

An analysis of the relationship between higher education and development by applying Sen's human capabilities approach. The case of three technological universities in Mexico.

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*To those UT graduates from Neza, Tula and Aguascalientes
who pursue their freedom through education*

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List of abbreviations

ANUIES	National Association of Universities and Higher Education Institutions
BANCOMEXT	National Bank of Foreign Trade in Mexico
CGUT	General Co-ordination of Technological Universities
COEPES	State Commission for Higher Education Planning
CONACYT	National Council of Science and Technology in Mexico
DFID	Department for International Development
EAP	Economically Active Population
GDP	Growth Domestic Product
GER	Gross Enrolment Ratio
GNP	Growth National Product
HDI	Human Development Index
ILO	International Labour Organisation
INEGI	National Institute of Statistics, Geography and Informatics
IPN	National Polytechnic Institute
ISCED	International Standard Classification of Education
IT	Information Technology
NES	National Education System in Mexico
OCE	<i>Observatorio Ciudadano de la Educación</i> (Education Policy Watchdog in Mexico)
OECD	Organization for Economic Co-operation and Development
PME	Programme of Educational Modernization
PND	Programme of National Development 1995-2000
PNE	National Education Programme, 2001-2006
R&D	Research and Development
ROREs	Rates on Return to Investment
SEP	Secretariat of Public Education
STPS	Secretariat of Labour and Social Protection
TSU	University Technician (<i>Técnico Superior Universitario</i>)
UAM	Metropolitan University of Mexico
UNAM	National Autonomous University of Mexico
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNRISD	United Nations Research Institute for Social Development
UTA	Technological University of Aguascalientes
UTN	Technological University of Neza
UTs	Technological Universities
UTT	Technological University of Tula
VET	Vocational Education Training
WB	The World Bank

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Abstract

Over forty years the relationship between education and development has been analysed using economic approaches. These analyses usually correlate educational variables such as attainment, years of schooling, and public expenditure in education, with economic outcomes (wage rates, growth output, etc.). Under these perspectives, economic progress can be explained by the formation of human capital. However, because these approaches use narrow concepts of development and they pay little attention to those conditions that influence education policies, they provide a limited account of the relation between education and development.

This thesis seeks to broaden the reductionism derived from economic approaches to analyse the relationship between education and development. In doing so, it applies Amartya Sen's concept of development and the human capabilities approach. These theoretical propositions restore an integral dimension to the role of education within the developmental processes.

By using three Mexican technological universities as case studies in different regions and by developing seven functionings to evaluate the effects of education, this thesis shows that university graduates have obtained personal and professional achievements. It was also found that as instrumental freedoms vary, individuals' functionality does also. So, the impacts of higher education can potentially be maximized if social opportunities and economic facilities are generated simultaneously. Conversely, a lack of the means of development will constrain educational endeavour.

Thus, the education provided by technological universities has helped individuals to gain valuable functionality. However, development is far from being achieved since instrumental freedoms have been missed. Education needs friendly conditions to succeed.

Introduction

Introduction

When the classical economist Adam Smith (1723-1790) observed that the abilities of individuals significantly impacted on production, he never thought that his ideas would be widely disseminated over time. Smith's considerations have inspired a vast literature and complementary approaches to demonstrate that education and development are inextricably linked.

Over the last forty years, the relationship between education and development has usually been analysed through economic approaches. Correlations between educational variables, (attainment, human capital formation, years of schooling, public expenditure) with economic variables (earning, levels of employment and output growth) have shown some evidence that economic advancement can be explained by human capital formation. These approaches can be divided into two levels: Macro and micro.

The macro-level approach generally applies econometric models and uses the production function to show a causal relationship between economic advancement and schooling. In this sense, Theodore W. Schultz systematized Smith's ideas, and pointed out that national output can be explained by investment in human capital, since skills and knowledge are a form of capital (Schultz 1961). Using the ideas of this author as a foundation, functional interpretations have emerged introducing variations and noting similarities and differences with the human capital theory principles. For example: "using and producing ideas" (Romer 1992); "human capital and endogenous growth" (Tallman and Wang 1993); "the knowledge-based economy" (OECD 1996a), "the knowledge society" (Ruiz 1997) and so on.

The micro-level approach is a derivation of the former approach. Some analyses of the micro level approach investigate the way in which education and economy should be connected through Cost-Benefit Analyses (CBA) techniques. Once having argued that

expenditure on education is a kind of investment, "one should be able to estimate the rate of return to this investment" (Psacharopoulos in Meier 1995:322). So that the economic impacts of education can be estimated by dividing the permanent annual benefits stream due to education by the cost of obtaining such education (see Psacharopoulos; 1981, 1985, 1987, 1994, 1995). The results of these divisions are the rates of return to investment in education (ROREs). These estimates have been commonly used by economists of international organizations, policy makers, educational planners, etc., to allocate public funds efficiently to different levels of education or types of learning (Psacharopoulos 1994, 1995; Lacher 1998).

Education for human development (DFID 1998, Watkins, 2000) can be also regarded as another micro-level approach since it focusses, in the first instance, on human capabilities or on qualitative issues, rather than on national outcomes, to show the effects of learning. Despite its relevance for the field of education, this humanistic perspective lacks empirical support.

Macro level and some of the micro level approaches (ROREs) focus on national output, or on labour market outcomes, to argue that education encourages development. However these perspectives limit a broader understanding. They fail to take two factors into account: firstly, the qualitative effects of education and secondly, the limited role of the education endeavour to overcome structural deprivations.

Even though monetary benefits are important indicators of how people can thrive thanks to their expertise, economic results represent only a part of the picture concerning the relationship between education and development.

I. The statement of the problem

Following the economic idea that education precipitates developmental processes, governments of advanced and less advanced countries have allocated massive

resources to the educational sector. Moreover, they expect to grow social and economically by improving educational attainment. But, paradoxically, unemployment rates among educated people increase, real wages fall, informal work expands; bigger economic disparities emerge, and thus inequality and poverty cannot be eradicated through the formation of human capital.

This thesis argues that economic approaches possess limitations because:

- ▶ If the relationship between education and development is considered uniquely as a positive and direct one, then this approach will tend to overlook contextual factors that also influence the learning process.
- ▶ In believing that education is a powerful force capable of moving a nation from one economic stage to another, there is a risk of overstating the effects of education. That is, education could be regarded as a panacea.
- ▶ When education is considered as a factor of production, it is common to overlook the simple - but important - fact that skills and abilities are embedded in human beings rather than in physical capital (Bowles 1977).
- ▶ Focusing on employment variables to explain the impact of education on economic growth, leads us to reduce human beings to actors with a unique role in life: that of workers; and we should understand human beings in a broader way (Sen 1999).
- ▶ Although economic approaches consider education as an independent variable of economic progress, schooling appears to be subordinated factor to the demands of the productive sector. As a result of this contradiction, political discourse becomes confusing.

III. The aims of the study

This thesis seeks to broaden the reductionism derived from economic approaches in the analysis of the relationship between education and development. In doing so, it uses Amartya Sen's concept of development and the human capabilities approach. Sen's theoretical propositions are illuminating since they restore a holistic perspective to the analysis of the links between knowledge and development.

It is worth saying that this study does not intend to generalise the results obtained in the case-studies to the rest of the UTs and their respective populations. This research, rather, is aimed at:

- ▶ providing an explanatory perspective to facilitate comprehension of how education can work within developmental processes.
- ▶ exploring the reasons why human beings still face socioeconomic disadvantages, despite the fact of having been technically trained.
- ▶ identifying the circumstances under which education can help individuals to expand their capabilities.
- ▶ identifying those factors that limit the expansion of human capabilities. This with the further purpose of developing a coherent social policy framework.
- ▶ integrating the economic perspective with the human capabilities approach.

III. Outline of the thesis

The arguments of this thesis unfold over ten chapters. Chapter 1 presents a critical revision of the main approaches used to prove the relationship between education and development. It begins by analysing the mainstream perspective: the human capital theory and continues with some of its derivatives. The relationship between education

and employment, manpower planning, the knowledge-based economy, the returns to investment in education (ROREs) and education for human development are put under discussion in this chapter. It underlines the limited capacity of economic approaches to explain adequately the relationship between education and development, though human development seems to fill this gap.

Chapter 2 presents a discussion about the relationship between education and development in Mexico. By contrasting national statistics with theoretical approaches, it can be said that connecting knowledge with development is more complex than expected. While educational attainment has considerably increased, unemployment rates among educated people are also going up. This kind of paradoxes lead us to reflect on education and development more widely.

In order to achieve this broad understanding, chapter 3 proposes a research design based on three methods. Firstly, three Technological Universities (hereafter referred as UTs) will be selected as case-studies under the regional and operational criteria. This method is helpful for examining the general idea of "education for development" but by focussing on particular contexts. Secondly, a combination of research techniques (documentary analyses, questionnaires and semi-structured interviews) is suggested. Questionnaires will be sent to a random sample of employed and unemployed graduates in order to obtain a "broad picture" of their socioeconomic situation. In contrast, interviews will be conducted with a non-probabilistic sample of graduates, employers of the three regions and civil servants. This qualitative method of enquiry aims at extending the information gathered through questionnaire as the pilot study showed this data collection to be limited for investigating people's capabilities. Thirdly, a comparative approach serves to identify under what conditions education could be more effective in the pursuit of development. This methodology is integrated with human capabilities approach which is described in chapter 4. Here, Amartya Sen's concept of development and human

capabilities approach are explained. Following Sen's ideas, it proposes to evaluate the effects of education through the functionality of individuals. So, seven functionings (four personal and three professional) were developed. In order to broaden the perspective of education and development, this chapter also suggests to put attention in the "instrumental freedoms".

To contextualise the case-studies into the idea of education for development, Chapter 5 presents the technical and social justifications for creating the Mexican technological universities. It explains the reasons why UTs are considered, by the Mexican government, as a development-oriented model of higher education. Moreover, a general overview of the demographic, economic and educational conditions of each zone analysed is provided. This sets a basis for incorporating into studies of education and development the way in which individual agency and the particular contexts complement each other.

But, once having described the foundations of the UTs, it is necessary to examine them through empirical research. Chapter 6 presents the opinions of the directive staff of each university as well as the General Co-ordinator of the UTs on five key issues: (a) the role of the UT as booster of development, (b) the pursuit of equity through short careers, (c) the structural socioeconomic problems, (d) the relevance of education as a main attribute of the UT model and, (e) the partnership of the UT with the industry. Here, different definitions of development will be given as well as a narrow use of the term: The relevance of education. An alternative interpretation is given.

Chapter 7 presents the results obtained through questionnaires. It is divided into four parts. The first gives the characteristics of the respondents from the UTs. The second part shows the expectations and aspirations of the University Technicians (henceforth referred as TSUs). Here, it is interesting to note that UTs have set a sound basis for making valuable personal and professional achievements. The third part presents the socioeconomic backgrounds of the UT graduates, highlighting variations in each region.

The last part analyses a key issue: employment and unemployment among the UT graduates. Changes over time in occupations and wage levels can be corroborated. This part is crucial for the determination of the extent to which education provided by UTs can help people in enhancing their capabilities.

Taking into account the results of both quantitative and qualitative analyses, chapter 8 presents the case of the UT of Neza. This chapter stresses the personal and professional achievements gained by young people. However, it is difficult to say that development was caused by the UT's creation, since structural factors significantly influence the functionality of individuals. Special attention is paid to identify these "unfreedoms". A similar claim is made in chapter 9 which presents the case of the UT of Tula. But here, sadly, interlinked systems of structural problems have had larger impact on educational endeavour. This argument is supported by contrasting, in chapter 10, these previous cases with Aguascalientes'. In this region the opportunities set is wider and thus a greater expansion of human capabilities can be more easily attained. These findings pave the way the conclusion that the effects of education can be maximized if the means of development are simultaneously generated. Contrary to this, a lack of economic facilities and social opportunities will undoubtedly restrain educational endeavour.

Thus, the education provided by Mexican technological universities has helped human beings to achieve valuable personal and professional functionality. However, development is far from being achieved since instrumental freedoms have been missed.

CHAPTER 1

Literature review

Chapter 1

Literature review

The evolution of thought about education and development: An introduction

The dominant argument for the existence of a relationship between education and development emerged from classical economics and its founder, Adam Smith. According to Schultz, Smith “boldly included all of the acquired and useful abilities of all inhabitants of a country as part of capital” (Shultz, 1961:2). The Scottish philosopher of the eighteenth century never thought that his ideas would be studied and reformulated into several approaches by diverse scholars during this millennium.

Carter and O’Neill argue that there is a “new orthodoxy” that states how education should be connected with economy. Five elements identified by these authors: (1) Improving national economies by tightening the connection between schooling, employment, productivity and trade; (2) Enhancing student outcomes in employment-related skills and competencies; (3) Attaining more direct control over curriculum content and assessment; (4) Reducing the cost to government of education; (5) Increasing community input to education through more direct involvement in school decision- making and through the pressure of market choice (Carter O’Neill in Ball 1998:122). This vision of education is also shared by international organisations such as the Organisation for Economic Co-operation and Development (OECD) and supra-national organisations such as the World Bank (WB) which, according to Phillip Jones, has promoted policies that use education as a “precursor” to modernisation. The WB has served as a “major purveyor of western ideas about how education and the economy are, or should be, connected” (Jones, 1992: XIV).

Over the last forty years, the relationship between education and development has usually been analysed using economic approaches. Correlations between educational variables (attainment, human capital formation, years of schooling, public expenditure) and economic variables (earning, levels of employment and output growth) have provided some evidence that economic advancement can be explained by human capital formation.

The economic approaches that show that education and development are closely entwined can be divided into two levels of analysis: macro and micro in accordance with their research methods, data and subjects of analysis. The former approach generally applies econometric models and uses the production function {output= f (land, labour, capital and human capital)} to show a causal relationship between economic advancement and schooling. For example, Theodore W. Schultz systematized Smith's ideas, and pointed out that national output can be explained by investment in human capital, since skills and knowledge are a form of capital (Schultz 1961). Functional interpretations have emerged from the foundation of Schultz's ideas, introducing variations and noting differences with the human capital theory principles. For example: "manpower planning" (Hinchliffe 1987); "using and producing ideas" (Romer 1992); "human capital and endogenous growth" (Tallman and Wang 1993); "the knowledge-based economy" (OECD 1996a), "the knowledge society" (Ruiz 1997) and so on.

The micro-level approach is a derivation of the macro-level approach. From this view, some analyses explain the way in which education and economy are connected through Cost-Benefit Analysis (CBA) techniques. Once having argued that expenditure on education is a kind of investment, "one should be able to estimate the rate of return to this investment" (Psacharopoulos in Meier 1995:322). Using these techniques the economic impact of education can be estimated by dividing the permanent annual benefits stream due to education by the cost of obtaining such education

(Psacharopoulos in Meier 1995). The results of these calculations are the rates of return to investment in education (ROREs).

Within the micro-level analyses, one of the most recent approaches for showing the effects of learning on development is "education for human development" (DFID 1998, Watkins 2000) which focusses, in the first instance, on qualitative issues such as poverty alleviation, rather than on national economic advancement.

In order to achieve an understanding of these approaches, this chapter is divided into two parts. The first presents a careful examination of the four macro-level approaches commonly used to analyse the relationship between education and development. They are: human capital theory, the relationship between education and the labour market, manpower planning, and knowledge based-economy. The second part, presents the foundations of the two micro-level approaches which are rates on returns to investment in education (ROREs) and education for human development. It concludes that economic approaches fail to capture an integral picture of the relationship between education and development, since they focus on labour market outcomes as well as national output growth. This view ignores complementary conditions that make education succeed and little attention is put to the qualitative benefits gained through learning. Though the human development approach seeks to redress this failure, it focusses only on basic levels of education, and its methods of application are not clearly explained. Therefore, I suggest that much more work needs to be done on this issue.

I. Macrolevel analyses

A. Human capital theory

In the 1960s, the analysis of the three factors of production (land, labour and capital) was inadequate to explain radical economic changes in some countries that had experienced calamities such as wars. Japan, for example, had demonstrated, "beyond any doubt, that

a rich endowment of natural resources is not necessary in developing a modern economy" (Schultz, 1971: 2). These observations were used by economists such as Gary Becker and Theodore W. Schultz to argue that "skills and knowledge are a form of capital which has grown in Western societies at a much faster rate than conventional (nonhuman) capital, and that its growth may well be the most distinctive feature of the economic system" (Schultz, 1961:1). Human capital theory can be defined as follows:

The concept of human capital refers to the fact that human beings invest in themselves, by means of education, training, or other activities, which raises their future income by increasing their lifetime earnings. Economists use the term 'investment' to refer to expenditures on assets which will produce income in the future, and contrast investment expenditure with consumption, which produces immediate satisfaction or benefits, but does not create future income. (Woodhall, 1997: 219).

The "investment in human capital" approach became a "powerful influence on the analysis of labour markets, wage determination and other branches of economics, such as the analysis of economic growth" (Woodhall, 1997:219). As we can see, education benefits are valued merely through labour market outcomes. This is a limited vision of education since there may be non-economic benefits that may also significantly enhance people's lives. Moreover, assuming that, as a person acquires knowledge he or she will become more productive and earn more, ignores the complexities of the labour market. "Job prospects have been bleak for recent graduates in most areas of the world in the 1990s", says Teichler (1998;6).

As a result of increasing rates of unemployment among educated people, bigger disparities in income distribution, and low economic growth despite heavy investments in education and training in the 1970s, "the faith in educational investment as an engine of development began to decline" (Little 1992:2). Griffith explains this "loss of faith" because the contribution of education to economic development,

tends to be more indirect and reactive to changes in others sectors, than to be as direct and proactive as the proponents of the 1960s believed (Griffith 1995:177).

So, to allocate massive public funds to train and educate people it is not enough to achieve economic growth. For Brown *et al*, the "fundamental failing" of the human capital theory is that it has not been able to comprehend the broader historical and social dimensions contributing to skill formation (2001:xi).

The criticisms which have arisen of human capital theory seem closely related to its fragmented vision of education and its effects on individuals. In this vein, Amartya Sen argues that:

The use of the concept of "human capital" which concentrates only on one part of the picture (an important part, related to broadening the account of productive resources), is certainly an enriching move. But it does need supplementation. This is because human beings are not merely means of production, but also the end of the exercise (Sen 1999:295).

Despite the contributions that human capital theory has made, it is a limited approach to understanding the relationship between education and development. "It needs supplementation", as Sen says.

B. The relationship between education and the labour market.

Although the connection between education and the the world of work forms an intrinsic part of human capital theory, it deserves separate discussion due its evident complexity. The labour market is crucial to the analysis of the development. For example, Ruiz (1997) points out that employment has been the most significant variable for explaining economic growth in relation to education.

Hinchliffe (1987) notes that, with the development of human capital theory, labour demand has been seen as a set of markets, each of which requires specific productivity,

a particular level of education, and thus, workers with different skills. However, entering this "set of markets" is not always a process based on qualifications. Cultural and social barriers obstructing to an educated person getting a job may exist. McNabb thinks that each segment of the labour market may have its own wage and employment determination mechanisms, in which the factors identified by the human capital theorists are of secondary importance (McNabb 1987).

The human capital theorists point out that a skilled person can be employed more easily than an unskilled individual and thus the former worker could be more productive and receive higher wages than those who have not been trained. However, the fact of being employable do not prevent people from facing structural disadvantages such as the low job creation in developed and developing countries. So, further discussions about the principles of the human capital theory need to be revised. Alpin *et al* argue that, if on the one hand, there are constraints in the labour market and, on the other, the supply of educated workers increases, firms will raise their minimum entry requirements (1998). Consequently, as Todaro (1994) explains, employers will choose candidates with higher levels of education even though satisfactory job performance may require no more than basic levels of expertise. This fact, inexorably, will lead to an "over-education" phenomenon that means, "the under-utilization of the skills of employed graduates" (Alpin *et al* 1998:18). Apart from being an employment problem, overeducation can be also regarded as a social problem since it may affect human beings in personal terms. Those workers who have acquired certain skills may feel frustrated at performing unspecialised activities. To illustrate this point, Graham-Brown quotes a Zambian:

We need to destroy the myth of education as the miraculous solution that's the type of thing which leads to the problems we have now [educated unemployment]. But having abandoned the miracle concept, a more sophisticated analysis is required which locates education within the economic and social structure of society, rather than treating it as largely independent variable. Only in this way can the limitations and potential strengths of particular educational strategies be assessed (in Graham-Brown 1991:3).

If governments promote education as a “miraculous” solution when macro-economic structure cannot create remunerative jobs, the effects will be very controversial. Political discourse, social policies and reality do not match up. This may have far-reaching effects on people.

The underemployment of skilled people was a neglected point in human capital theories that “have proven to be illusory”, according to Livingstone (1999:171). So if economic approaches try to assess the impact of education on development by relying on its labour market outcomes, then it is necessary to include an analysis of underemployment in order to have a broader perspective. Livingstone (1999: 171) argues that underemployment denotes the “wasted ability of eligible workforce” including both job holders and those without paid employment. This author identifies some dimensions of underemployment:

- The talent use gap between those from socially disadvantaged origins and more affluent families, as indicated by the fact that attainment of university degrees has remained very wide throughout most of the past century of unprecedented expansion of formal schooling.
- Structural unemployment which refers to a persistent gap between the excess number of job seekers and the scarce number of available jobs;
- Involuntary reduced employment which refers to those who want full time-time jobs can only obtain part-time ones;

- The credential gap which is the difference between educational attainments and established job entry requirements;
- The performance gap which refers to the extent to which employees have the levels of skill and knowledge needed to perform their jobs.
- Subjective underemployment, which refers to sentiments of over-qualification, untapped skills and entitlement to a better job (Livingstone, 1999:171).

Although education might facilitate access to remunerative jobs it is difficult to assess how education impacts on development by analysing, as a unique indicator, labour market outcomes. Moreover, "little can be read into unemployment statistics for many parts of the world" since underemployment may be hidden by official data (UNRISD 2000:9). So, several questions remain unanswered about the links between the level of schooling and the labour market. This also questions the claim that education encourages development automatically.

C. Manpower planning. "Educational requirements for economic growth"¹

Despite Hinchliffe's (1987) arguments that the first government to make manpower forecasts was the Soviet Union in 1928, Vanderstraeten (1997) argues that this economic approach was developed in the 1950s as a strategy to stimulate and optimise the economic growth of a country or region. According to this line of reasoning, it can be said that:

The education or training system functions (or can function) as a delivery service: by providing students with the appropriate knowledge and skills, the future needs of the job market can be met (Vanderstraeten, 1997:323)

¹ This phrase belongs to Hinchliffe (1987).

So, the leading rationale of manpower planning is to educate people in accordance with the future demands of the labour market, which will lead to greater national output. An example of this idea is given by one of the "major theorists" of the manpower forecasting, Parnes, who argued that:

the only meaningful sense in which a country can ascertain its educational requirements is to establish certain targets for social and economic development and to see what these necessitate in the way of education (in Hinchliffe 1987:316).

Some economists, including Mark Blaug and Hinchliffe, suggest some techniques for use manpower forecasting. They include (1) employer's survey, (2) international comparisons, and (3) labour-output ratios, among others.

Employer surveys, as Blaug pointed out, ask employers in certain segments of the economy to specify their future manpower needs. However, Hinchliffe recognises that the employer survey method has difficulties such as "ensuring adequate coverage and preparing meaningful and unambiguous questions" (1987:318). But, apart from conceptual and operational difficulties, it can be said that this method is controversial since it provides only a one sided point of view on workforce required, without taking into account the academic interests of youngsters. Moreover, in a context of economic crisis employers could assert their own job conditions undermining workers' rights with the aim of lowering production costs.

