30   0.765     -1.43726    1.056931
       d10_1 |   1.145573   .5866363     1.95   0.051    -.0042132    2.295359
          f1 |   1.535298   .8093451     1.90   0.058    -.0509893    3.121585
       _cons |  -1.303189   2.260029    -0.58   0.564    -5.732766    3.126387
------------------------------------------------------------------------------
```

Measures of Fit for logit of frecog

	Current	Saved	Difference
Model:	logit	logit	
N:	78	78	0
Log-Lik Intercept Only:	-52.413	-52.413	0.000
Log-Lik Full Model:	-44.261	-44.196	-0.064
D:	88.521(67)	88.393(65)	0.129(2)
LR:	16.304(10)	16.433(12)	-0.129(-2)
Prob > LR:	0.091	0.172	-0.081
McFadden's R2:	0.156	0.157	-0.001
McFadden's Adj R2:	-0.054	-0.091	0.037
Maximum Likelihood R2:	0.189	0.190	-0.001
Cragg & Uhler's R2:	0.255	0.257	-0.002
McKelvey and Zavoina's R2:	0.268	0.274	-0.006
Efron's R2:	0.196	0.196	0.001
Variance of y*:	4.492	4.531	-0.040
Variance of error:	3.290	3.290	0.000
Count R2:	0.692	0.692	0.000
Adj Count R2:	0.226	0.226	0.000
AIC:	1.417	1.467	-0.050
AIC*n:	110.521	114.393	-3.871
BIC:	-203.378	-194.793	-8.585
BIC':	27.263	35.848	-8.585

Difference of 8.585 in BIC' provides strong support for current model.