Another method of manpower forecasting is the use of international comparisons. According to Hinchliffe this method owes its existence to the lack of domestic labour market information particularly in the developing countries. So, a poor country could emulate another (more prosperous) country in its development of "manpower stocks". Blaug reports, for example, that Puerto Rico used the educational attainments corresponding to occupational categories in the United States and that Italy used France's experience in the distribution of the labour forces across sectors (in Hinchliffe

1987).

Leaving aside the simple idea of applying surveys, and the perspective of copying educational expansion in accordance with employment structure; labour-output ratio is another manpower forecasting method. This requires, as Hinchliffe argues, information about the present operation of the labour market and of the past trends in its operation, in the country under review. This author argues that:

Labour-output ratios have mainly been used for forecasting requirements in single occupations and these have tended to be ones requiring high-level qualifications: engineers, scientist, doctors, and teachers (Hinchliffe 1987:319).

But, under the functional idea of manpower planning, human beings are seen as an aggregate of pieces which should serve to encourage economic growth. There is little space for individuals agency. Therefore, these methods raise philosophical criticisms. Though the work of an economist differs greatly from that of a poet, it is revealing that the Mexican poet Octavio Paz had reflected about the questionable implications of manpower planning. In his book *La Llama Doble (Double Flame)*, he wrote:

In accordance with the necessity of economy or politics, governments or big companies could order the manufacturing of a certain number of medical doctors, journalists, teachers, workmen and musicians. Beyond, the weak feasibility of these projects, it is clear that they lie in a philosophy which harms the essential notion of human beings which were conceived as unique and non-repeatable beings (Paz 1993:200)².

As we can see manpower planning approaches seem incompatible with humanistic visions. Perhaps because for this, Paz underlined the "weak feasibility" of these techniques. Mark Blaug recognised, eventually, that in the 1970s there was disillusionment with manpower forecasting due to its over-rigid view of the capacity of the economic system to absorb educated people into employment (Blaug 1974).

² Paz's quote was translated from Spanish by the author.

If the functional idea of educating specific professionals for fostering economic growth is underpinned by a philosophy that harms the notion of human beings, then, it is difficult to speak about development understood as a “process of expanding the real freedoms that people enjoy” (Sen 1999:3).

D. Knowledge-based economy: Towards a re-configuration of education.

Knowledge-based economy is an idea invoked as a consequence of the striking economic growth of the Asian Tigers (Singapore, Taiwan, Hong Kong and South Korea) during the last forty years³. Both the educational sector and the productive sector underwent structural transformations in accordance with this economic model, which has been promoted to be emulated by other emerging economies, specifically those of Latin America (Baer, *et al*, 1999).

In analysing the Asian experience, interesting and revealing lessons can be drawn. For instance, manufacturing output in Taiwan rose by 175% from 1952 to 1989, whereas its commerce and primary industry outputs declined considerably (Tallman and Wang, 1993). Following this economic change, Taiwanese students were concentrated in the areas of engineering, computer science and business administration.

The governments of the East Asian countries have played a crucial role in having “put in place mechanisms to institutionalize the links” between universities and the productive sector (Ashton and Sung, 1997:217). This point is supported by Tallman and Wang (1993) who highlight the active participation of the Taiwanese government in setting up science parks to support industry as well as to enhance knowledge accumulation and establish the links for advanced research, technology transfer and searches for new technologies world-wide. With regard to Singapore, Tan (1999:Web-Site) points out that

3

See Baer, *et. al.* (1999) for a coherent explanation of the subsequent economic collapse of the “tigers”.

the primary motivation of its government was "the maintenance of national economic competitiveness in the global economy". Thus it has developed major educational policies such as the expansion of graduate enrolments and research activity.

So, it seems that these countries understood that education policy needed to be integrated with coherent institutional and technological policies in order to make knowledge a potential force for change. Besides, educational endeavour was linked with other social policies. On this topic Amartya Sen notes that:

Japan's economic development was clearly much helped by the human resources development related to the social opportunities that were generated. The so-called East Asian miracle involving other countries in East Asia was, to a great extent, based on similar causal connections (Sen 1999:41).

Lauder echoes Sen when he argues that, in Japan, lifelong employment and learning go hand in hand. "Underpinning this economic logic is a high trust bargain between workers and corporations" (Lauder 2001:175).

Additionally, these countries have intensively promoted Research and Development (R&D) projects. Science and engineering have been identified in Singapore as major prongs to remain economically competitive in the knowledge economy of the 21st century (Tan 1999). So, as we can see, the term "knowledge" has a wider connotation than formal schooling or educational attainment. Therefore, the knowledge-based economy approach seems to differ from the human capital approach. The OECD confirms this point as follows:

Although knowledge has long been an important factor in economic growth, economists are now exploring ways to incorporate more directly knowledge and technology in their theories and models. "New growth theory" reflects the attempt to understand the role of knowledge and technology in driving productivity and economic growth (OECD 1996a:7).

The OECD adds that in the knowledge-based economy, innovation is driven by the interaction of "producers and users" in the exchange of knowledge. To show empirical evidence of the importance of this interaction between the "producers" and the "users" of knowledge, Romer (1992) compares Mauritius to Sri Lanka with the aim of arguing that the former nation did much better in economic terms, by "using ideas", than the latter which had a much better record in education. Because of this, Romer questions the investment in human capital approach and argues that:

For small economy, investing in schooling may not by itself be enough for it to become involved in the production of ideas, where the high returns to human capital lie. The production of ideas requires human capital, but it also requires access to existing ideas. A country like Sri Lanka that invests heavily in education but remains isolated from all the economically important ideas that are in use in industrial countries has no hope of ever becoming a player in the global production of ideas (Romer 1993:82).

Romer emphasises the fact that education is not a panacea that encourages economic growth automatically, but is part of an integral policy framework that has tight connections between "ideas" and their macro-contexts. This is crucial for our discussion. Creating learning spaces, putting massive public resources into the education sector, and increasing schooling, is not enough to achieve development, thus I would argued that it is necessary to think more widely about the effects of education and knowledge.

The World Bank has also embraced the "knowledge" proposition as one of its main points in its report of 1998/1999 entitled *Knowledge for development*, which has some resemblance to Romer's arguments. The Bank points out that:

Approaching development from a knowledge perspective - that is, adopting policies to increase both types of knowledge, know-how and knowledge about attributes - can improve people's lives in myriad ways besides higher incomes (WB, 1998:2)

It seems that the Bank is moving in the right direction. Now, it suggests putting attention to the improvement of people's lives "besides" monetary bases such as income levels. This also stress the fact that the relationship between education and development needs to be thought in a broader perspective.

To sum up, two interesting issues are raised by the knowledge-based economy approach. The first deals with the wider impact of knowledge or ideas (instead of the term "education") on the process of growth. Producing ideas, as Romer suggests, has wide effects on the global economy. To recognise this fact is important since it may allow more creative ways of learning that can be taught not only within school's walls. It is clear that the concept of "formal education" would need to be re-shaped.

The second issue is the role of government. In this approach, there is an emphasises on promoting the supportive conditions that knowledge needs to succeed. Some state intervention may encourage growth at intermediate stages of development (Romer 1992).

II. Microlevel approaches

A. Rates of return on investment in education

Unlike the five approaches analysed above, the approach of rates of return on investment uses the earnings of skilled people rather than national output data to measure the effects of education. This method normally applies, cost-benefit analysis techniques and is a derivation of human capital theory. "Once education is treated as an investment, the immediate natural question is: what is the profitability of this investment in order to compare it to alternatives?" (Psacharopoulos 1995:www.worldbank.org).

With this method the economic impact of education can be estimated by dividing the permanent annual benefits stream due to education by the cost of obtaining such education (Psacharopuolos in Meier 1995). The results of these calculations are the rates

of return on investment in education (ROREs). According to Psacharopoulos (1995) these estimations can be obtained by three main methods: (a) the short-cut method, (b) the reverse cost-benefit method and (c) the earning function method -also known as the Mincerian method. ROREs can be estimated from either the private or the social point of view. Psacharopoulos argues that:

The private rate of return is used to explain the demand for education. It can also be used to assess the equity or poverty alleviation effects of public education expenditures, or the incidence of the benefits of such expenditure. The social rate of return summarizes the costs and benefits of the educational investment from the state's point of view, i.e., it includes the full resource cost of education, rather than only the portion that is paid by the recipient of education (Psacharopoulos 1995: Web-Site).

Clearly these methods of analysis have policy implications, especially in terms of public funding. Psacharopoulos suggests that the comparison among ROREs:

Can provide priorities for the allocation of public funds to different levels of education, or can explain individual behaviour regarding the demand, or lack of demand, for particular levels or types of schooling (Psacharopoulos, 1995: Web-Site).

For Blaug (1974), it is evident that much of the research on the economics of education has been inspired by the hope of providing answers to policy questions, and it is also evident that the "drift" of this research tends to support certain policy positions and undermine others. For instance, it supports the reduction of subsidies to levels on types of public education that register low rates of returns on investment. In this vein, some authors (Todaro, 1994; Psacharopoulos, 1994; Tooley 1999, 1999a) have argued that public expenditure on tertiary education is often "regressive". That is, higher education students come disproportionately from richer families and are "recipients" of public funds that should be allocated to poorer sectors of society. This claim supports the proposal to increase tuition fees in universities. But a rise in direct education costs, following ROREs criteria, would not necessarily alleviate poverty in developing nations (Bennell 1996). To charge heavily in the universities or schools of developing countries may lower, the

demand for education as Colclough (1996) pointed out, and this is not totally congruent with the idea of a knowledge-based economy.

Apart from controversial policy implications, ROREs do not include non-monetary benefits of education (externalities), and are therefore "uncompleted" techniques to demonstrate the direct impact of education on social and economic contexts (Bennell, 1996; Ruiz, 1997). Furthermore, the poor quality of the databases used for calculating ROREs as well as the lack of reliable empirical evidence are two problems with this approach (Bennell 1996; Colclough 1997; Ruiz 1997).

ROREs are a method commonly used to estimate whether or not investment in education has been profitable. Therefore, it is difficult, through this method, to provide a broader understanding of the relationship between education and development.

B. Education for human development: Raising qualitative issues

As we saw above, explaining the impact of education through economic approaches has not provided a clear understanding of the idea of education for development. In this vein Todaro (1994) argues that analyses of this connection should go beyond the single statistic of aggregate growth and consider the structure and pattern of economic growth and its distribution implications. Little (1992) notes that there has been a shift in the concept of development which implies a renovated role for education. She argues that:

development is no longer defined largely in terms of economic growth or redistribution of income. Because the new concept emphasizes the growth of people as well as income, the quality of life, the participation of people in their own development and human freedom, neither economic growth nor the distribution of income can be construed as ends in themselves. Both serve human development as much as human development serves them (Little 1992:6).

According to the United Nations Development Programme (UNDP), human development is:

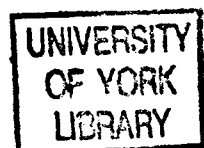
[...] a process of enlarging people's choices. Enlarging people's choices is achieved by expanding human capabilities and functionings. At all levels of development the three essential capabilities for human development are for people to lead long and healthy lives, to be knowledgeable and to have access to the resources needed for a decent standard of living[...]the realm of human development goes further: essential areas of choice, highly valued by people, range from political, economic and social opportunities for being creative and productive to enjoying self-respect, empowerment and a sense of belonging to a community (UNDP 1999:14).

The British Department for International Development adds that education is central to human development (DFID 1999). However, it seems that this idea is more related to basic levels of education, rather than to advanced levels such as higher education.

We can see that qualitative issues are included in this vision of development. Quality of life, human freedom, political participation and empowerment are concerns that need to be addressed by learning processes. Ilon remarks on the fact that, recently, the World Bank's educational policy "reveals a discernable movement" from human capital focusses towards educational policies committed to alleviating poverty, empowering people and promoting democracy (Ilon, 1996:414). It seems that the Bank is reacting to the failures of the human capital theories, which, for some "have proven to be illusory" (Livingstone 1999:171).

In explaining this movement, it is necessary to mention the work of Amartya Sen. Sen has participated, as a consultant, in the UNDP. Further, he has argued that:

Focusing on human freedoms contrasts with narrower views of development, such as identifying development with the growth of gross national product, or with the rise in personal incomes, or with industrialization, or with technological advance, or with social modernization (1999:3)



Explaining how education functions within human development raises many challenges for social researchers. However, the possibility of providing a coherent explanation of how learning can help individuals to thrive, beyond economic benefits, is an stimulating idea since little work has been done in this regard.

Conclusions

As we have seen, both macro and micro approaches to analysing the relationship between education and development have undergone several transformations over time (see Table 1.1). Despite this fact, this connection has been regarded as an economic and direct one in which national output or labour market outcomes can be explained by investment in education or by the educational performance of a particular population. This vision is open to criticism since employment indicators only capture part of the picture of the impact of knowledge. This is especially true of human capital theory and its derivatives. Another failure of these approaches is that they ignore the conditions that complement the educational endeavour. Education is thus regarded as a panacea rather than a promoter of social and economic change.

Furthermore, under a narrow economic perspective, the term "development" seems to be mean only economic growth and thus qualitative aspects are therefore neglected. Though human development theory redresses this failure, it seems that this micro approach is merely focussed on basic levels of education. In addition, its methods of application are not clearly explained. Therefore, much work still needs to be done.

Table 1.1. Some approaches to analyse the relationship between education and development

Theory	Key exponents	Key propositions	Related concepts	Strengths	Limits
Macrolevel					
Human capital theory	Theodore W. Schultz (1961) and Gary Becker	Education helps to raise productivity. Education has an positive impact on the earnings of workers.	Training, productivity, earnings.	Education is conceived as an investment rather than expenditure. Long term vision regarding education benefits. It places "humanity at the center of attention" (Sen).	Focuses too much on the monetary benefits of education Not interested in the qualitative impacts of education (e.g. critical consciousness, citizenship, political participation) Omits nature of the labour markets Asserts a causal relationship education and economic growth.
The labour market and education	Human capital theorists	There is a direct relationship between levels of education and wages, that is, "higher education means higher salaries".	Training, skills, vocational education, relevance of education.	Education is seen as an incentive for better salaries. It may inform educational policy.	Says little about job conditions, living standards or quality of life. Ignores social and cultural barriers in the labour markets. Omits phenomena such as underemployment. Poor quality of data on unemployment
Manpower planning	Mark Blaug (1974), Parnes; Hinchliffe (1987).	Educational structure ought to be geared to the prospective demand for labour (Hinchliffe 1987). Educational requirements for economic growth	Manpower forecasting, economic planning, stocks of personnel.	Large amount of empirical evidence.	Controversial methods of analysis. Harmful to human beings' agency Functionalist perspective of education and development.

continues...

Theory	Key exponents	Key propositions	Linking concepts	Strengths	Limits
Knowledge-based economy/ knowledge society	Romer (1992); OECD (1996), Ruiz (1997), Tang (1999); WB (1998)	Producing ideas for competing within the global economy Education is a good (Romer 1992). Massive investment in R&D New growth theory	Ideas, industrial organisation, competitiveness, knowledge, technology transfer.	Integral policy framework Wider connotation of education Revised human capital theory	Says little about inequalities in access to knowledge Legitimises a mercantile idea of knowledge
Microlevel					
Rates of return on investment in education	Psacharopoulos, (1981, 1985, 1994, 1995) Lacher (1998)	Education may or may not be profitable. Subsidies are, in certain levels of education, regressive. Develop criteria regarding public funding of education.	Earnings, cost of education for individuals (private) and society (social); profitability of education.	Large number of studies. Different methods of measurement. It has been under major scrutiny by scholars	Poor quality of data Lack of compelling evidence. Ignores non-economic benefits of education Controversial implications in developing countries.
Education for human development	DFID (1999); Little, (1992) Watkins (2000).	Educational programmes will focus on basic needs rather than on economic returns (Ilon, 1996) Bi-directional relationship between poverty and education. Welfare purposes of education.	Poverty, living standards, social rights, equality, development, human capabilities.	Considers qualitative issues Provides an integral vision of the role of education in developing countries. Revised interpretation of development	Focuses on basic levels of education. Difficult application Little empirical evidence

CHAPTER 2

Education and development: A discussion with reference to Mexico

Chapter 2

Education and development. A discussion with reference to Mexico.

I respect faith but doubt is what gets you an education
Wilson Mizner (1876-1933)

Introduction

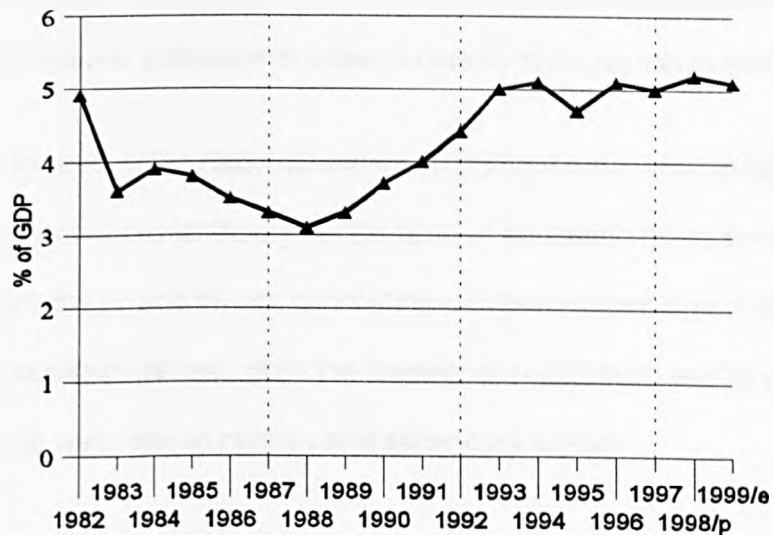
How is the idea of education *for* development understood and implemented in Mexico? This chapter addresses this question by contrasting some propositions shown in Chapter 1 with national statistics. Mexican evidence underlines the scepticism expressed by some authors about the capacity of economic approaches to show that education is strongly related to development. It will show that, while educational attainment has significantly improved in this Latin American country, unemployment among educated people has reached alarming levels. Moreover, despite an existing correlation between level of education and wage rates, the distribution of income of the majority of Mexicans has worsened considerably (Lacher 1998). More comprehensive approaches need to be devised to show how education can interact with developmental processes. This argument unfolds in five stages. The first shows the "commitment" of Mexico's government, expressed through public expenditure on education. The second part shows that, in part, human capital theories can be supported by Mexican evidence, but as we go further in the analysis of the labour market this view is blurred. In the third part, the difficulties of expanding enrolment in higher education become evident when it is seen that economic and cultural barriers prevail in Mexico. The fourth part stresses the controversial consequences of measuring the profitability of education, while the fifth part clearly shows that Mexico's human development has varied constantly. So, despite its

educational and economic performance, Mexico's government has failed in ensuring high living standards for the whole population.

I. Public expenditure in education

Since the late 1980s, education in Mexico has been considered as "a mechanism of change and transformation which will foster a new economic structure in accordance with recent times" (PME, 1989:xiv). The National Development Plan 1995-2000, stated that education was "a very high and constant priority of the Government of the Republic both in its programmes and in public spending" (PND 1995:85). In accordance with this idea, Mexico's government has invested massive public resources in the educational sector. Chart 2.1 shows that, after a downturn between 1982 and 1988, public investment has increased significantly during recent years.

Chart 2.1 Public expenditure on education as percentage of GDP, 1982-1999



p=preliminary
e=estimated
Source: SEP (2000).

Once we have corroborated “the government’s commitment”³ to its expenditure in education, a key research question is raised: Has this massive investment in education meant economic growth? Ruiz addressed this question by correlating, from 1970 to 1996, economic variables (employment and fixed capital formation) with educational variables (public expenditure and enrolment). He concludes that human capital represents an “important factor” in fostering Mexico’s economic growth (Ruiz 1997:81).

In addition, Ruiz (1997) also mentions that proportional changes (positive elasticity) between education and economic growth are higher at the tertiary level than at the basic level of education.

II. The contradictions between education and the labour market

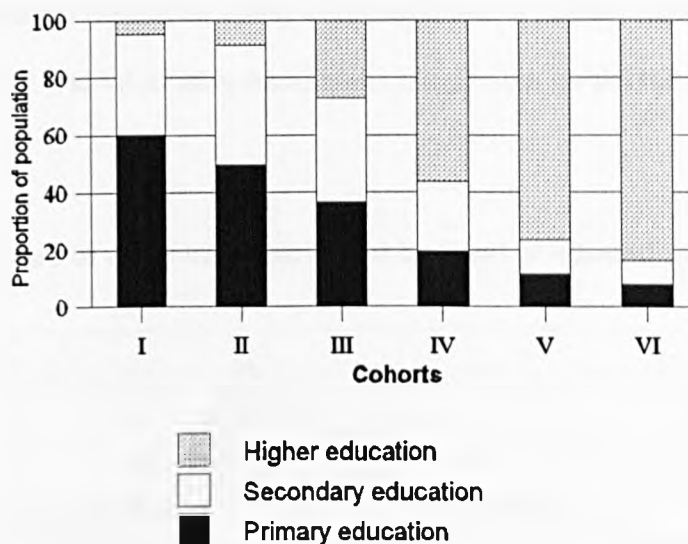
The schooling average of Mexico’s population has improved dramatically in the last twenty years. It has changed from 3.4 grades in 1970, to 7.7 grades in 1999 (SEP, 1999). If we correlate levels of education to levels of wages, it is possible to argue that academic instruction is a necessary element in order to receive high payments (see Chart 2.2).

At first glance, the data of the *National Survey of Employment in Mexico* support the main principle of the human capital theory: as the level of education rises, so do earnings. In the best-paid groups (V and VI) are concentrated higher proportions of individuals who hold a higher education degree, while the lowest-paid brackets (I and II) are constituted by Mexicans who went only to primary and secondary school.

3

The *Observatorio Ciudadano de la Educación* (OCE, 2000) argues that for an accurate view of the public expenditure on education, it is necessary to look at the expenditure per student which have decreased in real terms during Zedillo’s administration (1994-2000).

Chart 2.2. Relationship between level of income and level of education in Mexico



Source: INEGI (1997).

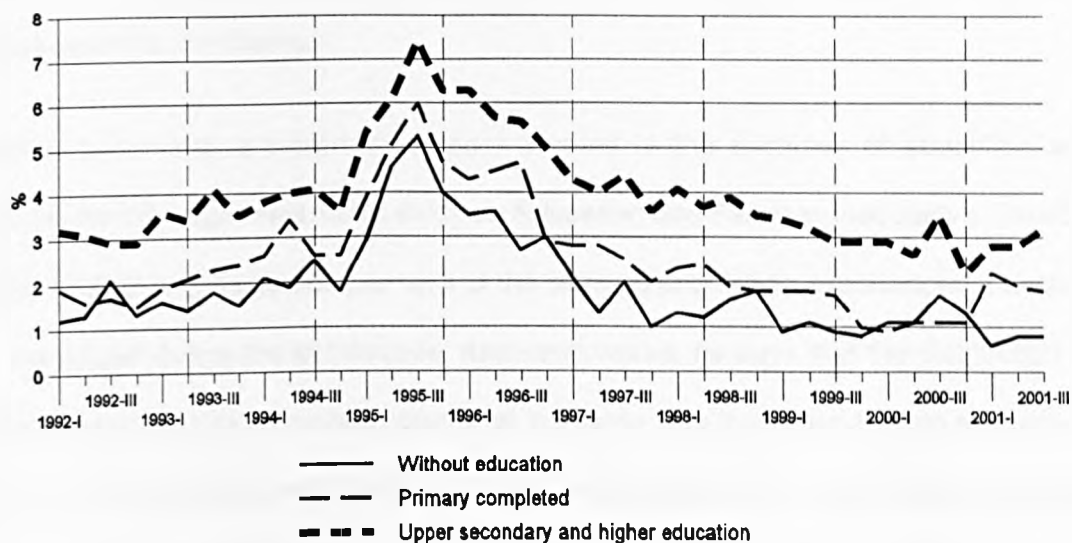
Nevertheless, the relationship between education and development becomes more complex as we go further in the analysis of employment indicators. Muñoz-Izquierdo (2000) argues that, paradoxically, Mexico has the highest number of educated and trained youngsters in its history, but it also has considerable unemployment and under-employment among more educated individuals (see Chart 2.3). This fact can be explained by taking into account that people with higher levels of education possibly belong to the less deprived sectors. Therefore, they can afford to wait more time as a unemployed persons. But this situation does not diminish the impacts of unemployment since this phenomenon contributes, as Amartya Sen argues, to the "social exclusion of some groups, and it lead to losses of self-reliance, self-confidence and psychological and physical health" (Sen, 1999:21).

If Mexico's government has been committed to increasing educational attainment, but at the same time, unemployment⁴ among people with higher levels of instruction has grown

⁴ Although Mexico registers low unemployment rates compared to those of European countries, we should take into account that in this Latin American country, the "low level of the official unemployment rate does not provide an accurate indication of the structural under-utilisation of labour" as the OECD noted (1998:22).

too, how is the relationship between education and development understood in Mexico? Arguably, this question cannot be easily addressed with a human capital interpretation. Under-employment and informality have been two issues neglected in this economic perspective.

Chart 2.3. Rates of open unemployment by level of education, 1992-2001



Source: INEGI (2001)

Regarding informality, the director of the International Labour Organization (ILO) in Mexico, Jean Maninat, underlined severe problems in the labour market of this country. He pointed out that the tendency is that workers are unable to work in formal markets, where productivity is high and wages relatively good, so many workers have to engage in a number of activities that sometimes just allow them to survive, such as citing self-employment, domestic service and employment in micro-enterprises (*La Jornada* 8-XI-1998). Here, it is necessary to ask whether "informal" activities can be considered as totally "unproductive" occupations. The relationship between the concept of productivity and informality needs to be discussed in future analyses.

Regarding underemployment, a former Mexican Secretary of Labour recognized that "40 per cent of the Mexican working population (around 15 million) were employed in

activities where their skills were under-utilised and thus they lack social services" (Javier Bonilla in *La Jornada*, 9/05/98). Under such circumstances, it is fair to ask: how can Mexico be part of "those countries with higher economic growth which have oriented their economy toward an knowledge-based economy", as the former president Ernesto Zedillo suggested (1995:8). High unemployment rates among educated people, growing informality, and poor job conditions call into question the relationship between education and development in Mexico.

Another factor that is important to bear in mind in the analyses of education and development is wage rates. In his study on *Education and Earnings Inequality in Mexico*, Lacher (1998) argues that 83 per cent of the working population experienced a decline in real wages during the last decade. And even worse, he says that the distribution of income in Mexico has worsened notably, at the same time that a remarkable advance in education achievement took place. Regarding income distribution, García points out that in 1984, the Gini coefficient⁵ was 0.4652, whereas in 1994 it went up to 0.6383. So, it can be said that the formation of human capital is not always a process associated with equality.

III. Mexico and its knowledge-based economy

As was said in Chapter 1, "knowledge-based economy" is an idea invoked as a consequence of the relevant links between ideas and economy promoted by East Asian countries. One part of this chain is the commitment of the governments of Asian Tiger countries to increase enrolment in higher education. This commitment is shown in Table

⁵ Gini coefficient refers to a statistical method conventionally used in order to describe the degree of inequality distribution. It is calculated by determining the area between a Lorenz curve of distribution and the line of perfect equality. As inequality increases, the Gini coefficient moves towards its maximum value of 1 (Dictionary of Sociology, 1998).

2.1, which compares the Gross Enrolment Ratios (GER)⁶ in tertiary education of three Asian countries with that of Mexico.

Table 2.1. Gross enrolment ratios in tertiary education in selected countries by year

<i>Country</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>
Mexico	14.3	15.9	14.5	15.3
Hong Kong	10.3	14	19.4*	NA
Korea	14.7	34	38.6	52
Singapore	7.8	13.6	18.6	33.7

NA=Not Available

* These data refer to 1991

Source: UNESCO (1998)

While Hong Kong, Korea and Singapore have vigorously increased their GER, Mexico's has remained almost steady over fifteen years of "modernization". More recently and according to the Mexico's *National Education Programme 2001-2006* (PNE), the GER for 2000 was 20 per cent. This means that only two of ten Mexicans, aged 19-23, is studying a higher education course. In accordance with this reality, a question emerges: can Mexico "produce ideas" by having so few people enrolled at the higher education level?

Additionally, the *Observatorio Ciudadano de la Educación*⁷ (hereafter OCE, 2000) reported that, while in 1990 there were 6.7 million of Mexicans without access to higher education, by 2000 this number had increased to nearly 8 million. However, the low

⁶

According to UNESCO (1998:3-34), the GER is calculated by using that part of the enrolment which corresponds to the age group of the level considered.

⁷

The OCE is an education policy watchdog in Mexico. Its aims are, among others, to examine critically education policy processes, to criticize the means of their implementation, to promote a culture of accountability among authorities, etc. It is formed by researchers, students, teachers, journalists, legislators, housewives, and so on. It publishes its articles in a Mexican newspaper. For further information see: www.observatorio.org

enrolment in higher education in Mexico cannot be explained only by economic restrictions but also by cultural barriers. The National Institute of Statistics, Geography and Informatics reported that those young people aged 15-19 - who are the potential candidates to enter universities - had left their schools because: (1) they did not want to study and (2) they needed to work to maintain their families. The first reason constituted the highest proportion of people surveyed: 60% for male and 54% for female, while the second reason was 29.2% and 18.6%, respectively (INEGI 2000). This fact highlights the necessity of designing and implementing coherent social policies, since the exclusion experienced by Mexican youth combines several misfortunes.

If Mexico wants to become a "high skill economy"⁸ - as many politicians assume - it needs to create the conditions where all, as Brown argues, have the potential to benefit from skills upgrading and lifelong learning (1999).

The expansion of enrolment in the knowledge society also deserves further discussion. Ruiz notes that, in developed nations, the proportion of students in higher education is fairly distributed across the different areas of study. For example, he stresses the fact that engineering careers seem prioritised over administrative specializations. Humanities, on the other hand, is another area commonly chosen by young people in these nations. However, these observations contrast with Mexico's case. According to the National Association of Universities and Higher Education Institutions (Anuies, 2000), engineering registered 27 percent of the total enrolment. Meanwhile, social and administrative careers⁹, and the humanities constitute 43% and 16% of students, respectively. So, the bulk of students are concentrated in administrative careers.

8

According to Brown, "in ideal-typical terms a high skills economy is one which has a high social capacity for learning, innovation and productivity in a post-industrial or knowledge economy" (1999:239).

9

The lion's share of this enrolment is concentrated in three careers: business, accounting and law.

Another interesting fact is that seven out of ten university graduates in Mexico look for a job after their studies - they are also called "job seekers" - while two out of ten start to work in their own business and only one becomes an employer (INEGI, 1993).

IV. Rates on returns of investment in education. Their consequences in Mexico

As was argued earlier, rates on returns of investment in education (ROREs) have been used more commonly as a criterion to allocate public funds rather than a theoretical approach to understanding the relationship between education and development. However, such methods have also received criticism since their techniques cannot capture the non-economic benefits of education (externalities).

In 1998, Ulrich Lacher, principal economist for the Mexico Department of the World Bank, estimated private and social RORES by level of education for this Latin American country (see Table 2.2).

Table 2.2. Private and social RORES in Mexico, 1984 and 1994*

<i>Educational level</i>	<i>1984</i>	<i>1994</i>
<i>Private rates %</i>		
Primary	15.6	12.8
Secondary	12.7	15.2
Preparatory	13.9	16.3
University	9.1	17.6
<i>Social rates %</i>		
Primary	14.4	10.5
Secondary	11.3	12.2
Preparatory	11.7	12.2
University	7	12.1

* Based on average foregone earnings
Source: Lacher, 1998:24.

Taking into account that in 1984 private and social rates at the university levels were lower (9% and 7%, respectively) than those in the rest of the educational levels, Lacher

pointed out that:

Public expenditure spending in the early 1980s was very skewed toward higher education, which exhibited the lowest rates of return. That is, it was both inefficient and inequitable (1998:15).

Nevertheless, this "unprofitable investment" in higher education changed over time. Table 2.2 shows also that, during 1994, both private and public RORES at university level were the highest rates for all educational levels. Under Lacher's premises, it can be argued that university education provided benefits beyond public and private investment. Despite reaching this conclusion, Lacher's study made a controversial recommendation¹⁰. He said that:

Barring more public resources, the only option for expanding of investment in higher education (desired on efficiency grounds) without cutting public funding for primary education is by attracting greater private sector participation (1998:15-16).

Moreover, he proposed "increasing the level of cost-recovery in higher education" which meant charging money to the "beneficiaries" of education. Coincidentally, in March 1999, the former Rector of the National Autonomous University of Mexico (UNAM), Francisco Barnés proposed increasing tuition fees for studying in the largest public university of this country (see Barnés 1999). The results of this proposal were disastrous in political and academic terms. Some groups of students protested against this policy, organising a strike which kept the UNAM closed for nine months. Moreover, the political polarization permeated not only the academic community of this institution but was extended to the whole society of Mexico. In the end, a special force of the federal police intervened to

¹⁰

Dr. Julio Boltvinik stressed these controversies in his articles in *La Jornada* on the 4th December and 20th February, 1998. He argued that the World Bank seems to act under "ideology rather than scientific premises" in education matters.

dissolve the conflict, fortunately without fatalities¹¹.

As we can see, some economic approaches to measuring the benefits of education can be applied in order to achieve economic efficiency, but their unexpected consequences demand a critical examination of their rationales. RORES are a good example of this controversy.

V. An approach to the human development approach. The case of Mexico

Although the human development perspective is more extensive than an index, this part focusses only in showing Mexico's Human Development Index (HDI). This indicator is based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy (two-thirds weight) and the combined gross primary, secondary and tertiary enrolment ratio (one-third weight); and standard of living, as measured by GDP per capita (PPP US\$) (UNDP, 2000:279). The HDI is an indicator that competes with traditional macroeconomic criteria such as the Gross National Product (GNP) to measure the total output of any economy during a specified time-period. The HDI seeks to reconcile economic progress with qualitative advancement and it ranks developing and developed countries in ascending order. Sadly, Mexico fell from rank 40 in 1990 to 55 in 2000.

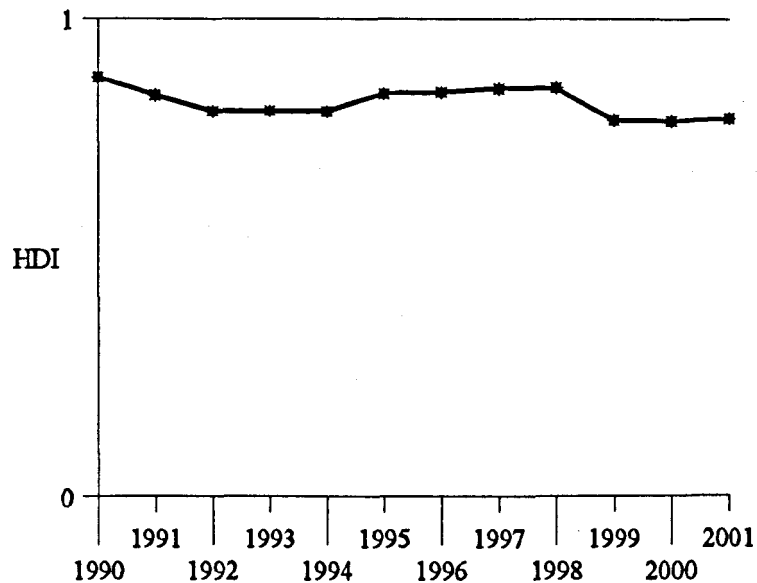
Chart 2.4 shows the fluctuations in Mexico's HDI over eleven years of "modernization". These variations lead us to re-think the idea of searching for economic growth through education when it is difficult to ensure that Mexico's population can enjoy decent living conditions. "Why is economic growth sought in the first place?", Sen reflects (1997). It can be said that despite the fact that economic growth is a major determinant of expanding opportunities, this is not the end of the story (UNDP, 1996). This claim also

¹¹

On this, see Jo Tuckman's news in *The Guardian*, 8th February, 2000, p. 19.

places education in a realistic position and thus a broader understanding of the way in which knowledge interacts *within* developmental processes should be achieved.

Chart 2.4. Human Development Index in Mexico, 1990-2001



Source: UNDP (1990-2001)

To reconcile economic growth with human development through education constitutes a big challenge to Mexico's government and put "people at the centre of the economy". Fortunately, under a human development perspective, this process can be ignited by launching institutional, political and democratic measures, there is no need to wait until money comes to address the inequalities that people face (see UNDP, 1990-2000).

Conclusions

Mexico's case illustrates how difficult it is to provide an explanation of the direct relationship between education and development by using economic approaches. While educational attainment has significantly increased, the level of unemployment among educated people is also growing. Even though there is a correlation between level of education and wage rates, the distribution of income of the majority of Mexicans has

worsened notably (Lacher 1998). Although public expenditure is positively related to economic growth, as Ruiz argues (1997), human development has constantly fallen over the last ten years.

How is the idea of education *for* development understood and implemented in Mexico? Was the education-economic growth relationship overstated? The Mexican evidence awakens the scepticism expressed by some authors about human capital theories and their derivations. It seems that more comprehensive approaches need to be devised. As a first step, education needs to be considered more broadly as does the process of development. This is exactly what this thesis proposes.

CHAPTER 3

Methodology

Chapter 3

Methodology

Introduction

In order to assess whether the technical education provided by the Mexican UTs can expand people's freedoms, this chapter gives an account of main methodological techniques employed. It is divided into two main parts. It begins by providing a brief outline of Mexico's educational context highlighting its growth, but also its inequities.

The second part presents the three research methods used: (1) the case-study method, (2) a combination of three data collection techniques and, (3) a comparative perspective which are the primary basis for application of Sen's human capabilities approach (see Chapter 4). In order to make this work as reliable as possible, a systematic process for selecting case-studies, designing samples and applying data collection instruments is followed.

This chapter emphasises the aim of this thesis: to develop an analytical approach, rather than a descriptive view, of how education functions within the developmental processes.

I. Short background of Mexico's educational context.

Education has been one of the main priorities of post-revolutionary governments and a crucial pillar of social policy in Mexico. At risk of some oversimplification, it can be said that during the 1920s to 1940s education was a means of national unification and social justice, in the 1950s, academic instruction was one of the driving forces behind Mexico's industrialization, in the 1960s, education helped considerably to expand the middle class and increase social mobility, while in 1970s and 1980s, the learning process was influenced by political ideologies rather than by an economic perspective. This vision

radically changed during 1990s when knowledge came to be seen as a productive factor for achieving higher economic growth; and in the new millennium, Mexico's education seems to be closer to a qualitative outlook. In the National Education Programme (PNE), 2001-2006, the Mexican president, Vicente Fox points out that:

[...] we cannot aspire to construct a country where all have an opportunity to achieve a high standard of living if [Mexico's] population do not have education that allow them, within a competitiveness context, to lead their destiny and, consequently, to act (PNE 2001:9).

As national development projects vary, education also tends to be adapted and transformed. This emphasises the importance of analysing the relationship between education and development in Mexico in recent times.

The National Educational System (NES) of Mexico is massive. More than 30 million of Mexicans - almost a third of the total population - are studying an educational course and there is almost 1.5 million teachers in 221,754 schools (PNE 2001). The structure of the NES is shown in Table 3.1.

Table 3.1. National Education System in Mexico, 2001-2002

<i>Level</i>	<i>Enrollment</i>	<i>Teachers</i>	<i>Schools</i>
Basic education	23,764,972	1,024,284	201,763
Upper secondary	3,095,361	218,115	10,094
Higher education	2,156,470	219,637	4,213
Job training	1,189,347	36,443	5,684
Total	30,206,150	1,498,479	221,754

Source: PNE 2001-2006.

As we can see, 90% of the NES' enrollment is in basic level (pre-school, primary and secondary) while upper secondary and job training constitutes only 4% and 2%, respectively. The lowest proportion is registered by higher education (1.8%). These proportions need to be analysed taking into account the age groups of the Mexican

population as they demonstrate a problem of inequity. Only two Mexicans out of ten, aged 19-23, is studying at the university level. Moreover, the *Observatorio Ciudadano de la Educación* (OCE, 2000) reported that, despite an increase in enrollment from 1990 to 2000, there are more people excluded from higher education services in absolute terms. When in 1990 there were 6.7 million Mexicans without access to higher education, in 2000, this number increased to nearly 8 million.

If Mexico is immersed, as Ruiz, (1997) says, in a global context characterised by productive flexibility and unpredictable changes, higher education needs to be actively promoted. This author stresses the fact that while few Mexican students have studied at university level, in developed countries there has been a strong commitment to the involvement of more youngsters in order to face the challenges of the "knowledge society".

So, my interest in analysing the relationship between higher education and development in Mexico is based on the following factors:

- ▶ A study about higher education allows us to investigate groups of people who have apparently met their basic needs, but who may also be excluded from social opportunities.
- ▶ Analysing the performance of university graduates in the labour market, may help us to identify the "hidden" problems that prevail between education and the world of work more easily than if primary school children were focussed on.
- ▶ As higher education has been seen as a "magic passport" (term taken from Cline, 1962) to greater social mobility, is revealing to look at how such aims of education may overlap with economic objectives.
- ▶ Finally, I have been involved in tertiary education projects in Mexico since 1993. This experience has allowed me to observe severe disconnections between

public policy making processes, existing socioeconomic conditions, and policy outcomes.

Higher education, according to Mexico's Public Education Secretariat (SEP, 1999), is the advanced instruction which is given after upper secondary school or equivalent studies. It is provided in four different types of institutions: universities, technological institutes, teacher training colleges, and technological universities. Higher education comprises five levels: (1) technical university or associated professional, (2) bachelor's degree, (3) specialization; (4) master's degree and, (5) PhD or doctorate. The enrollment of the higher education system is presented in Table 3.2.

Table 3.2. Enrollment in higher education by sector, 1998/99-1999/00
(Thousands)

Institutions	1998-1999	1999-2000	Change	
			Absolute	%
Public sector	1315.6	1367.1	51.5	3.9
Autonomous universities*	830.4	862.0	31.6	3.8
Technological institutes**	266.4	273.6	7.2	2.7
Technological universities	20.6	29.8	9.2	44.7
Teaching training schools	142.2	137.1	-5.1	-3.6
Others***	56.9	64.6	8.6	15.4
Private sector	522.3	595.7	73.4	14.1
Total	1837.9	1962.8	124.9	6.8

* Includes UPES, UNAM, UAM and UPN

** Includes technological institutes, IPN, schools of agriculture, forest and sea.

*** Includes INAH, INBA and military and naval schools

Source: SEP (2000).

The massive expansion in the enrollment of technological universities, as compared to all other sub-systems of higher education is evident. In relative terms, the enrollment of the UTs increased by 44.7 percent, while that of technological institutes and autonomous universities only by 2.7 and 3.8 percent, respectively.

It is worth saying that the UT adopted a development-oriented model of education which has aimed at encouraging economic progress in the regions where they are situated.

Thus, the UTs seem to be suitable case-studies for this research, because they may illustrate the links that try to bind knowledge to economy. But, before going into detail, it is necessary to describe the methodological techniques used in this thesis.

II. Research design

The relationship between education and development in developing countries is immersed in a context of complex events that makes its investigation a difficult task. So, in order to provide an explanation of this connection, a coherent research model needs to be devised. Here, three methods of analysis are suggested: (A) the case-study method, (B) a combination of three data collection instruments (documents, questionnaire and semi-structured interviews), and (C) comparative analyses. These research methodologies serve as a basis for applying Sen's human capabilities approach which is explained in Chapter 4.

A. Case-study. An attempt to understand the general theory.

The case study is a suitable method for the coherent explanation of how the various parts of a social phenomenon are linked (Denscombe, 1998). For Platt case study can,

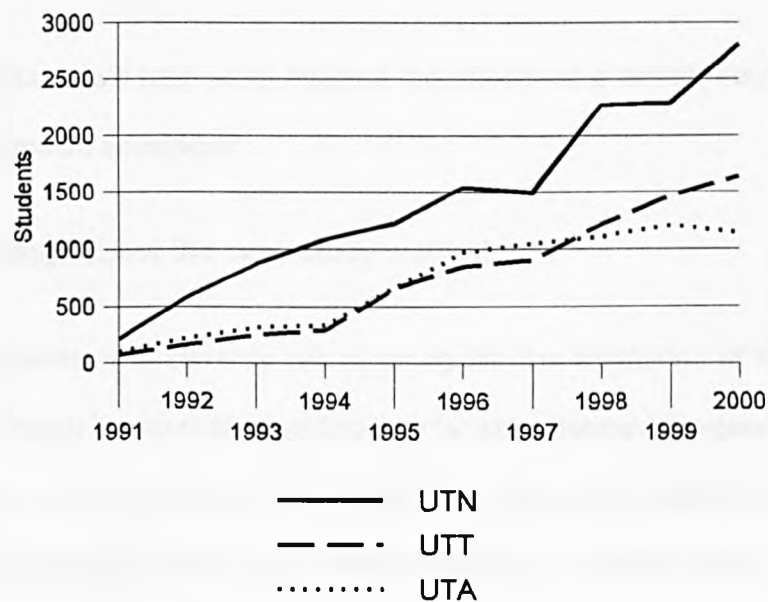
give holistic accounts of events or life-patterns which show social supports and constraints, help understanding of how one event is linked to another in a strange setting, and generally give the context of the particular topic (Platt 1999a:165).

Focusing on particular cases allows us to see the wider implications that do not come to light through the use of a research strategy that tries to cover a large number of instances (Denscombe, 1998). Due to this, only three UTs of 44 have been selected for this research. These UTs are the Technological University of Aguascalientes (hereafter referred as UTA) the UT of Neza (UTN); and the UT of Tula (UTT). They have been chosen under the operational and regional criteria which are explained in the next part.

1. Operational criterion

This criterion refers to the practical performance of the UTs within their regions. This selection is valid since it permit us "to analyse things as they naturally occur, without introducing artificial changes or controls" (Denscombe, 1998:32). These three UTs have been operating since 1991, thus they have had the chance to put into practice their educational model. A proof of this is given in Chart 3.1 which presents the growing enrollments registered by these institutions. This fact can be interpreted as the degree to which the UTs have adapted to their respective environments.

Chart 3.1. Enrollment growth in the UTs selected



Source: CGUT (Web-Site 2002).

As a consequence of the growing number of students there are, logically, a considerable number of graduates from whom researchers can gather information. In this case, there is the maximum amount of graduates available since I have chosen the first three UTs to be established in Mexico. But, besides the practical justifications, these institutions possess a key characteristic for our study: they are based in different and contrasting regions of the Mexican Republic.

2. Regional criterion

The three UTs selected are situated in different regions which differ greatly from one another in educational, social and economic terms (see Chapter 5). For example, UTN is situated in the State of Mexico (Estado de Mexico), specifically in the Neza municipality, which is the closest state to Mexico City and thus, this institution has a urban profile. On the other hand, UTT was established in the municipality of Tula, in the State of Hidalgo, which has been characterised by the coexistence of industrial parks and relatively deprived areas. Meanwhile, UTA lies in the capital of the State of Aguascalientes, also called Aguascalientes which is the farthest from Mexico City. There, remarkable economic progress has been experienced over the last twenty years.

Regional variations will help us to analyse the effects of a similar educational model under varying macro conditions.

3. Some warnings about the case-study method

Despite its benefits, it is certainly fair to recognise the limitations of the case-study. Denscombe (1998) is sceptical regarding how far it is reasonable to generalize from the findings of one case to others. Since one of the aims of this research is to provide a broader understanding of the way in which education functions within a process of development, this study adopts an explanatory rather than a descriptive approach. This means that it is not concerned with making generalizations about the UTs selected, and then applying these generalizations to the rest of the UTs.

Denscombe also underlines the need to identify the boundaries that case studies have. That is, what is contained within the case. This consideration is very important for this research since a higher education institution can have relations with a wider spectrum of social, academic, political and economic concerns. Thus, it is necessary to set some limits around the UTs.

First of all, it is necessary to say that UT graduates are the main subjects of analysis. That is, data will be collected from them. The study will also concentrate largely upon the partnership between the UT and the local employers, and the social policy process by which the UTs were created. So, this research is not concerned with the organisational structure, curriculum planning or academic performance of the UTs analysed.

B. Data collection techniques.

The collection of data will be based on a combination of three research techniques. This "triangulation" means using different types of measures or data collection techniques to examine the same variable or subject (Neuman 1991). The data collection instruments used in this study are: (1) documents; (2) questionnaires; and (3) semi-structured interviews. Each method can "look at the thing from a different angle and -from its own distinct perspective- and these perspectives can be used by the researcher as a means of comparison and contrast" (Denscombe 1998:84); and due to this, some authors suggest that research can gain greater reliability from the enhanced consistency of information gathered through different techniques (Denscombe 1998, and Neuman, 1991).

1. Documents

According to Denscombe (1998) documentary research has two components. The first is an essential research platform to provide background information; and the second is a specific method of investigation which offers an alternative to questionnaires, interviews or observation as a means of collecting data.

Platt (1999b) adds that documentary research is not a "well-recognised" category as is survey research or participant observation due to a gap concerning the proper use of documents as data sources. We recognise Platt's point of view since reports, statistics, or programmes, in many cases, provide a broad picture of social phenomena which will

require accurate analysis by the researcher.

In order to select useful written material, May (1997) observes that the classification of documents tends to fall into three categories: (a) primary, secondary and tertiary documents; (b) public and private; and (c) unsolicited and solicited sources.

Following May's classification, this study will take into consideration secondary, public and solicited documentary sources. Secondary sources are written after an event which the author had not personally witnessed and May (1997) notes that the researcher has to be aware of potential problems in the production of this data. Books, journals, or newspapers that allow analysis of the relationship between education and development retrospectively fall in this category.

Public documents can be those produced and published by international organisations, and national and local governments which are either written in Spanish or English. Within this category, we have government programmes, national or regional development plans, and official statistics.

Solicited documents refer to those materials available to researchers, but which are directed at a specific audience. Public access to solicited documents is a key characteristic in democratic regimes because information is open to public discussion. These conditions were found to exist in Mexico during the pilot study carried out for this research. Easy access to public and solicited information in the educational sector was evident.

It is worth noting that web-site pages and the *internet* in general are also considered to be public and secondary sources, but these documents must to be subjected to reliability and credibility criteria. The weak point here is that kind of information may not be permanent and thus it cannot be checked by others.

Like all data collection instruments, documents also have a degree of unreliability. For

Denscombe (1998), one disadvantage of using documentary research is the potential lack of credibility of the source. But Platt (1999b) goes beyond Denscombe's ideas concerning credibility and underlines a key element for using documentary research: inferences. What inferences can be made from documents about matters which they do not directly describe? Platt addresses this question by saying:

The inference can be justified to the extent that the theory is known to be correct. There must be an independent evidence to support such theory and an alternative theory which could also account for the forms the document takes (1999:219).

Solid bases for inference are required when documentary analyses are used. Written material can only show a part of the phenomenon analysed, thus making simple generalizations from this documentary evidence can be misleading for social analysis.

In this research special attention is paid to the correct use of written material in order to establish a strong basis for empirical work. Documentary research will be complemented with "fresh data" gathered through questionnaires and semi-structured interviews with the aim of discussing the complex relationship between higher education and development in Mexico.

2. Surveys. Searching for measurability.

According to Denscombe (1998) the survey approach is a "research strategy" which employs diverse techniques such as postal questionnaires, personal interviews, or telephone interviews for collecting data. For Marsh a survey is:

[A]ny inquiry which collects pieces of information, by whatever method, over a range of different cases, and arranges the information about those cases as variables; variables therefore must have the property of providing one unique code for every case (Marsh, 1984:84-85).

So, the information collected through surveys can be measured, though this information must be structured to make a reliable measurement possible (de Vaus, 1986). This fact

helps to clarify the relationship between variables as well as their distribution (Kidder and Judd, 1986).

Surveys have been one of the most common approaches to social research. In fact, Frankfort and Nachmias (1992) mention that there are indications that survey research is becoming a widely used tool to explain public policy outcomes. However, surveys can also exhibit technical failures which are described below.

a. The advantages and disadvantages of survey approach

All research methods have advantages and disadvantages. For Denscombe (1998) an advantage of survey research is that it produces data-based on empirical observation. Moreover, for Kidder and Judd (1986), the strength of survey research lies in its answering factual questions and assessing the distributions of the characteristics of populations. So, the collection of information from numerous subjects could be used to make generalizations regarding certain social phenomena.

However, "wide coverage" is also seen as an empirical approach that encounters philosophical criticisms due to its mass collection of facts and statistics, and provision of nothing of theoretical value (de Vaus, 1986). Similarly, Marsh (1984) thinks that surveys are popular more for their predictive ability than for their provision of any explanation for and understanding of the social phenomena.

The lesson that can be taken from this discussion of the characteristics of surveys is that the number of facts collected is secondary to their importance for social analysis. A broad collection of structured data should be used for the construction of an original idea.

But, once the survey approach is accepted as a suitable mechanism for collecting data, two technical problems emerge. The first consists of the need to define the type of sample individuals that share the specific characteristics investigated, and the second concerns conceptualizing and operationalizing each variable drawn from the hypotheses

(Neuman, 1991).

As this thesis seeks for explanations rather than descriptions, “operationalizing the variables of the hypotheses” is not required. The relationship between higher education and development is analysed under Sen’s human capabilities approach, thus the effects of education are evaluated through “functionings” (see Chapter 4). But, this does not preclude discussion of some sampling issues, since this work uses a survey to collect structured data concerning the socioeconomic backgrounds of the UT graduates. This information will be integrated into a qualitative analyses. Both, quantitative and qualitative information will serve to illustrate Sen’s human capabilities approach, which is explained in Chapter 4.

b. Sampling issues

As Frankfort and Nachmias (1992) argue, it would be virtually impossible and very expensive, to use questionnaires or interviews to gain information from all potential units of analysis encompassed within the research agenda. Thus, certain elements within the population can provide data to make generalizations about the population as a whole. This subset is called a sample. However, selecting reliable samples is not easy matter. Frankfort and Nachmias argue that three major problems confront sampling theory: (a) the definition of the population; (b) the sample design; and (c) the size of the sample.

i. Population

According to Kidder and Judd (1986) a population is the aggregate of all the cases that conform to a designated set of specifications. For this research the population is formed by all of the graduates of the three selected technological universities (UTN, UTT and UTA). However, this population requires a narrower description. Frankfort and Nachmias (1992) explain that the population must be defined in terms of content, extent and time. On the basis of these criteria, this research defines the population of graduates as: (a).

all employed and unemployed graduates; (b) those graduates who have studied a career in the three selected UTs; and (c) those graduates who have finished their studies up to spring of 2000.

ii. Sample design

According to de Vaus, there are two broad types of samples. Probabilistic and non-probabilistic. He explains that:

A probability sample is one in which each person in the population has an equal chance (probability) of being selected while in a non-probability sample some people have greater chance than others of selection (de Vaus, 1986:52).

This research uses both types of sample for collecting information from the UT graduates. With respect to the probability sample, a subset of UT graduates was selected randomly in order to send out questionnaires. This strategy aims to obtain a broad overview of graduates socioeconomic backgrounds.

In general terms, non-probability sampling has four sampling criteria: (a) purposive; (b) snowball; (c) theoretical; and (d) convenience (Denscombe 1998). This author explains that, purposive sampling - also known as judgment samples by Frankfort and Nachmias, 1992 - refers to deliberately selecting people or events which the researcher already knows. With snowballing, "the sample emerges through a process of reference from one person to the next" (Denscombe, 1998:16). With theoretical sampling the selection of instances is based on the development of a theory which is grounded in evidence. And finally, convenience sampling is built upon selection convenient to the researcher.

For this research, a combination of purposive and convenience criteria is used for the deliberate selection of graduates, employers and educational authorities. They will provide evidence on the basis of which the prevailing vision of the relationship between education and development in Mexico can be modified, informed, or simply confirmed.

iii. Conceptual definitions

Conceptual definitions refer to the clarification of the concepts used in the research process. That is, it is the description of concepts by means of other concepts (Frankfort and Nachmias, 1992). In this part, the two key concepts of this research are briefly defined: Higher education and development.

Higher education

As was argued earlier on, higher education is the advanced instruction which is given after upper secondary school or equivalent studies, which prepares people in the different fields of science, technology, teaching, and research (SEP, 1999). But, this broad definition deserves further analysis.

If we are considering the technological universities as case-studies, then we should define more accurately what kind of knowledge is being transmitted in these institutions. It has been said that the UTs adopted a vocationally-oriented model, thus the higher education provided in the UT may differ from that given in the autonomous universities. Vocationalism, according to the Dictionary of Sociology is:

An educational philosophy or pedagogy, claiming that the content of the curriculum should be governed by its occupational or industrial utility, and marketability as human capital (1998:695).

So vocationalism is a form of education with primarily instrumental aims, which are principally to prepare students for employment (Winch and Gingell, 1999). Based on these definitions, it can be said that the higher education provided in the UTs has instrumental purposes which are "governed by its occupational utility".

Controversial discussions are still emerging regarding the differences between general education and vocational/technical education (also referred as training). Some authors have seen both types of academic learning as antagonistic concerns (Peters 1966).

Others question this view by saying that "liberal education overlooks the important fact [...] that all education has originally been vocational in the sense of equipping particular kinds of people for known functions in a specific society" (Jeffreys 1972:88-89). Arguably these discussions encourage further research to facilitate understanding of how education is shaping values and aims during this global era. These analyses cannot be undertaken here, and therefore should be conducted in other studies.

Development

In order to assess whether education is having an impact upon development, the term development is understood here as "a process of expanding the real freedoms that people enjoy" (Amartya Sen 1999:3). But this concept involves several issues that require further explanation, thus Chapter 4 presents a more in depth discussion of Sen's theoretical propositions and their applicability to this thesis.

That completes discussion of sampling issues, so let us now move on to describe the second instrument of data collection.

3. Questionnaires

Questionnaires are a useful technique of data collection, which is commonly employed in the survey approach. However, questionnaire construction requires careful consideration. For de Vaus "the art of questionnaire design involves thinking ahead about research problem, what the concepts mean and how we will analyse the data" (1986:71). In addition, the general objectives of the research should guide the inclusion of relevant questions aimed at collecting highly structured data, which tends to fall into two broad categories: facts and subjective experiences (also called opinions).

Denscombe (1998) adds that questionnaires can be more productive under certain circumstances, for instance, when used with large numbers of respondents in many locations or when there is a need for standardized data from identical questions without

requiring personal face-to-face interaction. In constructing questionnaires, this author provides some advice.

[O]nly ask those questions which are absolutely vital for research; be rigorous in weeding out any duplication of questions; make the task of responding to the questionnaire as straightforward and speedy as possible; pilot the questionnaire to see how long it takes to answer (Denscombe 1998:6).

The questionnaire designed for this research includes twenty two questions of which four are contingency questions and six have a ranking format (see Annex 1). All questions are closed due to the fact that they will provide pre-coded data which can be easily be analysed. However, there is a disadvantage associated with close questions, according to Denscombe:

[...]there is less scope for respondents to supply answers which reflect the exact facts or true feelings on a topic if the facts or opinions happen to be complicated or do not exactly fit into the range of options supplied in the questionnaires (Denscombe, 1998:101)

Other questionnaire disadvantages are the problems of checking the truth of answers (Denscombe, 1998); and the low response rate which calls into question any conclusions based on structured data (Kidder and Judd, 1986).

Although a questionnaire was used as an instrument to gather information from a considerable number of UT graduates in the three regions selected (Neza, Tula and Aguascalientes), during the pilot study it was found that this research technique had limitations, thus semi-structured interviews were integrated into the data collection process.

4. Interviews

For some authors such as Kidder and Judd (1986), this technique is "part art, part science" because it combines the individual's attitudes, such as the interviewer's

common sense, with the respondent's motivation. Despite their flexible nature, interviews must state their questions precisely and clearly, using clear wording and sequence which defines the structure of the interview (Frankfort and Nachmias, 1992). In general, there are three types of interview; structured interview, semi-structured interviews; and unstructured interviews, which are different due to "the degree of control exercised by the researcher over the nature of the responses and the length of the answers allowed by the respondent" (Denscombe, 1998:114).

In this research, a personal semi-structured interview will be used in order to collect in depth information regarding the impact of technical education on the graduates' lives (see Annex 2). The aim is to extend the information obtained through the questionnaire which provides descriptive rather than explanatory data. This combination of research methods is implicitly advocated by Ragin's work when he points out that:

The key features common to all qualitative methods can be seen when they are contrasted with quantitative methods. Most quantitative data techniques are data condensers. They condense data in order to see the big picture [...] Qualitative methods, by contrast, are best understood as data enhancers. When data are enhanced, it is possible to see key aspects of cases more clearly (in Neuman, 1997:14-15).

Data collected through questionnaires is presented in a condensed form as a foundation for a deeper qualitative analysis where "key aspects" of the relationship between higher education and development "are seen more clearly".

Frankfort and Nachmias (1992) explain that semi-structured interviews or focused interviews have four characteristics: (a) They take place with respondents known to have been involved in a particular experience; (b) They refer to situations that have been analysed prior to the interview; (c) They proceed on the basis of an interview guide specifying topics related to the research hypotheses; and (d) They are focussed on the subjects' experiences regarding the situations under study.

For this research, three groups of informants were chosen: Some staff holding management positions in the UTs, employers and UT graduates (see Annex 2). Table 3.3 shows each group with their respective themes of analysis. With regard to the UT graduates, they were selected by using two criteria: (1) employment situation (employed or unemployed) and (2) wage level (high, middle, low).

Table 3.3. Informants and themes for a semi-structured interview

<i>Staff holding management positions in the UTs</i>	<i>Employers</i>	<i>Graduates</i>
Performance of UT as booster of regional development	Importance of specific skills in jobs	Effects of education as a social driving force
Problems of the UT model	Labour rules or laws to recruit university graduates	Expectations of better life through education
Development as a variable dependent of education	Distinctive features of the UT education and differences with others schools	UT as facilitator for enlarging choices
Role played by local enterprises	Academic weaknesses of UT education	Weaknesses of UT education
Controversies of the relationship between education and development	Institutional weaknesses of the UT	Perceptions of the social and economic issues of region
		Perception of job conditions

During data collection, I attempted to avoid bias, though Kidder and Judd argue that interviewers are human beings who can never completely overcome bias. However, their effects can be reduced "by using standard wording in surveys questions" (1986:272). In fact, Frankfort and Nachmias (1992) remark that the flexibility, that is the interviews' chief advantage, leaves room for the interviewer's personal influence and bias. In order to reduce this risk, Frankfort and Nachmias provide some principles of the interview process:

- ▶ The interview should be conducted in an informal and relaxed atmosphere, and the interviewer should avoid creating the impression that what is occurring is a cross-examination or a quiz.

- ▶ The questions should be asked exactly as worded in the interview guide.
- ▶ Questions should be presented in the same order as in the interview guide. This is to provide continuity and to make sure that the respondents' answers will not be influenced by their response to previous questions.
- ▶ Questions that are misinterpreted or misunderstood should be repeated and clarified.

Apart from creating a positive atmosphere, asking the questions properly, and avoiding bias, Kidder and Judd (1986) suggest recording the responses. The recording of the interview can also be backed up by written field notes in order to accurately capture the content of the interview. Furthermore, some interviewees may ask for anonymity. These factors stresses two disadvantages of interviews, on one hand, the invasion of privacy of informants who can be upset by "tactless interviewing", and, on the other hand, the presence of the tape-recorder can inhibit certain people (Denscombe, 1998).

C. Comparative method

Mackie and Marsh argue that comparative analyses "generate, test, and subsequently reformulate theories, and their related concepts and hypotheses"(1995:174). The comparative method in this study will be used to compare and contrast the different experiences of the three UTs selected. This method is aimed at verifying under what macro regional conditions, a UT can be a facilitator to the expansion of people's freedoms (using Sen's terminology).

It is important to stress that this research will be extremely careful in generalizing about the results obtained in such comparisons. The purpose is to understand social and economic relations across three technological universities and within their respective contexts.

In sum, three research methods will be employed (case study, triangulation of data collection techniques and comparative analysis) to provide a broader explanation of the way in which education interacts with the development process.

D. Analysing data

Data collected through questionnaire were analysed in Excel to obtain frequencies which are presented in charts and tables. Meanwhile, qualitative data were analysed by using the software *Nvivo* for Windows (version 1). Once having translated and transcribed the semi-structured interviews, data were organised in general themes (nodes) with the purpose of condensing the information gathered. This helped me to provide explanations of the relationship between education and development which “tend to be rich in detail, sensitive to context, and capable of showing the complex processes or sequences of social life” (Neuman 1997:420).

E. Pilot study

The pilot study consisted of testing the questionnaire before use of the final version (see Annex 3). Its aims were: (1) to make an initial approach to potential respondents; (2) to ascertain whether the key variables included in the questionnaire were relevant for the research purposes; and (3) to identify possible logistical obstacles associated with data collection.

This pilot study was undertaken from September to November 1999 and 78 pilot questionnaires were sent to the employed graduates of these universities. Thirty eight questionnaires were answered during a graduation ceremony at Neza, 20 were filled out in a course at Tula and 20 were given out in graduates’ work place in Aguascalientes.

The results of this reliability exercise were extremely useful for the further progress of this work. Originally, the intention was to examine the relationship between education and development as a simple relationship between tertiary education and the labour market

and to use only a survey. However, it became clear that quantitative information would be insufficient to provide an explanation about the way in which education work within developmental processes, thus a more diverse methodology was developed.

It is worth saying that the most significant findings of the pilot study were the following:

- ◆ The reasons for selecting the UT model, as a tertiary education alternative, varied significantly by region.
- ◆ There were significant differences in graduates' household incomes by region.
- ◆ The majority of graduates found a job in less than a month.
- ◆ The first job destination of the UTs' graduates varied significantly by region.
- ◆ The graduates' salaries improved over time.
- ◆ The UT model constituted an important mechanism to help graduates to obtain a job.
- ◆ Despite the majority of the UTs' graduates being satisfied with their current jobs, a high proportion of the respondents wanted to continue their education with the traditional BA (*Bachelor*).

The pilot study achieved the goals of making an initial approach to the UT graduates, and it allowed the identification of relevant variables for this study. Regarding the logistical facilities during the data collection it can be said that all of them were solved thanks to the institutional support of the General Coordination of Technological Universities (CGUT) and each UT.

Final comments

If the relationship between education and development in developing countries is complex, then, a coherent research framework needs to be devised to provide an original interpretation of such a connection. In view of this, three methods of analysis are proposed: (1) the case-study method, (2) a combination of three data collection techniques and, (3) a comparative perspective. These constitute the primary means for assessment of whether or not the technical education provided by the Mexican UT can expand people's freedoms.

This research methodology serves as a basis for applying Sen's human capabilities approach which is explained in Chapter 4. As was argued earlier on, this work seeks to develop an analytical approach, rather than a descriptive view of how education functions within the developmental processes and thus a systemic process is followed to select the case-studies, to design samples, to choose documentary material, and to conduct data collection techniques. All in order to make the results of this approach as reliable as possible.

CHAPTER 4

Sen's human capabilities approach in the analysis of development and education

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Sen's human capabilities approach in the analysis of development and education

Introduction

The concept of development has been considered as a synonym of "growth", "progress", "advancement, or "enhancement". Such terms are used interchangeably, thus the meaning of development has become more confusing in recent times. On the other hand, this concept has also been refined with adjectives such as "human development"; "sustainable development", "economic development", "social development" and so on. From a humanistic position Amartya Sen defines development as "a process of expanding the freedoms that people enjoy" (1999:3). This also implies the possibility of radical changes in ways of analysing the links between education and development beyond monetary incomes as ends of academic process. Sen's theoretical proposition on development also leads us to consider the complementarity between human agency and societal arrangements, which has been overlooked in studies of education and development. Undoubtedly, the vision of this author broadens the approach of using economic techniques to analyse how knowledge impacts on development.

This chapter begins by discussing general concepts and finishes by defining practical issues. Its first part contrasts different concepts of development and it adopts Sen's definition as the leading one for this work. The second part discusses, by way of Sen's perspective, the links between three concerns: development, freedom and education. This part also presents some of the basic concepts of Sen's approach and it defines seven functionings for evaluating the effects of education as well as their links with instrumental freedoms. My aim is to use Sen's approach to verify whether education

provided in Mexican UT has expanded the human capabilities of their graduates.

I. The contested definitions of development.

Attempting to prove the existence of a relationship between education and development poses conceptual difficulties. Therefore, this part deals with the understanding of the term "development" in this research. Rather than revise the most important schools of the thought about development (e.g., Marxism, Dependency Theory, Neoclassical Theory; Structuralism, Endogenous Growth, etc.), I focus upon the different concepts of development in order to set up a basis for analysing its relationship with the education issues.

The concept of development has usually related to economics, so we will start by discussing the concept as given by Meier. Economic development is:

A process whereby the real per capita income of a country increases over a long period of time -subject to the stipulations that the number of people below an "absolute poverty line" does not increase, and the distribution of income does not become more unequal (Meier, 1995:7).

Meier's definition has two advantages. First, it highlights the condition of growth in quantitative terms (higher income), but also in qualitative ones (equal distribution). Secondly, it also stresses a "long period of time" in which real income must increase steadily, "not simply a short period rise, such as occurs during the upswing of the business cycle" (Meier, 1995:7). Because he takes this point into consideration, Meier's definition can be complemented with the adjective: "sustainable". Despite this, I consider Meier's definition to be narrow, because it relies too heavily upon income increases as a means of reducing inequalities when betterment can be achieved through others means such as an expansion of social services, education, social care, state intervention and so on.

On the other hand, Meier gives some suggestions for how to address the results of development. He observes that to "interpret development in terms of a process involving causal relationships should prove more meaningful than merely identifying development with a set of conditions or a catalogue of characteristics" (*ibidem*). This claim is consistent with the idea of "education for development" since economic growth has commonly been explained through human capital formation. However, this direct and casual connections between knowledge and progress contains contradictions. For example, Todaro (1994) argues that educational systems may perpetuate, reinforce and reproduce economic and social structures, whether these are egalitarian or not. Hence, Todaro proposes analysing the links between education and development in five categories: (a) education and economic growth; (b) education, inequality and poverty; (c) education, internal migration and the brain drain; (d) education of women, fertility and child care and (e) education and rural development. To explain each approach is not our concern; rather, our purpose is to underline the different aspects implied by the relationship between education and development which do not always reveal a causal and positive relation.

Todaro understands development as "a multidimensional process involving the reorganization and orientation of entire economic and social systems" (1994:68). This definition incorporates a key aspect: "a reorganization process" which inexorably implies a voluntary change. Thus in Todaro's view, development can be conducted by many institutions such as the state, the market, the legal system and so on.

On the other hand, the Oxford Concise Dictionary of Politics defines development as "a multidimensional process that normally connotes change from a less to a more desirable state" (McClellan, 1996:137). But a question arises: "desirable" to whom? Any answer to this question needs to draw attention to equality issues. It is difficult to argue that there exist development when "the world enters the twenty-first century heaving with poverty and inequality" (Callinicos 2000:1).

Putting human beings at the centre of stage, Amartya Sen states that:

Development can be seen as a process of expanding the real freedoms that people enjoy which contrasts with narrower views of development, such as identifying development with the growth of gross national product, or with industrialization, or with technological advance, or with social modernization (1999:3).

With this contribution to studies on development, Sen's work "has consolidated and institutionalized a broader conception of development, which goes beyond a focus on income and commodities" (Gasper and Cameron, 2000:985). For Sen, "money is not the life", - as a famous Mexican song says. He thinks that "the same level of achievement in life expectancy, literacy, health, higher education, etc. can be seen in countries with widely varying income per capita" (1984:495). So, it can be argued that monetary advancement is not sufficient to improve quality of life but it can be a basis upon which to do so. In many countries, economic growth has not been translated into qualitative improvements for the whole society (see UNDP 2001). This fact can be explained by many factors. Here, one is underlined by Sen:

If the government of a poor developing country is keen to raise the level of health and the expectations of life, then it would be pretty daft to try to achieve this through raising its income per head, rather than going directly for these objectives through public policy and social change[...] (Sen:1984a:496).

Rather than assuming that "money answereth all things", development should also be induced by political actions, otherwise "the answer certainly will come slowly", as Sen argues. Economic progress by itself cannot tackle the social, political and cultural problems of nations.

It is worth noting that Sen never speaks about the direct state intervention but in its place, he mentions "public action" or "societal arrangements". It seems that he visualises the

process of governing¹³ as an interrelation of organisations which can exacerbate, or perhaps, diminish the development process. This integral vision makes Sen's ideas extremely useful for both understanding the complex social problems of developing countries, and, therefore for devising effective strategies of action.

From a philosophical standpoint, Sen makes another contribution to development theory when he places human beings in the centre of development process by recognising individuals as responsible agents to "influence the world". This can be named the "agency aspect of individuals" (1999:18). He goes on to argue that:

Understanding the agency role is [...] central to recognise people as responsible persons: not only are we well or ill, but also we act or refuse to act, and can choose to act one way rather than another. And thus we - women *and* men - must take responsibility for doing things or not doing them. (1999:190 author's italics).

Arguably, the way of understanding the process of development in the twenty-first century is changing, but as Sen argues "it is not a switch (as often portrayed) from a state-dependent view of development to a market-reliant view" (1997:1). Rather, this change involves a "fuller view of human beings". But, sadly, individuals live in a world where,

[...] various types of unfreedoms such as poverty as well as tyranny, poor economic opportunities as well as systematic social deprivation, neglect of public facilities as well as intolerance or overactivity of repressive states that leave people with little choice and little opportunity of exercising their reasoned agency (1999:xii).

Therefore, it is important to view development as a process in which there exists a "deep complementarity between individual agency and social arrangements" (1999:xii). This encourages us to re-analyse social phenomena from different perspectives and with

¹³ Rhodes describes this process as governance which refers to "self-organising, inter-organizational networks characterised by interdependence, resource exchange, rules of the game and significant autonomy from the state" (1997:15).

intellectual rigour. Amartya Sen paves the way in this direction.

Considering development as freedom raises challenging research questions regarding the role of education within Sen's rationales.

II. Education, development and freedom from Sen's perspective.

As was argued in Chapter 1, the relationship between education and development has usually been analysed through economic approaches. In accordance with this line of reasoning, we can distinguish two levels of analysis: The first can be called a "macro-level of analysis" because education is considered as an economic factor capable of bringing economic advancements in the macro-structure of nations. The connection between schooling and economy is commonly tested through the production function¹⁴ and outcomes are generally measured in relation to the Gross Domestic Product. Using this level of analysis, it was thought that the key of enrichment lay in the formation of human capital.

While there is some evidence to support the usefulness of this approach, it fails to look at qualitative effects of education and it fails to explain "what other changes are necessary to maximize the effects of education [...]" (Levin and Kelley 1997:250). So, as a consequence of some empirical contradictions in these methods, some authors argued that human capital theory has proved to be "illusory" (Livingstone, 1999).

The second level of analysis of the relationship between education and development is called here a "micro-analysis". This focusses on changes in workers' earnings as a result of having studied. Indeed, this approach is a derivation of the "macro-level" analysis and normally it estimates the rates of return on investment in education by dividing the permanent annual benefits stream due to education by the cost of obtaining such

¹⁴ The production function is generally described as: $Output=f(Land, Labour, Capital, Human\ Capital)$

education[...] (Psacharopoulos in Meier, 1995:322). This approach has been criticised by several scholars (Bennell, 1996; Colclough, 1996, 1997; Lauglo, 1996, Ruiz, 1997; Flores-Crespo 2000) due to its clear omission of non-economic benefits (externalities¹⁵) arising from the learning process, and to its controversial implications for public policy. So, from a qualitative perspective, it cannot be said that such estimations strongly indicate that "development" occurs as a direct result of investing in education.

But these approaches, especially the macro, adopt a functional perspective in which "human capital" will directly encourage development. However, as Sen argues,

If development is seen, ultimately, as the expansion of the capability of people to do the things they have reason to value and choose, the glorification of human beings as instruments of economic development cannot really be adequate (Sen 1997:20).

Sen argues that the usefulness of the traditional focus upon the concept of human capital is partial because it tends to concentrate only on income generation (Sen 1997). Then, he marks differences between his human capabilities approach and that of human abilities. He points out that:

At the risk of some oversimplification, it can be said that the literature on human capital tends to concentrate on the agency of human beings in augmenting production possibilities. The perspective of human capability focuses, on the other hand, on the ability -the substantive freedom- of people to lead the lives they have reason to value and to enhance the real choices they have. The two perspectives cannot but be related, since both are concerned with the role of human beings, and in particular with the actual abilities that they achieve and acquire. But the yardstick of assessment concentrates on different achievements (Sen 1999:293).

So, Sen's approach focuses on "soft" achievements related to human freedom, while human capital theorists (including manpower planners) deal with "hard" matters concerning production, physical capital or economic benefits. But what are "hard matters"

¹⁵ Sen (1997) provides a deeper interpretation of externalities when he refers to the "direct" role of human capabilities such as human freedom or well-being.

of human capital for? Once economic growth is achieved, where should countries go next? Sen addresses these question by saying that there are differences between means and ends of development. He lucidly argues that:

The acknowledgement of the role of human qualities in promoting and sustaining economic growth - momentous as it is - tell us nothing about *why economic growth is sought in the first place*. If, instead, the focus is, ultimately, on the expansion of human freedom to live the kind of lives that people have reason to value, then the role of economic growth in expanding these opportunities have to be integrated into that more foundational understanding of the process of development (1997:21 my italics).

Advocating the integration of economic growth, development, human qualities and human freedoms into a "foundational understanding" poses a methodological and epistemological challenge for social researchers. A step forward in the development of "foundational understanding" is to concentrate upon human capabilities approach and its roles, as Sen argues below:

The expansion of human capabilities, thus, have both "direct" and "indirect" importance in the achievement of development. The indirect role works through the contribution of capability expansion in enhancing productivity, raising economic growth, broadening development priorities and bringing demographic changes more within reasoned control. The direct importance of human capability expansion lies in its intrinsic value and its constitutive role in *human freedom, well-being and quality of life* (1997:21 my italics).

It is worth noting that Sen considers the enhancing of productivity as an "indirect effect" of expanding human capabilities, while human freedom is a "direct" effect of such enlargement. His approach seems to differ greatly from the "modern" vision of education that suggests economic approaches, specifically, manpower planning techniques. These functional models of planning adequate "stocks of professionals" for matching productive demands and then of boosting development fails to consider human beings in a "fuller view". In this vein, a philosophical criticism is given by the Mexican poet Octavio Paz who, in his book entitled *The Double Flame: On Love and Erotism*, wrote:

In accordance with the necessity of economy or politics, governments or big companies could order the manufacturing of a certain number of medical doctors, journalists, teachers, workmen and musicians. Beyond, the weak feasibility of these projects, it is clear that they lie in a philosophy which harms the essential notion of human beings which were conceived as unique and non-repeatable beings (Paz 1993:200)¹⁶.

The content of the Paz's words lies in a humanistic vision which is compatible with Sen's. Both Nobel prizes winners emphasised what the economist named, "individual freedom", so coincidences between the two are not surprising.

Before going on to tighter explanations of Sen's approach, it is necessary, very briefly, to look at the links between the Indian economist's thoughts and those of another humanistic thinker: the Brazilian pedagogue Paulo Freire.

A. Amartya Sen meets Paulo Freire

When Sen speaks of development as freedom, he inexorably leads us to think of education as a factor of liberation, just as some authors have claimed before. For Szkludlarek, both education and freedom are closely linked. He argues that:

Knowledge and freedom are inevitably linked to education. Beginning with Plato, through to stoics, to the contemporary with a particular place reserved for the Enlightenment. Reason was considered as the basis of freedom, and education was conceived as a way of liberation (1993:41).

Defining development as freedom, as Sen does, implies that the development process can also be seen as "liberation" or "emancipation". These terms have been commonly used by Paulo Freire to refer to the process of liberating human beings from oppression through *their own* pedagogy, "[...] so the oppressed, in order to become free, also need a theory of action" (Freire 1972:50), thus education becomes the means by which individuals can perceive, interpret, criticize and, eventually, transform their reality.

¹⁶ Translated by the author.

While Freire developed literacy campaigns among adults with the aim of converting them into subjects rather than objects of their contexts characterised by “oppression”. Sen stresses the importance of recognising human beings as responsible agents. Individual agency, Sen says, is “ultimately” central to addressing deprivations (1999:xi). So both authors depart from the assumption that people are succumbing to poverty, inequity, exploitation, and illiteracy; thus something needs to be done to reverse this situation. However, Freire and Sen do not seem to be trying to save the poor as they conceives human beings as responsible agents who can alter their destiny. They rely upon the “human agency” of individuals to transform their realities. This is a remarkable coincidence if we take into account that the *Pedagogy of the Oppressed* came out in the early 1970s and Sen’s *Development as Freedom* was published in 1999.

Nevertheless, Carmen (2000), rather than focussing on convergences, has contrasted Freire’s approach to Sen’s. He criticises Sen’s capabilities approach due to its “individualistic mindset” and thus introduces a neologism called *capacitation* which “has the power -by virtue of ‘learning’ in solidarity with others - to autonomously generate employment and income” (2000:1023). Carmen also believes that Sen’s “abstract formalisms” cannot be operationalized, while:

Capacitation has been operationalized on a large scale, in one major variant, the Organizational Workshop (OW), by the Brazilian innovator Clodomir Santos de Moraes, a contemporary, compatriot of one-time co-prisoner with Paulo Freire (Carmen 2000:1023).

I would say that Freire’s thoughts are linked with Sen’s by thread of justice and freedom. This is very remarkable. Both authors have provided a sound basis upon which to analyse two inseparable issues: education and freedom. Freire, does this upon pedagogical bases - basically literacy campaigns - and particularly focussing on the Latin American reality; and Sen does this by articulating and restoring a humanistic vision of development processes.

As we can see, the links between education, development and freedom are not novel. Rather, what has changed, is the way of analysing this connection.

B. Analysing Sen's human capabilities approach.

In order to assess whether education has expanded the freedom of UT graduates and thus whether a process of development can be corroborated, it is necessary to analyse both "the constitutive" role of freedom and "the instrumental" role of freedom proposed by Sen (1999). He distinguishes the former by saying that it is "*the primary end*" of development, that is, the process of expanding human freedoms, and it relates to elementary capabilities (e.g., being able to avoid starvation, deprivation, under-nourishment, morbidity and premature mortality). Since this research analyses university graduates' lives, analysing these basic capabilities might be futile, because the majority of graduates are presumed already to have met such needs. The second perspective called the "*instrumental*" role seems more suitable for our study. In this, "the role of freedom concerns the way different kinds of rights, opportunities, and entitlements contribute to the expansion of human freedom in general and thus to promoting development" (Sen 1999:37). Figure 4.1 illustrates Sen's idea of development.

Figure 4.1. Sen's perspective of development



According to Sen, there can be five types of instrumental freedoms: (a) political freedoms; (b) economic facilities; (c) social opportunities; (d) transparency guarantees and (e) protective security. Table 4.1 shows a brief description of each one.

Table 4.1. Descriptions of instrumental freedoms

<i>Political freedoms</i>	<p>Broadly conceived (including what are called civil rights), refer to the opportunities that people have to determine who should govern and on what principles, and also include the possibility to scrutinize and criticize authorities, to have freedom of political expression and an uncensored press, to enjoy the freedom to choose between different political parties, and so on. They include the political entitlements associated with democracies in the broadest sense (encompassing opportunities of political dialogue, dissent and critique as well as voting rights and the participatory selection of legislators and executives).</p>
<i>Economic facilities</i>	<p>Refer to the opportunities that individuals respectively enjoy to utilize economic resources for the purpose of consumption, or production, or exchange. The economic entitlements that a person has will depend on the resources owned or available for use as well as on conditions of exchange, such as relative prices and the working of the markets. Insofar as the process of economic development increases the income and wealth of a country, they are reflected in corresponding enhancement of economic entitlements of the population. It should be obvious that in the relation between national income and wealth, on the one hand, and the economic entitlements of individuals (or families), on the other, distributional considerations are important, in addition to aggregative ones. How the additional incomes generated are distributed will clearly make a difference.</p>
<i>Social opportunities</i>	<p>Refer to the arrangements that society makes for education, health care and so on, which influence the individual's substantive freedom to live better. These facilities are important not only for the conduct of private lives (such as living a healthy life and avoiding preventable morbidity and premature mortality), but also for more effective participation in economic and political activities. For example, illiteracy can be a major barrier to participation in economic activities that require production according to specification or demand strict quality control (as globalized trade increasingly does). Similarly, political participation may be hindered by the inability to read newspapers or to communicate in writing with others involved in political activities.</p>
<i>Transparency guarantees</i>	<p>Deal with the need for openness that people can expect: the freedom to deal with one another under guarantees of disclosure and lucidity. When that trust is seriously violated, the lives of many people -both direct parties and third parties- may be adversely affected by the lack of openness [...] These guarantees have a clear instrumental role in preventing corruption, financial irresponsibility and underhand dealings.</p>
<i>Protective security</i>	<p>Is needed to provide a social safety net for preventing the affected population from being reduced to abject misery, and in some cases even starvation and death. The domain of protective security includes fixed institutional arrangements such as unemployment benefits and statutory income supplements to the indigent as well as ad hoc arrangements such as famine relief or emergency public employment to generate income for destitutes.</p>

Source: Sen (1999:40)

Congruently with his idea of complementary between individuals and institutions, Sen argues that these instrumental freedoms directly enhance the capabilities of people. They

also supplement one another, and can furthermore reinforce one another. These interconnections, he says, are particularly important to seize in considering development policies (Sen 1999).

However, an analysis of how higher education enhances the graduates' capabilities to focus on the five instrumental freedoms seems ambitious and technically impossible. So, I focus basically on the second and third types of freedoms.

Although these "instrumental freedoms" are a way of evaluating the expansion of capabilities, methodological problems remain. For example, in the instrumental freedom of social opportunities, it seems that Sen is focusing on basic levels of education when he says that "illiteracy can be a major barrier to participation in economic activities". These capabilities differ from those who have studied higher levels of education as is our case. So, functionings for university graduates have to be developed.

This research tries to evaluate functionings by applying a questionnaire to graduates which is then the basis for an exploration, through an in-depth interview of what they can or cannot do or what they can or cannot be once they have finished their studies at the UT.

Before defining graduates' functionings used for this work, it is crucial to explain some basic concepts and to make clear some methodological concerns.

Basic concepts of Sen's approach

Capabilities are "naturally" linked with the perspective of positive freedom (Sen 1984:512) and functionings sets form the human capabilities which "are essential for people because they can lead the kind of lives they value-and have reason to value" (Sen 1999:18). In short, functionings are the achievements of a person: "what he or she manages to do or to be" (1985a:10). What graduates can or cannot do as well as what

they can be or cannot as a result of technological education is the basis for the evaluation of functionings.

For Alkire and Black capabilities are the “positive freedoms to achieve valuable functionings” which range from basic functionings to higher functionings (1997:263). Basic functionings such as being able to avoid deprivation, starvation, under-nourishment, morbidity and mortality may be irrelevant for this research since I am concerned with the university graduates who apparently have met basic needs.

Within his integral way of thinking about development, Sen links states such as well-being with functionings. In fact, he argues that the direct importance of human capability expansion lies in its intrinsic value and its constitutive role in *human freedom, well-being and quality of life* (1997:21). Sen reflects that well-being cannot be defined by the characteristics of goods possessed by a person but rather by his or her achievements: “how well is his or her being”? (1985a:5). So, a functioning is different from having good. The well-being of a person, he argues, is best seen as an index of the person’s functionings” (1985a:25).

Adopting a flexible and analytical line of thought, Sen argues that goods can be transformed into functionings, for example, “the consumption of food, on the one hand, and the functioning of being well nourished, on the other” (1985:198). He adds:

Interpersonal variability of the relation between goods and functionings turns out to be quite central to many important policy issues. For example, the comparison between the positions of men and women in terms of nutritional achievement in the poorer countries is often distorted by the use of food intake figures, which are not only unreliable, but also difficult to relate to well-being (1985: 199).

Two remarkable points are underlined in this quotation: interpersonal variability and the appeal to a comparative approach. For this research, both elements will be adopted in order to highlight the barrier that clouds the links between education and development. Interpersonal variability is based on the level of income of graduates, their job position,

their career and the place where they studied. This will be integrated with a comparative approach among the three technological universities to address the hypothesis that, in the UTs that are based in affluent regions, the process of development is quicker than in those where socioeconomic disadvantages prevail. Sen's ideas correspond well with this assumption. He wrote that:

Importance may well be attached to checking whether one person did have the opportunity of achieving the functioning vector that another actually achieved. This involves comparison of actual opportunities that different persons have. If one person could have achieved all the relevant functioning vectors that the other could, then in some important sense the first person had at least as much freedoms to live well (1985:201).

And the last concept, but not the least, that Sen discusses concerns choice. He argues that the "quality of life" a person enjoys is not merely what he or she achieves but also what options the person has had the opportunity to choose from. So "good life" is partly a life of genuine choice, and not one in which the person is forced into a particular life" (Sen, 1985:70).

Once I have described the foundations of Sen's approach, I move on to define what functionings I will try to identify in UT through the in-depth interviews and questionnaires. As was said earlier, in this exercise I try to link "instrumental freedoms", described above, and the Basic Human Functional Capabilities developed by Nussbaum (1995) (see Table 4.2).

Table 4.2. Description of functionings of UT graduates

<i>Functionings proposed</i>	Links with:	
	<i>Sen's instrumental freedoms</i>	<i>Nussbaum's basic functional capabilities</i>
1. Being able to develop further abilities	Economic facilities/social opportunities	Being able to move from place to place

continues...

<i>Functionings proposed</i>	<i>Sen's instrumental freedoms</i>	<i>Nussbaum's basic functional capabilities</i>
2. Being able to acquire knowledge required in a job position	Social opportunities	Being able to think and to reason and to do these things in a way informed and cultivated by an adequate education...
3. Being able to choose jobs desired	Social opportunities/ economic facilities	Being able to form a conception of the good and to engage in critical reflection about the planning of one's life. This includes, today, being able to seek employment outside the home...
4. Being able to visualize life plans		
5. Being able to look for and ask for better job opportunities	Social opportunities/ economic facilities	Being able to live one's own life in one's own surroundings and context.
6. Being able to feel confidence and self-reliance	Social opportunities/ economic facilities	Being able to avoid unnecessary and non-beneficial pain, so far as possible, and to have pleasurable experiences
7. Being able to transform commodities into functionings	Economic facilities	

Conclusions

In Amartya Sen's perspective, development is considered to be a process of expanding the freedoms that people enjoy. This radical vision also implies challenges for educational researchers.

This thesis uses Sen's theoretical propositions since: (1) they consider monetary benefits as means of development and not as ends thus it allows deeper understanding between schooling and economy; (2) they highlight the complementarity between individual agency and social arrangements as means to development; thus connections between education and development are set within an integral framework; (3) they set a basis for evaluating the effects of education in qualitative and in quantitative terms (functionings); (4) they connect concepts such as development, freedom and education. All these points are essential to fill the gap in the existing literature on education and development.

CHAPTER 5

**The technological
universities and their
contexts. A documentary
analysis**

Chapter 5

The technological universities and their contexts. A documentary analysis

Introduction

Under the modern¹⁶ belief that Mexico required more technicians than bachelors (*licenciados*) to change its economic structure, the Technological Universities (here after UTs) were created in 1991. These higher education institutions are characterised by their vocational curricula and their aim of establishing strong links with local enterprises. This model of education has been ambitiously and optimistically promoted in Mexico as a booster of development.

This chapter is divided into three main parts. Part one describes the process for creating the UTs. It stresses the technical bases for creating the UTs and their aims and their exponential growth as part of the higher education system. Part two analyses the three regions where our case-studies are based. Special attention is given to economic and social issues such as employment and educational structures. The last part shows the results of the feasibility projects exclusively developed for these universities. Here, methodological weaknesses and inconsistencies in the results obtained are presented. These issues serve as an introduction for the empirical results shown in the subsequent chapters.

I. The creation of the technological universities in Mexico.

During the administration of the Mexican president Carlos Salinas (1989-1994), it was said that the transformation of education was an "indispensable condition for modernising

¹⁶ This term derives from the following definition of modernization: "Modernization theory held that less developed nations would eventually catch up with the industrialized world, providing they emulated the economic and social systems of Western capitalism" (*Dictionary of Sociology* 1998:155).

the country” (PME, 1989). During this time, education was considered an economic factor capable of shifting Mexico from one state of progress to another. In this line of reasoning, technical knowledge was seen as a key part of the national aspirations for growth. This idea is clearly supported by the OECD, which argues that:

The effectiveness of a modern economy depends to a considerable extent on its technicians and middle managers: within the North American economic area, the development of these intermediate qualifications may in the medium term represent Mexico’s opportunity (OECD 1997:179).

Technical and vocational education have been priorities in the educational agenda of international organisations, thus the OECD pointed out that:

The advanced technician level, situated between the *bachillerato* [upper secondary] and *licenciatura* [first degree], should be expanded considerably, either within the framework of existing institutions, especially, in the technological sector, or in new institutions such as the technological universities (OECD 1997:216).

So, after six years of existence created the UTs received the support of the OECD. It is interesting, as Kent (2000) argues, that being an organization aimed at encouraging economic development, the OECD shows a growing interest in education.

According to the Secretariat of Public Education, since 1989, new educational options were required in Mexico, so drawing on the systems of certain countries “which register higher economic growth,” such as USA, France, Japan, Germany and Great Britain,

It was found that the model of *Institute Universitarie de Technologie* in France was the most adequate scheme to be adapted in Mexico (SEP, 1991:2)

So, an education model from an advanced country was selected to be implemented in Mexico. This process is also known as Policy Transfer (PT) which refers to a systematic sequence of steps within which,

knowledge about policies, administrative arrangements, institutions, etc. in one time and/or place is used in the development of policies, administrative arrangements and institutions in another time and/or place (Dolowitz and Marsh, 1996:344).

In spite of the benefits of learning from others' experiences, such as time savings and from an implementation standpoint, the PT process is ambiguous due to the lack of propinquity implied in the adaptation of lessons drawn from one country to another.

In the case of Mexican UTs a questions raised: Are these institutions operating and interrelating within a macro context similar to countries with "higher economic growth"? At first glance and analysing roughly both macro-contexts, it is clear that France's economic and social structure differs greatly from that of Mexico (see Table 5.1).

Table 5.1. Some macro indicators in France and Mexico

	France		Mexico	
	1990	1999	1990	1999
Real GDP per capita (US\$)	13,961	22,897	4,624	8,297
Gross Enrollment Ratio in tertiary education (% of the relevant age)*	25	51	14	16
Average hours worked per week*	40	39	43	45
Minimum wage (\$ per year)*	6,053	12,072	1,343	768
Human Development Index (HDI)	0.974	0.924	0.876	0.790

* These data refer to 1980/84 and 1995/99, for 1990 and 1999, respectively.
Sources: The World Bank (2001) and The UNDP (2001).

Interestingly, in relative terms, the change in the GDP per capita from 1990 to 1999 was higher in Mexico than in France (79% and 64%, respectively). Despite this fact, in the Latin American country there was a meagre increase - across almost a decade - of two points of the GER in tertiary education in relative terms. Contrary to this, in the European country the proportion of people who entered university doubled over nine years.

From the labour market perspective, it can be seen that a Mexican worker spent more

hours in his or her job in 1999 than in 1990. Moreover, the minimum wage rate fell significantly from 1990 to 1999. Meanwhile, in France, people worked less in 1999 than in 1990 and the minimum wage was raised considerably in this period.

All these inequalities seem to be reproduced in the Human Development Index (HDI)¹⁷ of Mexico which has undergone negative fluctuations over time.

Such disparities question the assumption that through technical education, Mexico will attain the economic advancement of the developed countries. There are several deprivations to be addressed in the Latin American country. In this respect, it might be expected that Mexican technological universities, in comparison with their French counterparts, are operating differently.

A. The technical basis for creating a development-oriented model of education.

According to the Mexican educational planners there was a shortage of technically qualified professionals whose job positions were being occupied by *licenciados* (bachelors). "There is huge gap of professionals in short term courses, thus the strategic character of technological universities is to fill it out", said the former Under-Secretary for Higher Education, Daniel Reséndiz (*La Jornada* 09/02/99).

Mexican authorities clinched the argument of the "gap" in tertiary education with the International Standard Classification of Education (ISCED)¹⁸, developed by UNESCO. The ISCED divides higher education basically into three levels. Firstly, level 5 refers to programmes leading to an award not equivalent to a first university degree, and is sub-

¹⁷ The HDI is a composite index based on three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of adult literacy (two thirds weight) and the combined gross primary, secondary and tertiary enrolment ratio (one third weight); and standard of living, as measured by GDP per capita (PPP US\$) (UNDP 2000:279).

¹⁸ ISCED emerged in 1978 and has been the official basis for the national and international educational statistics despite the fact that experts at UNESCO estimate that data from 70 countries -slightly less than half of UNESCO's member states - suffer serious reliability problems' (Puryear, 1995:81).

categorised in to "A" and "B". The former sub-categorization is formed by programmes that are "largely theoretically based and are intended to provide sufficient qualification for gaining entry into advanced research programmes and professions with high skills requirements". The latter comprises programmes that "are generally more practical/technical/occupationally specific than ISCED 5A programmes" (UNESCO 1997:Web-Site). Secondly, level 6 consists of programmes leading to a first university degree or an equivalent qualification and, finally, level 7 comprises programmes leading to a post-graduate university degree or equivalent qualification.

Reséndiz (1998) pointed out that graduates of UTs belong to level 5B which is rare in Mexico and thus jobs that require qualifications at this level are occupied by students who come from the upper levels (6 or 7). This, he said, provokes "unjustified" costs for three segments of society: firstly, for those students to whom the opportunity cost of working is higher than an "excessive" stay in schools; secondly, for family and society (although he does not mention that it is clearly expensive for the State as well) which, as a consequence of paying for an "excess of study", are "deprived" of students' earnings. Thirdly, there are costs for employers who contract professionals whose educational attainment does not match with the qualifications required in specific jobs, and thus graduates with levels 6 or 7 are "less productive" and must be re-trained in order to acquire the skills needed (Resendiz, 1998).

Table 5.2 shows the percentages of employed population by level of qualification. Based on these data, Reséndiz emphasises the need for technicians in Mexico as a lesson to be learned from developed countries.

Table 5.2. Employment structure in Mexico and other countries

Type of qualification	ISCED Level	% of employed population in formal economy			
		Mexico	Italy	Switzerland	France
Directors and professionals	6 and 7	3.7	10	17	18
Intermediate occupations and "associated professionals"	5	3.2	15	17	16
Operators and technicians	3	10.6	35	30	31
Technicians with basic skills and workmen	2	82.5	40	36	35

Source: Reséndiz, (1998:60).

If we follow the ISCED data and the employment structure of advanced countries, Mexico requires professionals who hold not only 5, but also levels 6 and 7 of education. Interestingly, as we can see, France - the nation from which Mexican policy makers transferred the UTs model - has the highest rate of levels 6 and 7 of the three developed countries (18%). So, why is Mexico's government devoted to investing more in level 5 than in levels 6 and 7? According to Reséndiz, "the stock of personnel available" in levels 6 and 7 is greater than the demands of the labour structure, while Mexico's labour market is demanding professionals who hold level 5 qualifications who do not exist in that "stock" (*acervo*) (Reséndiz 1998:62). This functional idea is questionable for methodological and philosophical reasons.

From a methodological standpoint, Lorey, in his study, *The University System and Economic Development in Mexico*, argues that in Latin American countries:

Development planners used the data to forecast "manpower" need based on roughly calculated estimates for future economic development. But development did not take place as predicted, and manpower needs were frequently found to be very optimistic (Lorey 1993:41).

He goes further in his analysis and argues that the Mexican economy's demand for specific fields of professional expertise has never been adequately examined (Lorey

1993). Another technical failure has been underlined by educational specialists who tend to agree that ISCED's concepts and definitions are especially inappropriate for vocational and technical education (Puryear, 1995).

In philosophical terms, the idea of planning "manpower" to meet the needs of the labour market seems to treat human beings as aggregate pieces useful for economic growth. This vision has been criticised by economists such as Amartya Sen, who argues that:

If development is seen, ultimately, as the expansion of the capability of people to do the things they have reason to value and choose, the glorification of human beings as "instruments" of economic development cannot really be adequate (Sen 1997:20).

Sen's humanistic perspective is congruent with another Nobel prize winner, Octavio Paz, the great Mexican poet who wrote:

In accordance with the necessity of economy or politics, governments or big companies could order the manufacturing of a certain number of medical doctors, journalists, teachers, workmen and musicians. Beyond, the weak feasibility of these projects, it is clear that they lie in a philosophy which harms the essential notion of human beings which were conceived as unique and non-repeatable beings (Paz 1993:200)¹⁹.

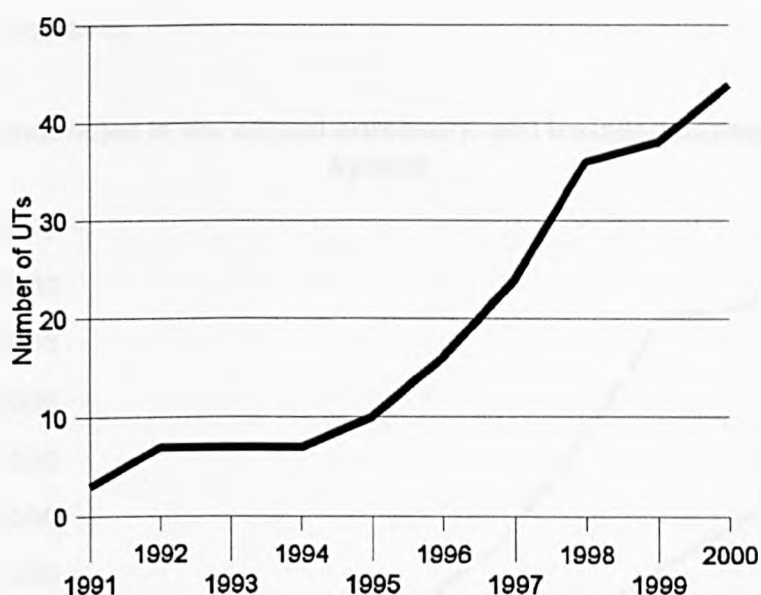
The technical bases for creating this model of education are controversial since they reduce human beings to malleable instruments of economic change. Why do they not see UTs as part of the social opportunities of their regions? Apart from this functional justification, the Mexican government also tried to expand educational services to distant and relatively deprived zones of the country. This objective seems more congruent with the idea of achieving development by using knowledge. The social purposes of the UT model are largely discussed in Chapter 6.

¹⁹ Translated by the author.

B. The growth of the UT sub-system

The development of the Technological Universities sub-system has been very ambitious and its growth has been "vertiginous" (OCE, 1999b). While in 1991 three UTs were created, in 2000 the Mexican government embarked upon the creation of forty-four new educational institutions covering 24 states in the republic (see Chart 5.1).

Chart 5.1 Growth of the system of technological universities



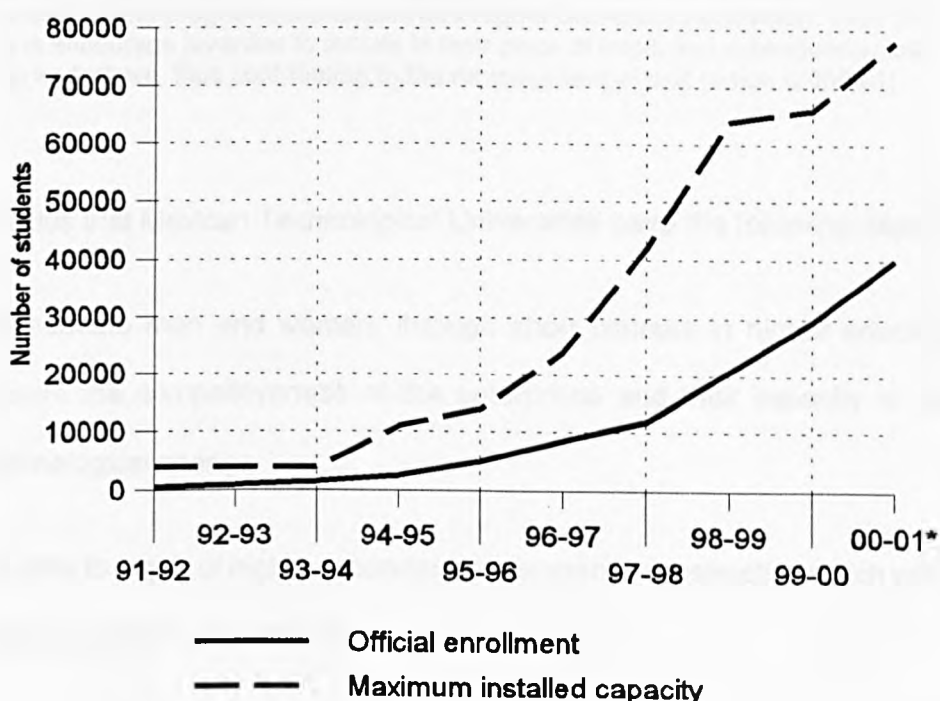
Source: CGUT (2000a).

Mexican authorities have enthusiastically supported this educational policy. A former Secretary of Public Education pointed out that "as a result of presidential commitment of forming a new generation of students who hold technical abilities and university knowledge, 29 out of 36 existing UTs were created in the current administration" (Miguel Limon in *La Jornada* 09/02/99). Economic support has come hand-in-hand with political discourses. Despite the economic crisis of 1995 that affected Mexico's economy, the UT sub-system grew significantly during that period (see Chart 5.1). The fall in oil prices and cuts in public expenditure during 1998 and 1999 did not affect the growth of this educational option either. Twelve new UTs were created in 1998. Undoubtedly, this

model of education deserves careful examination.

In the 2000-2001 school year, the Mexican government expected to enrol 40,000 students in the UT system. This number represented an increase of 34% with respect to the previous year (CGUT, 2000a). It is interesting to note that even though Mexico's government was still very keen on opening UTs, there is a gap between the UTs' official enrolment²⁰ and the the maximum installed capacity (see Chart 5.2). Although the growth in the demand is positive as the continuous line shows, the gap between lines widens as the time-span increases.

Chart 5.2. Tendencies in the official enrolment and installed capacity of the UT system



Source: CGUT, 2000a and CGUT, 2000b.

* The official enrolment was estimated by the CGUT (2000a) and the maximum installed capacity was calculated by taking into account the creation of six new UTs in 2000.

²⁰ We should be cautious of accepting "official" data as real because authorities commonly tend to exaggerate this kind of information.

How should the UT system react to this situation? The under-utilization of the UTs' infrastructure over time might move the UT system toward severe contradictions such as offering "commercial diplomas" in order to increase demand and thus override the key characteristics of the UT model such as the heralded "relevance of education". Moreover, how can a university system be sustainable if the public funds are limited? These issues raise several challenges in terms of social policy.

C. The mission of the UTs

The Secretariat of Public Education (SEP) argues that:

Technological universities are state-government decentralized public bodies that offer two-year programs to graduate as a Higher University Technician. Their aim is to encourage juveniles to remain in their place of origin and subsequently take up work there, thus contributing to the development of that region (2000:81)

The SEP adds that Mexican Technological Universities have the following objectives:

- ▶ To educate men and women, through short courses in higher education, to ensure the competitiveness of the enterprises and their capacity to react to technological change.
- ▶ To offer to pupils of higher secondary levels intensive instruction which will permit them to attain, in the short term, a productive job.
- ▶ To impart quality studies through a flexible curriculum which will give to graduates the professional opportunity to be devoted to and involved in a vast range of productive activities.
- ▶ To combine studies in the classroom, workshop, labs and placements in industrial production of both goods and services.
- ▶ To foster the skills, knowledge and abilities of pupils to act professionally in the

labour market, to offer independently their professional services or to open their own business.

As the UTs adopt a development-oriented model of education based on vocational careers, the first three universities were selected as case-studies for this research. They shall illustrate the way in which education functions within developmental processes.

II. Regional analyses. Similarities and disparities.

In 1965, Myers published his book entitled *Education and National Development in Mexico* in which he wrote:

It is impossible[...]to view Mexico as a uniform or homogenous nation. A regional, or sectional, approach is essential. The national situation can only be understood by understanding its component parts, and the disparities that have characterized economic development have characterized human resource development as well (Myers 1965:137)

Following Myers's idea, this part presents a regional analysis of the areas where the three UTs are situated (see map 5.1). It will be relevant to know to what extent the disparities underlined by Myers have changed 37 years after his observations.

A. The State of Mexico. The "huge neighbor" of Mexico City

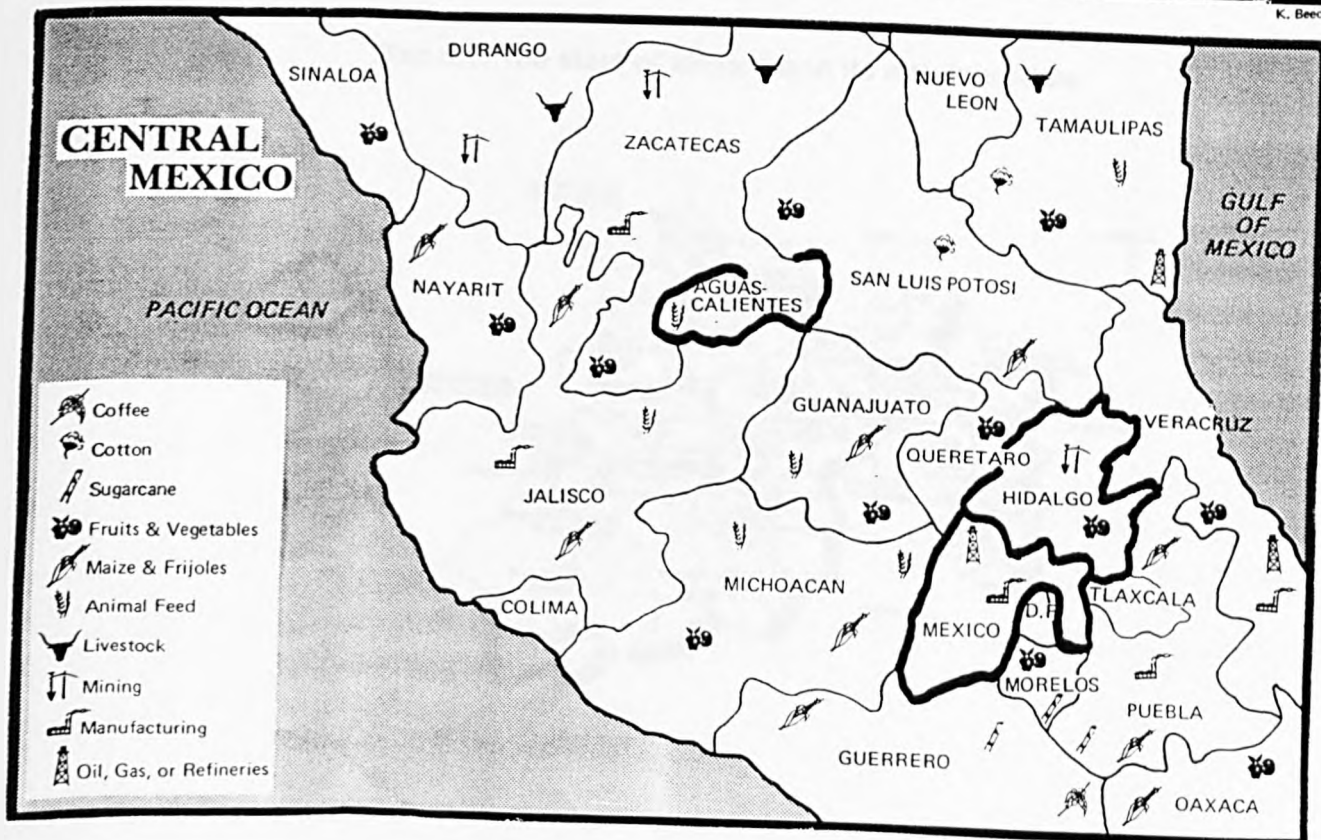
1. Demographic and economic figures

The State of Mexico is the largest entity near to Mexico City. Its population comprises 12,745,305 inhabitants, representing 12 per cent of Mexico's total population. The proportion of women in this state is higher (52%) than that of men (48%). The proportion of population aged between 15 and 29 is 30.8%, which is higher than the national average (28.8%) (INEGI 2000).

Map 5.1. Mexico: States and commodities



K. Beede



K. Beede

Source: Taken from Cockcroft, 1983.

This state embraces 65 municipalities of which *Ciudad Nezahualcoyotl* (henceforth referred to as Neza) is the second largest, with 1,233,868 inhabitants (INEGI, 1999) (see map 5.2).

The economic subsectors that impact significantly on the Gross State Product (GSP) are: (a) manufacturing industry with 32.7%, and (b) mercantile activities (*comercio*) such as restaurants and hotels (19.1%).

According to *The Economist*, (October 28th 2000) the GDP per person in this Mexican state ranges from Mx\$3000 to Mx\$3999²¹, which is below the average GDP per person (Mx\$4,311).

In 1996, the State of Mexico contributed a proportion of 10.37% to Mexico's Gross National Product (GNP) (INEGI, 1999a).

Map 5.2. The state of Mexico and its municipalities



Source: Taken from INEGI (Web-Site 2001).

²¹ Between £206 and £275 approximately.

2. Education in the State

According to the Secretariat of Public Education (SEP, 1999), the schooling average²² of the state of Mexico is 8.2 which is higher than the national mean (7.7). The illiteracy rate is 6.5 which is lower than the national index (10). It can be argued that in educational terms, this state has performed well. In fact, 29.51 per cent of its population over 15 years has studied at upper secondary and higher education levels (see Table 5.3).

Table 5.3. Distribution of population over 15 years by level of education (Percentages)

No schooling	7.32
Uncompleted primary	17.83
Complete primary	18.67
Post-primary education (con instrucción media básica)	26.24
Upper secondary and higher education	29.51
Not specified	0.43

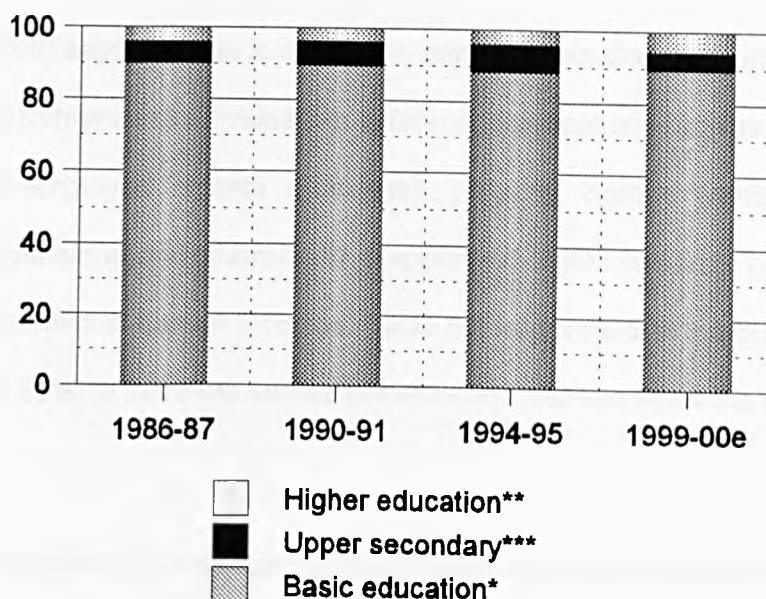
Source: INEGI (1999).

Even though the Mexican government recognises that the higher education system has been expanded as a result of "demographic growth, together with broader coverage in basic and upper secondary education and a growing interest of society to raise its levels of knowledge" (SEP, 2000:76), in the State of Mexico the growth of this higher education level has been very meagre over time (see Chart 5.3).

As we can see, more than 80% of the population in this state have been enrolled in the basic level of education over time. This structure follows the pattern of the National Educational System in Mexico (NES).

²² This represents the average number of educational grades achieved by a specific population over 15 years.

Chart 5.3. Student enrolment by level in the State of Mexico, 1986-2000



* Comprises pre-school (*preescolar*): primary and secondary levels.
 ** Includes postgraduate enrollment
 *** Includes general and technical options
 e=estimated
 Source: SEP (1999)

The municipality of Neza, during the 1997-1998 school year, registered 237,678 students. Table 5.4. presents how these were distributed and Neza's proportion with respect to the rest of the state.

Table 5.4. Student enrolment by level in the State of Mexico and Neza, 1997-1998

	<i>The State of Mexico (Thousands)</i>	<i>Neza (Thousands)</i>	<i>Proportion of the state</i>
Pre-school	315.0	14.4	4.5%
Primary	1853.5	147.7	8%
Secondary	675.1	52.3	7.7%
Vocational school	69.1	3.8	5.5%
Upper secondary	278.0	19.3	7%
Higher education	143.6	NA	---
Total	3403.4	237.6	7%

Source: SEP (1999) and INEGI (1999a).

3. Income level

As García (1999) says, income is defined in primarily two stages: monetary and non-monetary. The former can be divided into different classifications such as earned income (wages); self employed income (business); property income (rents); employer's contributions (pensions) and others (selling properties). In this research, the data is based on national statistics of earned incomes. Table 5.5 suggests that the bulk of employed population (31.82%) in this state earned between one and five times the minimum wage in 1995.

Table 5.5. Proportion of employed population by income brackets in the State of Mexico, 1995

No income	8.37
Less than one minimum salary	15.37
Between one and two times the minimum salary	31.82
Between two and five times the minimum salary	30.81
More than five times the minimum salary	10.59
Non-specified	3.04
Total	100.00

Source: INEGI (1999a).

4. Migration in the State of Mexico

Migration is a variable worthy of comment in studies of education and development. Myers (1965) pointed out that it is likely that many graduates with middle and higher education from the less advanced states are now living outside them. This phenomenon is also called "brain drain", which could occur at national or international level. Mobility amongst graduates shows the capacity of regions to retain their educated workforce within the local context as consequence of a dearth of opportunities. This has relevance to our research because Mexican authorities have argued that the aim of the technological universities is "to encourage juveniles to remain in their place of origin and subsequently take up work there, thus contributing to the *development of that region*" (my

italics) (SEP, 2000:81).

According to the INEGI (2000), the inter-state migration rate in Mexico is 4.7% of the whole population, which means that 3.9 million Mexicans have moved from their local regions. Migrants are most likely to be young, for example, the highest mobility is registered in the 20-24 age group.

The State of Mexico has a positive migration rate of 0.5% of young people between 15 and 29 years, which means that it “gains”, through migration, more young inhabitants than it loses (INEGI, 2000). Historically, the municipality of Neza is considered a receptacle of the country’s migration due to its proximity to Mexico City and its intense trade activity.

5. Some aspects of the labour market

According to Ruiz (1997), employment has been the most significant variable with which to explain economic growth in relation to education. So, the State of Mexico has an urban unemployment rate of 2.1%²³ and an Economically Active Population (EAP) of 5,276,329, which represents 41% of the whole population. Despite the low rate of unemployment in relative terms, this state has an imbalance in gender terms. Among the economically active population, 34% is female while male workers account for the remaining 66% (STPS: 2000a). The majority of the economically active population is working in the tertiary sector²⁴ (59.11%); whereas 30.03% is concentrated in the secondary sector²⁵ and only 10.38% in the primary sector.²⁶

²³ This rate refers to October, 2000

²⁴ This sector includes: commerce, transport, government and others.

²⁵ Made up of mining, oil and gas extraction, manufacturing, electricity, water and construction industries.

²⁶ This comprises agriculture, cattle, fishing and others.

On the other hand, official statistics give only a vague idea of the classification of job occupations. Since most workers hold positions such as employee (*empleado*), national data says little on specific positions such as foreman, qualified technician, manager, business owner and so on (see Table 5.6).

Table 5.6. Proportion of employed population by job position, 1995

Employee or workmen	58.73%
Unskilled worker	5.25%
Businessmen or employer	2.66%
"Free lance"	26.31%
Worker without payment	6.45%
Not specified	0.60%

Source: INEGI (1999a).

B. The State of Hidalgo. The most deprived region

1. Demographic and economic figures

Hidalgo is a state where industrial parks coexist with marginality. It has 2,206,918 inhabitants who are distributed across 40 municipalities (see Map 5.3). Its population represents 2 per cent of Mexico's total population.

As in the State of Mexico, the proportion of women in this state is higher (52%) than that of men (48%). The proportion of population aged between 15 and 29 is 26.4%, which is lower than the national average (28.8%) (INEGI 2000).

Map 5.3. The state of Hidalgo and its municipalities



Source: Taken from INEGI (Web-Site 2001).

In economic terms, the industrial subsectors that impact significantly on the Gross State Product (GSP) are: (a) manufacturing industry (24.3%) and (b) different kinds of services (*comunales, sociales y personales*) (19.4%). As a consequence of its natural conditions the cement industry flourished in this state and it has been one of its main economic activities.

In the interesting survey of Mexico entitled "After the revolution", *The Economist* (October 28th 2000) says that the GDP per person in Hidalgo ranges from Mx\$2000 to \$2999,²⁷

²⁷ Between £137 and £206 approximately.

which is lower than the average GDP per person (Mx\$4,311).

In 1996, Hidalgo contributed a proportion of 1.47% to the Gross National Product (GNP) of Mexico (INEGI, 1999b).

2. The educational structure of Hidalgo

This state is an educationally disadvantaged region. On one hand, the schooling average was 6.4 which is lower than the national mean (7.7). On the other hand, the illiteracy rate is 15.4, which is higher than the national index of 10 (SEP, 1999). This fact may be related to the number of indigenous inhabitants over five years of age who are living in Hidalgo. The proportion of this minority group is 17.7 per cent, which differs greatly from the national proportion of 6.9% (INEGI, 2000).

Unlike the educational situation in the State of Mexico, Hidalgo has only enrolled 17.59 of its population in the upper secondary or higher education levels. This proportion is almost equal to that registered in "No schooling" (15.8%) and lower than that of completed primary (see Table 5.7).

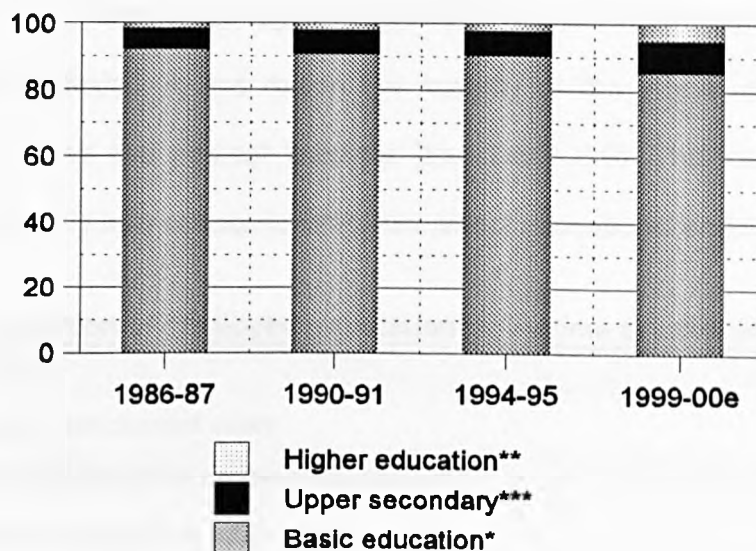
Table 5.7. Distribution of population over 15 years by level of education, 1995
(Percentages)

No schooling	15.81
Uncompleted primary	24.88
Complete primary	19.11
Post-primary education (con instrucción media básica)	22.45
Upper secondary and higher education	17.59
Not specified	0.16

Source: INEGI (1999b).

Chart 5.4 illustrates how the educational system has changed over time. While the enrolment in basic education remained steady over nine years (from 1986 to 1995), a slight increase in higher education in the 1999-2000 school year can be corroborated.

Chart 5.4. Student enrolment by level in Hidalgo



* Comprises pre-school (*preescolar*): primary and secondary levels).
 ** Includes postgraduate enrollment
 *** Includes general and technical options
 e=estimated
 Source: SEP (1999)

It is also relevant to know the figures of the educational system in the nearest municipalities to where the UT is based. In the 1997-1998 school year, the municipality of Tula registered 25,217 students, while Tepeji had 16,088 pupils. Table 5.8 presents how these proportions of students were distributed across both municipalities with respect to the whole state.

Table 5.8. Student enrolment by level in Hidalgo, Tula and Tepeji, 1997-1998

	<i>The State of Hidalgo (Thousands)</i>	<i>Tula (Thousands)</i>	<i>Proportion of the state</i>	<i>Tepeji (Thousands)</i>	<i>Proportion of the state</i>
Pre-school	77.7	2.88	3.7%	1.61	2%
Primary	374.6	13.21	3.5%	9.97	2.6%
Secondary	133.4	5.52	4.1%	3.29	2.4%
Vocational school	14.8	0.38	2.5%	0.43	2.9%
Upper secondary	59.5	3.21	5.3%	0.77	1.3%
Higher education	25.6	NA	---	NA	---
Total	685.6	25.2	3.6%	16.07	2.3%

NA=Not available
 Source: SEP (1999) and INEGI (1999a).

3. Income level

Apart from educational disadvantages, Hidalgo also faces income inequalities. Contrary to the State of Mexico, in this region the majority of the employed population is concentrated in the two poorest brackets (see Table 5.9). This case will be very illustrative to identify how economic difficulties affect educational endeavours.

Table 5.9. Proportion of employed population by income bracket in Hidalgo, 1995

No income	16.96
Less than one minimum salary	27.54
Between one and two times the minimum salary	31.27
Between two and five times the minimum salary	18.00
More than five times the minimum salary	4.40
Non-specified	1.83
Total	100.00

Source: INEGI (1999b).

4. Migration. A long-standing phenomenon in Hidalgo

One of the first studies of the relationship between education and national development showed huge regional disparities within Mexico. Myers developed a migration analysis that showed that among the states that lost population through migration were Michoacan, the State of Mexico, Hidalgo, Tlaxcala and Guerrero (1965). While the State of Mexico could mitigate its negative rates of migration, Hidalgo still faces this social phenomenon. This state has a migration balance of -2.2% among young people (15 to 29 years old). So since 1965, Hidalgo has lost more people than it has gained (INEGI, 2000). The problem here is that migrants are commonly the young and educated sectors of society. For this reason, Hidalgo's proportion of people aged between 15 and 29 has tended to decrease.

5. Some aspects of the labour market

Hidalgo has an urban unemployment rate of 2.6%²⁸ and an Economically Active Population (EAP) of 929,836 workers, representing 42% of the whole population. Like the State of Mexico, this region has the same female economically active population (34%), while male workers account for the remaining 66% (STPS: 2000b).

The majority of the economically active population is working in the tertiary sector (41.16%); whereas 22.15% are concentrated in the secondary sector. The proportion of workers in the primary sector is significantly higher than that in the State of Mexico (36.56% and 10.38%, respectively) (INEGI, 1999b). This can form part of the explanation for income inequalities and educational disadvantages. People living in rural areas are generally excluded from stable systems of payment and educational benefits. It can be argued that Hidalgo is the most deprived region of our three case studies.

Table 5.10 shows a considerable proportion of unskilled workers (15.97%) compared to that of the State of Mexico (5.25%). It seems that in Hidalgo, as Myers would say, "disparities that have characterized economic development have characterized human resources development".

Table 5.10. Proportion of employed population by job position, 1995

Employee or workmen	40.33%
Unskilled worker (<i>jornalero o peon</i>)	15.97%
Businessmen or employer	2.43%
"Free lance" (<i>trabajador por su cuenta</i>)	26.82%
Worker without payment	14.15%
Not specified	0.30%

Source: INEGI (1999b).

²⁸ This rate refers to October, 2000.

Furthermore, the number of workers who do not receive payment is significantly higher than that in the State of Mexico (6.45%). Under these exploitative conditions, how can we expect that the UTs will encourage development? This question is addressed in subsequent chapters.

C. The State of Aguascalientes

1. Demography and economy

The State of Aguascalientes is a small region situated in an arid zone in the centre of the Mexican Republic. Economically speaking, Aguascalientes' progress has been remarkable. Its economic growth rate has been 6.8% in the last five years.

The Aguascalientes' population consists of 937,445 inhabitants who are distributed across 11 municipalities (see Map 5.4). Its population represents 0.96 per cent of Mexico's total population.

As in the State of Mexico, the proportion of women in this state is higher (52%) than that of men (48%) (STPS, 2000). 28 out of 100 inhabitants are aged between 15 and 29 and this number is almost equal to the national average (28.8%) (INEGI 2000).

The industrial subsectors that have more impact on the Gross State Product (GSP) are: (a) manufacturing industry (26.6%) and (b) different kinds of services (*comunales, sociales y personales*) (19.3%). One of the strengths of Aguascalientes is the textile industry which has formed its main sector of production. Likewise, *maquiladoras* (assembly plants) represent an important source of employment for locals and migrants.

Map 5.4. The state of Aguascalientes and its municipalities



Source: Taken from INEGI (Web-Site 2001)

The GDP per person in Aguascalientes is the highest of the three regions analysed (Mx\$4,000 to \$4999²⁹) and it falls into the average limits (Mx\$4,311) (*The Economist*, October 28th 2000). However, comparing Aguascalientes' contribution to the Gross National Product (GNP) of Mexico to those in the two previous regions, the proportion of this state is the lowest (1.07%) (INEGI, 1999b).

The industrial subsectors that have more impact on the Gross State Product (GSP) are: (a) manufacturing industry (26.6%) and (b) different kinds of services (*comunales, sociales y personales*) (19.3%). One of the strengths of Aguascalientes is the textile industry which has formed its main sector of production. Likewise, *maquiladoras*

²⁹ Between £275 and £345 approximately.

(assembly plants) represent an important source of employment for locals and migrants.

2. Education in Aguascalientes

Aguascalientes' educational sector has some remarkable figures. Its population schooling average is 8.2, which is above the national average (7.7). Furthermore, in 1999 and it has a low illiteracy rate (5.2) which contrasts with those of Hidalgo and the State of Mexico (15.4 and 6.5, respectively) (SEP, 1999).

Unlike Hidalgo, Aguascalientes has enrolled the majority of its population in upper secondary or higher education levels (see Table 5.11). Furthermore, Aguascalientes has the lowest proportion of population without schooling (5.76%) which contrasts with those percentages in the State of Mexico (7.32%) and Hidalgo (15.81%).

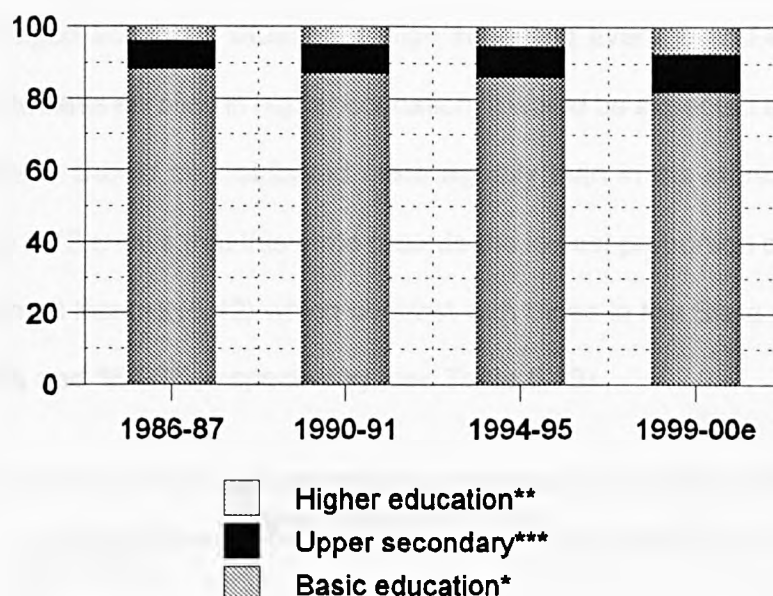
Table 5.11. Distribution of population over 15 years by level of education, 1995
(Percentages)

No schooling	5.76
Uncompleted primary	20.30
Complete primary	20.87
Post-primary education (con instrucción media básica)	23.29
Upper secondary and higher education	29.64
Not specified	0.14

Source: INEGI (1999c).

The common element in the three regions is that enrolment in basic education forms the highest proportion of the educational systems. However, in this case, Aguascalientes has had larger proportions in upper secondary and higher education over time, compared to those in the State of Mexico and Hidalgo (see Chart 5.5).

Chart 5.5. Student enrolment by level in Aguascalientes



*Comprises pre-school (*preescolar*): primary and secondary levels.

** Includes postgraduate enrollment

*** Includes general and technical options

Source: SEP (1999) e=estimated

As was said earlier, Aguascalientes is a small state which is formed by only eleven municipalities. The majority of its population (70%) live in the capital of the state, also named Aguascalientes. Consequently, six out of ten students attend schools in the capital (see Table 5.12).

Table 5.12. Student enrolment by level in Aguascalientes, 1997-1998

	<i>The State of Aguascalientes (Thousands)</i>	<i>Aguascalientes (Thousands)</i>	<i>Proportion of the state</i>
Pre-school	34.2	22.6	66%
Primary	143.7	87.8	61%
Secondary	51.5	32.2	62%
Vocational school	11.9	1.8	15%
Upper secondary	28.0	16.2	58%
Higher education	17.3	NA	---
Total	286.6	160.6	56%

NA=Not available

Source: SEP (1999) and INEGI (1999a).

3. Income level

Having a privileged economic situation, a high schooling average and a considerable proportion of students enrolled in higher education, it would be expected that the income in Aguascalientes should be distributed more equally than in the states of Mexico or Hidalgo. Table 5.12 shows that this state records the lowest proportion of its employed population without income (6.42) which contrast with those in the State of Mexico and Hidalgo (8.37% and 16.96%, respectively) (see Table 5.13).

Table 5.13. Proportion of employed population by income brackets in Aguascalientes, 1995

No income	6.42
Less than one minimum salary	13.20
Between one and two times the minimum salary	32.95
Between two and five times the minimum salary	33.57
More than five times the minimum salary	11.60
Non-specified	2.26
Total	100.00

Source: INEGI (1999b).

Aguascalientes registers the highest proportion of well-paid workers (11.60%) compared with those in Mexico (10.59%) and Hidalgo (4.40%).

4. Aguascalientes. An attractive place to live.

Due to its living conditions and opportunities, Aguascalientes has attracted more people than it has lost. This state has a migration balance of 4.6% of young people (between 15 and 29 years old). This rate sharply contrasts to those of Hidalgo and the State of Mexico (-2.2% and 0.5%). It seems very unlikely that educated people of this state would emigrate to other regions. So we can infer that the UT can achieve its goals of encouraging "juveniles to remain in their place of origin and subsequently take up work there" (SEP, 2000:81). But another question arises from this point: Are the existing social and economic conditions of Aguascalientes contributing to the success of the UT? Do

modern educational models suit modern and prosperous regions? I shall try to address this question in Chapter 10 (see section II).

5. Some aspects of the labour market

Aguascalientes has an urban unemployment rate of 2.1%³⁰ and an Economically Active Population (EAP) of 355,010 workers, representing 38% of the whole population. Like the State of Mexico and Hidalgo, this region has the same level of female economically active population, of 34%, while male workers account for the remaining 66% (STPS: 2000b).

The majority of the economically active population is working in the tertiary sector (56.31%); whereas 28.88% is concentrated in the secondary sector. The proportion of workers employed in the primary sector is 14.61% (INEGI, 1999b).

In labour terms, Aguascalientes' structure marks two differences with respect to the two previous regions. The first is that the proportion of businesses or employers in this state is 4.67%, which is higher than in the State of Mexico (2.6%) and Hidalgo (2.43%). Secondly, while in this region 5.86% of its population is working without payment, in the State of Mexico and Hidalgo this proportion represented 6.45% and 14.15% respectively (see Table 5.14).

Table 5.14. Proportion of employed population by job position, 1995

Employee or workmen	62.22%
Unskilled worker (<i>jornalero o peon</i>)	7.48%
Businessmen or employer	4.67%
"Free lance" (<i>trabajador por su cuenta</i>)	19.04%
Worker without payment	5.86%
Not specified	0.73%

Source: INEGI, 1999c.

³⁰ This rate refers to October, 2000

Outlining the conditions of these three regions makes it possible to analyse how macro contexts influence educational endeavours. So having revised national statistics, it can be said that the states selected share two main characteristics. The first is that the economic activity that most impacts on their respective Gross State Products is manufacturing. The second is that their educational structures follow the same pattern: the highest proportion of pupils are concentrated at the basic levels.

But more remarkable than the similarities were the differences. In Hidalgo just a few workers receive high salaries, in contrast to those received by employed people in the State of Mexico and Aguascalientes, and the proportion of people without payment is alarming. Table 5.15 examines these differences more deeply.

These regional variations are expected to be reflected in the relationship between education and development. So I assume that in more affluent regions such as Aguascalientes, the educational endeavours can be maximized considerably in contrast with Hidalgo's situation.

Table 5.15. Some social and economic indicators of the states selected.

	<i>State of Mexico</i>	<i>Hidalgo</i>	<i>Aguascalientes</i>
Size	Big	Medium	Small
Proportion of the Economically Active Population of the total population	41%	42%	38%
Proportion of population earning more than fives times the minimum salary	10.59%	4.40%	11.60%
Youth migration	Low	Very high	Very low
GDP per capita (Mexican pesos)	\$ 3000-3999	\$2000-2999	\$4000-4999
Two major productive sector	Manufacturing and Comercio (mercantile services)	Manufacturing and different services.	Manufacturing and different kind of services
Education performance	Good	Bad	Excellent
Proportion of population with a upper secondary and higher education level	29.51%	17.59%	29.64%

Having described the main characteristics of the regions where the UTs are situated, it is necessary to analyse the feasibility projects of each institution. This will help us to learn how Mexican authorities thought this educational model would be relevant within a macro

context.

III. The “feasibility” studies of the UTs.

According to the Secretariat of Public Education (SEP, 1991) in August 1990, this institution contracted a private consultancy (*Consultoría y Diseño Técnico*) to carry out a study in order to support the creation of the Mexican UTs. Six feasibility projects were developed: (1) Macro-regional overview, (2) Micro-regional analysis, (3) Labour market study, (4) Educational demand and supply study, (5) An analysis of the socioeconomic expectations of locals, and (6) A study of academic profiles.

These studies are commonly developed once the decision to open a UT has been made. This point can be corroborated in a book edited by the SEP-CGUT and Noriega, (2000), which says that in 2000 six UTs will be opened when, at the same time, viability projects were taking place. Opening a UT is a decision based on agreements between the Secretariat of Public Education (SEP) and the governments of the states. Apart from technical aspects, political factors are also intrinsically involved in the process of creating a UT. The way in which these factors can be compatible with the modern idea of pursuing economic development through higher education raises controversial issues. In this research some contradictory points are outlined in Chapter 6. Meanwhile, it is necessary to examine the technical justifications of our first case study: the UT of Neza.

A. The Technological University of Nezahualcóyolt (UTN)

In theoretical terms, the UTN was created in accordance with its feasibility projects and following the results of earlier studies carried out by the SEP and by the National Autonomous University of Mexico (UNAM) - these studies were not available in the CGUT.

As this research is concerned with the role played by education in development, only three parts of the feasibility studies will be analysed: (1) the socioeconomic situation of the region and the educational expectations of locals; (2) the study of labour market needs; and (3) the analysis of demand and supply in higher education. The results of these reports are summarised in the next sections.

1. Socioeconomic conditions and educational expectations

According to the SEP (1991a), a questionnaire³¹ was applied to 289 households which were selected by the number and demographic characteristics of their members. The criterion was that families interviewed should contain a father, a mother and a young person aged between 15 and 20 years old. The most important findings were:

- ▶ The income average per month of these households was 4.5 times the minimum salary.
- ▶ The majority of parents wanted their sons and daughters to study for a bachelor's degree (e.g., medicine, law), while only one per cent chose a technical career for their sons.
- ▶ Fifty-six per cent of the youngsters interviewed wanted to study for a first degree, while 28 per cent were interested in a technical course.
- ▶ Forty-two per cent of respondents wanted to study with the purpose of obtaining personal and profesional advancement ("*salir adelante*"), whereas 22 per cent desired an economic stability gained through education and 10 per cent saw education as a means of "personal satisfaction".

³¹ This mechanism of data collection was not included as an annex in the feasibility study.

2. Labour market needs

This part of the feasibility project aims at identify the vacancies within the productive sector, and as SEP (1991a) said, 500 questionnaires were applied to those responsible for human resources. Unfortunately, the results of this survey were not shown, so it was not possible to learn the opinion of employers. We should remember that the partnership with industry is one of the key attributes of this "modernist" educational model (using OECD's term).

3. The demand and supply of higher education.

The feasibility study stresses the lack of public higher education institutions in Neza (SEP, 1991a). Prior to the creation of the UT, only five universities provided higher education in this zone. Therefore, policy makers believed that the openness of this academic option would attract many students in this municipality.

When the project started, the Mexican authorities estimated a potential demand that could have exceeded the capacity of the UTN just one year after its creation. However, these estimates were very optimistic and, though the demand has steadily increased, there were big variations between the estimated enrolment and the real enrolment (see Table 5.16).

Table 5.16. Estimated demand and official enrolment in the UTN

<i>Academic year</i>	<i>Estimated</i>	<i>Real</i>	<i>Difference</i>
1990-91	1,975	218	805%
1991-92	2,106	583	261%
1992-93	2,246	867	159%
1993-94	2,396	1,079	122%
1994-95	2,555	1,542	65%
1995-96	2,725	1,491	82%

Source: SEP (1991a) and CGUT (1999:Web-Site)

In 1999, the official enrolment in the UTN reached 2,238 students (CGUT, 2000) which is similar to that estimated for the academic year 1992-1993.

Another point worthy of note is the methodological weaknesses of the feasibility study. For example, when the heads of households were asked about the ideal type of technical career for their sons and daughters, the proportion of "No Answers" was extremely high (91%).

The "feasibility study" should be considered more as a technical requirement rather than a viability test since the UTs are opened independently of the results of a systematic analysis. The following quotation of the Secretariat of Public Education supports this claim when it omits to mention the feasibility projects as a factor in the emergence of this academic model:

Their creation [of the UTs] resulted from a joint-responsibility agreement among the three levels of government -namely, federal, state and municipal - which has enabled these institutions to adapt to local needs and to have a beneficial impact on the development of their zones (SEP, 2000:81).

On the other hand, it is important to bear in mind that the UTN is the closest university to Mexico City where large universities such as the National Autonomous University of Mexico (UNAM); the National Polytechnic Institute (IPN), and the Metropolitan University (UAM) are based. Access to these public institutions has been the subject of constant debate between researchers, policy makers, students and educational authorities since a massive entry of youngsters has been restricted in the name of "quality".

Given these restrictions, it is not illogical to think that these entry constraints can be compensated for new educational options such as the technological universities. For Middleton, some governments have an interest in reducing the pressures that unmet social demands for higher education can bring, thus they seek to avoid an "excess supply

of university graduates with high expectations" (1993:60-61). So, there is a "diversion"³² of students from the most popular institutions to "alternative" educational options.

B. The Technological University of Tula-Tepeji (UTT)

According to the CGUT, this university was created while taking into account "the feasibility projects developed in 1991 and following the direct instructions given by the President of Republic" (2000a:378). The UTT is situated between two municipalities: *Tula* and *Tepeji*, which belongs to the Hidalgo state. Even though the same private consultancy (*Consultoría y Diseño Técnico*, CDT) was contracted for the SEP to advise on the creation of this UT, its feasibility project shows different content, headings, and the results are more carefully presented than in the case of the UT of Nezahualcóyotl.

Apart from the sections on: the socioeconomic situation and educational expectations of the inhabitants; and an analysis of labour market needs and demand and supply in higher education, an important part on the relationship with industry is included in this viability study. Let us analyse each part.

1. An analysis of socioeconomic conditions and educational expectations.

According to SEP (1991b), the sample was formed by 300 households with an average of three members per family: the father, the mother and a young person aged between 16 and 20. The most relevant findings were:

- ▶ The majority of fathers and mothers (78% and 90%, respectively) wanted their sons to continue studying a higher education course. But their preferred option was a first degree rather than a technical one.

³² This term belongs to John Middleton who is known as one of the three leading specialists of the World Bank in vocational education according to Bennell and Segerstrom (1998).

- ▶ Twenty-eight per cent of fathers answered that their sons and daughters needed to study due to the possibility of their personal and professional enhancement (*superarse*).
- ▶ According to 17 per cent of mothers, education was necessary in order to have a "better future", while only 4.3 per cent of parents answered that their sons should study to have a better job.
- ▶ Two per cent of the fathers and 1.3 per cent of mothers interviewed had studied for a first degree, while the majority had only finished primary school.
- ▶ In employment terms, 21.9 per cent of fathers were employed on cattle farms, and the majority of mothers (79.4%) were housewives.

2. The labour study

In accordance with the results of the feasibility study, 76 companies were selected, of which 26 per cent belonged to the textile sector, and 17 per cent to the steel sector (*producción metalúrgica*). Employers were asked about the possibility of collaborating in the consolidation of the UTT. The results show a considerable level of interest from the productive sector (see Table 5.17).

The majority of employers interviewed were interested in participating in this educational effort. Therefore, an acceptable level of co-operation between the industrial and educational sectors was expected. However, a neglected point in this study was the exploration of reasons why employers were interested in being involved in this process.

**Table 5.17. Level of interest of employers in the creation of the UTT
(percentage)**

	<i>Very interested</i>	<i>Interested</i>	<i>A bit interested</i>	<i>Maybe</i>	<i>Not interested</i>
To collaborate in the design of the UT	224	487	92	105	92
To participate with training programmes	224	381	141	145	105
To collaborate in the development of the UT	276	500	40	118	66
To hire TSU ³³ s	329	526	13	66	66

Source: SEP (1991b).

3. Demand and supply in education

The SEP (1991a) argued that the higher education alternatives were non-existent in this area, thus the creation of the UT was essential. The demand estimations of the feasibility study were also very optimistic, as in the case of Neza. In its first school year (1991-1992), the UT expected to enroll 850 students, however, the official data registered only 74 pupils (CGUT, 1999), which meant less than ten per cent of the original estimation.

4. The relationship between industry and education

The link between the productive and educational sectors is a "pillar" of the UT model. This is also known as the relevance of education. The common perception is that in Mexico:

For historical reasons the system generally functions independently of its social context. The relevance of courses can only improve as links with the economy and with society as a whole, are strengthened, in upper secondary and higher education (OECD, 1997:215).

³³ TSU stands for *Técnicos Superiores Universitarios* (technically trained person).

Furthermore, the UT model proposes to include in its governing structure some representatives from the business sector. This is congruent with the modernist vision of education which is summarised in the following quotation.

The "modernist" approach [of education] seeks to be more rational and more efficient, especially in the allocation of resources and the match to labour market needs. The modernists are not opposed to enrolment fees and seek partnerships with business and industry, whereas the populists reject all forms of interference (OECD, 1997:140).

Based on one of the mechanisms used by the manpower planning approaches, the SEP - assisted by a private consultancy - conducted a survey among regional companies and businesses in order to discern the type of vacancies required. The feasibility study of this UT points out that employers should participate in the design of academic programmes, including an analysis of the skills and abilities that TSUs should have; become members of the National Board of the UT system (*Junta Directiva del Consejo Nacional*) and of the Executive Board of the UT (*Consejo Directivo*).

In addition, businessmen should give financial support (e.g. scholarships, grants, etc.) for disadvantaged sectors of students and permit co-operative agreements between company workers and the academic staff of the UT as well as facilitate the access of TSUs to labs and industrial areas in the factories and offer placements. Meanwhile, the UT had to provide facilities to companies for lectures and in developing research projects.

C. The Technological University of Aguascalientes (UTA).

As was said earlier on, the UTA is based in the capital of the State of Aguascalientes, also named Aguascalientes. Like the two previous UTs, this higher education institution was created in 1991 by considering the feasibility study which included: an overview of the socioeconomic situation and educational expectations; an analysis of the needs of the labour market; a study of demand and supply in higher education; and a proposal for

links between the UT and the industrial sector.

Unlike the UTN and UTT, the UTA's viability project justified the creation of this UT in the report of the State Commission for Higher Education Planning (COEPES). This point is quite important because the Secretariat of Public Education (SEP) itself pointed out that:

The SEP does not approve the opening of any new higher education establishments nor the introduction of new programs or careers without their prospective impact on local development first being assessed by the pertinent state commission and the support of a favorable report on its part (SEP 2000:75).

Thus different actors, such as a private consultancy, state commissions, "the three levels of government", and even the former Mexican president (as in the case of the UTT) were involved in the creation of the Uts. These aspects challenge the modernist educational policies which are supposedly based on economic rationales.

1. Socioeconomic study and educational expectations

As part of the feasibility study, 900 people were interviewed in 300 households formed by parents and a young person aged between 16 and 20 years. The majority of mothers (85.4%) were housewives, while 11 per cent of fathers were employed in cattle farms and the remaining percentages in the industrial sector.

As we can see in Table 5.18, most of the interviewees preferred to study for a bachelor's degree than for a higher diploma.

Table 5.18. Locals' preferences for educational options
(percentages)

	<i>Father</i>	<i>Mother</i>	<i>Son</i>
First degree (<i>Licenciatura</i>)	340	341	456
Higher Diploma (<i>TSU</i>)	75	56	77
Technician	32	73	122
Working as apprentice (<i>oficio</i>)	23	53	45
Non-specified	335	460	300

Source: SEP (1991c)

It is clear that the first degree is the most attractive option for the three groups of respondents; and meagre proportions were registered in the technical option (7.5%, 5.6%, 7.7%). Moreover, it is important not to overlook the high percentages registered in the option "Non-specified", which was not explained in the feasibility report.

Education in developing countries has been considered as a vehicle for upward mobility, thus it is crucial to know the reasons given by parents and prospective students for continuing to pursue knowledge acquisition (see Table 5.19).

Table 5.19. Reasons for studying
(percentages)

	<i>Father</i>	<i>Mother</i>	<i>Young</i>
Personal development (<i>superarse</i>)	28.4	30.5	36.0
To be an educated person	10.9	10.6	---
To attain a better job	6.2	13.9	---
To have a "better future"	4.3	5.0	8.2
Other	50.2	40.0	---
<i>Total</i>	100.0	100.0	---

Source: SEP (1991c).

According to their responses, parents and young people perceived education as a factor which would enhance their personal capabilities (*superarse*) or make them an "educated person". It is also interesting to note that 13.9% of mothers wanted their sons to go to school in order "to attain a better job". This proportion of answers is twice as high as that

given by fathers (6.2%).

2. The labour study

In order to obtain a broad perspective of labour market needs, 176 companies were randomly selected, of which 16.5 per cent formed part of the textile sector - one of the strongest sectors in this state - and 16.5 per cent part of the food sector (*alimentos y bebidas*). The majority of these companies were classified as medium enterprises in accordance with the number of employees.

Co-operation between the educational and productive sectors can be demonstrated in different ways. One concerns the willingness of employers to financially support disadvantaged pupils. Table 5.20 reveals this concern.

Table 5.20. Would you like to provide financial support to students (percentages)

Yes	85
Yes, but under certain conditions	250
No	392
Don't know	273
Total	1000

Source: SEP (1991c)

Given that the productive sector is a distinctive factor that should be involved in the UT model, it is interesting that the majority of employers (39%) tended to deny their economic support to students. Let us consider another form of co-operation: hiring educated people in which employers seemed to change their mind (see Table 5.21). These aspects lead us to think in the benefits that employers and students could pursue when cooperation agreements are implemented between the productive and the university.

Table 5.21. At what level are you interested in hiring TSUs
(Percentages)

Very interested	267
Interested	494
A bit interested	34
Maybe	182
Not interested	23
<i>Total</i>	1000

Source: SEP (1991c)

The majority of employers (49%) answered that they were “interested” in employing UT graduates. Chapters 8, 9 and 10 present some of the reasons why employers have employed UT graduates.

3. Demand and supply in education by region.

Unlike Tula, Aguascalientes had seven higher education institutions offering 61 academic programmes when the UT was created. Moreover, the Autonomous University of the State (UAA), a public institution is recognised for its academic reputation. So the people who have selected the UT as a first study choice have acted more “rationally” than those in the two previous cases because their decision has not been influenced by entry restrictions to other public universities or by the lack of educational services. As a result of an adequate supply of educational resources within the state, the demand for UTs should have been expected to be moderate (see Table 5.22).

Table 5.22. Estimated and real demand for the UTA
(Students)

<i>Academic year</i>	<i>Estimated</i>	<i>Real</i>	<i>Difference</i>
1991-1992	949	102	827%
1992-1993	1,069	220	386%
1993-1994	1,043	317	229%
1994-1995	971	337	188%
1995-1996	936	663	41%

Source: SEP (1991c) and CGUT (1999)

As we can see, the variations between estimation and reality are huge. But, as in the previous cases, the educational demand has increased gradually over time.

4. The relationship between the educational sector and the productive sector

Consistent with the feasibility project for the UTT, the SEP also recommended to conduct a survey among regional companies and businesses with the purpose of learning the types of vacancies required. It was proposed that employers would participate in the directive boards of the UT allowing co-operative links between workers in their companies and the academic staff of the UTs. All these assumptions require empirical support in order to discern whether the "modernist" vision of education can be implemented in Mexico.

Conclusions

Having emulated educational models from developed countries, the Mexican government created the UT with the aim of encouraging economic and social progress. Yet this policy transfer process is highly questionable since terrible disadvantages - which require more than educational endeavours - prevail in this Latin American country in comparison to the advanced countries. Within this line of thought, the way in which education should be connected to the economy is also very controversial because human beings are treated as mere instruments of economic growth without considering their capacity to act, to discern, etc. So, human agency is missed under this functional approach.

Apart from philosophical criticism, functional approaches to manpower planning in Mexico possess methodological failures. Following the idea that education brings development, as in rich countries, Mexico's educational planners have been very keen on promoting the UT model of education, though they have neglected the fact that regional disparities significantly influence the educational endeavour. This can be corroborated through a documentary analysis of each region selected.

While in the prosperous, economy and education seem to form a virtuous cycle, in the most deprived region this cycle is not clearly discernable.

Methodological failures were compounded by the analyses of the feasibility projects of the three UTs analysed. In addition, it seems that political factors were inextricably involved in the creation of the UT. This fact challenges the economic rationales behind the modern idea of achieving development through the formation of human capital.

CHAPTER 6

The foundations of the UT model under examination. A qualitative approach.

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The foundations of the UT model under examination. A qualitative approach.

Introduction

As a primary approach to evaluate how the UTs are working to enhance the living conditions of individuals, this chapter aims to present some testimonies from the Mexican authorities about this model of higher education. It is divided into five main parts. The first discusses the way in which a process of development can be triggered by creating higher education institutions. Here, disparate definitions of development are given by UT rectors and civil servants.

The second part analyses the social purposes pursued by the UT model, such as equity. However, the equity criterion - amply heralded by the Mexican authorities - seems to be blurred when structural disadvantages cannot be eradicated. This point is discussed in part three which highlights the necessity of implementing complementary action in order to achieve fairness.

Another key attribute of the UT model is the relevance of education, which is critically examined in part four. As some trends point a reconciliation of vocational education with general education, it seems that some UT rectors possess a narrow vision of what should be a relevant academic qualification. This raises several controversial issues. Therefore, an alternative interpretation of the relevance of education is provided.

The last part analyses another pillar of this model of higher education: the partnership with industry. It can be said here that, in terms of funding, the original goals set by Mexico's government have been unfulfilled after ten years of the UT existence. Regarding the benefits of this liaison, it will be suggested that a complex set of values

and interests are implicitly involved in this relationship. Thus it is necessary to analyse these links by taking into account mutual benefits of both sides, without overstating the role of the representatives of the productive sector which will help us to understand more broadly the relationship between education and development.

I. The pursuit of development

During the administration of the Mexican president, Carlos Salinas (1989-1994), it was said that the transformation of education was an "indispensable condition for modernising the country" (PND 1989:102), that meant to meet the society's demands, to contribute to national development and to encourage a higher participation of the different levels of government (SEP, 1991:11). So the technological universities were, in part, an educational endeavour for attaining that modernization since they will have the capacity of adapting their academic activities to local needs and, "to have a beneficial impact on the development of their zones" (SEP, 2000:81). But, what kind of development does Mexico's government expect? This question will be addressed here through interviews conducted with some civil servants, rectors of the UTs and directive staff.

The General Co-ordinator (GC) of the Technological Universities in Mexico, Mr. Arturo Nava, argued that there was some evidence that the UTs are creating "development". I asked him how this assumption could be proved and he replied as follows:

...when you see abandoned, flat areas which are far away from the city and you establish a UT; the emergence of small businesses can be seen, there are some places...for example in *Campeche* the people of a municipality are providing accommodation for students. This creates development. I am not going to define what I understand by economic development, but to some extent it has been observed, in *Ocosingo*, where the UT is based, it was very difficult to think that there could be drinking water, electricity and phones.

It is reasonable to think that the creation of any school or university will indirectly promote economic activity in certain regions by developing businesses such as bookshops, grocery stores, pubs, newspaper stalls and so on. However, this sector is an indirect

beneficiary of education establishments. What is missing in this quotation is the identification of a set of clues which can reveal whether or not TSUs have enhanced their living standards when they finish their studies.

The Rector of the Technological University of Neza, Roberto Reyes also assumed that the UTs were promoters of development. In a very assertive way, he pointed out that:

Of course that the UT have had an impact on the region! Why? Because they have raised the standard of life of their graduates (*nivel de vida de los egresados*) and this is very important, isn't it? For that reason, I disagree when somebody says that we are creating cheap labour force and we are producing educated people only suitable for employers...so? If this opens up the opportunity for young people of raising their standard of living, they have that right, why not?

Mr. Reyes raised a key issue for our discussion, standard of living, thus he was asked what he meant by this term and how the UT was contributing in this sense. He said that once locals have studied in the UT, they

have other characteristics (*trato*), you can see that they approach life differently to other people (*presentarse*); their way of acting (*desenvolverse*) and they had the chance of...not...remain in...I do not know how to say...in the low status (*bajo estrato*) where they live, they have no options; only as *limpiaparabrisas* (windscreen cleaner).

This rector believes that education has enhanced the personal sphere of graduates to the extent that certain behaviours (e.g. *trato*, *presentarse*) and ways of acting have changed thanks to the technological education. A question arises from the UT rector's quote: Could human capacities be equally improved in another kind of higher education institution? What is important to highlight is the impact of knowledge acquisition, irrespective of its general/academic or vocational/technical orientation. So, the UT also has to be seen as a learning and a socialising space, not only as a square box where human beings are technically trained.

On the other hand, it is worth commenting that the Rector of the UT-Neza stresses the fact that without education, young people from that municipality would have not had any better option than being windscreen cleaners (*limpiaparabrisas*). So, education enhances personal traits and this can be significantly important to human beings in constructing their own destiny.

On the other hand, the Rector of the UT of Tula, Javier Hernández also gives a broader understanding of the impact of the UT on its respective region and on its community. He explained that:

I am sure that the UT has positively impacted on this region. Actually, we have some relationship with the eight nearest municipalities. The UT is recognised as an academic authority (*juez or arbitro*) in environmental technology...the graduates from manufacturing processes, industrial maintenance and electronics are also recognised....With respect to social or cultural matters, we implemented a community programme three years ago which is based on organising workshops every Sunday (*talleres dominicales*). These workshops are free for all and five subjects are taught: theatre, the history of art, literature, music and painting....we have an attendance of 170 persons from different ages to these *talleres* every Sunday, we have elderly people, adults and children who can also have access to the library when we have some terminals with the *internet* which can be used absolutely free. Our aim is to contribute to the cultural enhancement of this region...

Mr. Hernández gauges the impact of the UT through the academic recognition of this university. He focuses on the regional level which comprises municipalities and he stresses the importance of community programmes which have fostered cultural aspects within this region. If one follows Mr. Hernandez's idea of the UT's impact, one sees that development is explained in broader terms than in merely a functional idea of matching technically trained people to the demands of the productive sector.

So, during the interviews conducted with the UT's authorities, disparate connotations of development were provided. Certainly, the impact of education can be measured through the creation of public services, the rising of standards of living, improvements in personal attitudes, the recognition of academic quality and the promotion of culture. However, this

thesis focuses on the way in which a learning space can expand people's achievements, which is closer to Amartya Sen's concept of development.

II. Social purposes of the UTs: Equity through a decentralization process

Apart from the pursuit of development, the UTs are also committed to achieving further objectives. These institutions have had to meet the higher education demand in distant zones of Mexico. Therefore a decentralization process took place. From an administrative point of view, the decentralization and the diversification of higher education³³ has been a remarkable attempt to offer academic instruction to economically disadvantaged young people. But, why has technical education based on short courses been promoted in poor zones? The next quotation of the International Encyclopaedia of Education helps to address this question.

In less developed countries and Western industrialized countries alike, vocationalization of general education to varying degrees was a typical policy response in the late 1970s and early 1980s to the employment problems facing school leavers. These problems have been especially severe in many developing countries where the growth in school enrolments has far outstripped the growth in opportunities for wage employment in the modern sector. By adapting curricula more directly to particular occupations, it was hoped to promote economic development and mitigate unemployment among school leavers (1986: 1439).

As we can see, diversifying education by creating vocational education has four aims, among others. The first is to stop the migration of rural people to urban sectors, secondly to promote economic growth, thirdly to persuade individuals to opt for a technical formation rather than a general education and, fourthly, to reduce the opportunity cost of studying to those young people who cannot "lose" time in schools due to their economic needs. The Rector of the UT of Tula, Javier Hernández illustrates this theoretical idea by highlighting the high opportunity cost of studying for Tula's young

³³ The UTs fall in the category of *Organismo Público Descentralizado* (Decentralised Public Organization) of their respective states.

people. He explained that:

the cost of maintaining the student after two years is a burden for parents; but in a couple of years the students are working with the possibility of continuing their studies (e.g. first degree, specialization)...but there are two years of investing...

Widening the characteristics of the vocational education, Benson comments on the advantages of vocational courses. They are:

(a) the programs are intended to serve people who are seeking to enter the work force at some level above that of unskilled labor; (b) the jobs for which people are being prepared do not normally require applicant to hold a university or baccalaureate degree; and (c) a portion of the training is offered in publicly administered forms of instruction (this characteristic distinguishes vocational education from those forms of on-the-job training that are completely under the control of the employer) (Benson 1987:324).

These theoretical propositions correspond well to the educational policy implemented by Mexican authorities at the higher level. The General Co-ordinator of the UTs, Mr. Arturo Nava points out that:

The creation of the UT had two aims. The first was to diversify the higher education supply with short courses, and secondly..to facilitate access to the labour market for young people after two years of studying...

With the UT model, higher education supply was particularly targeted to the educational demands of the poor segments of the population. This fact has been considered by the General Co-ordinator of the UTs, Mr. Arturo Nava as an "equity" policy. He said that:

another characteristic of the UTs is that they emerged in places where there was no higher education supply. Our young people who were interested in studying at higher education level had to travel long distances, emigrate from their place of origin and, sometimes, they did not have the necessary economic resources. According to the external evaluations of this system, it is revealed that our students are economically disadvantaged people (*clase económicamente baja*) thus we can corroborate here a criterion of equity (*concepto de equidad*). There are higher education options in distant places such as *Ocosingo, Chiapas; Sierra Hidalguense in Zacualtipán; Huasteca Hidalguense, El Valle del Mezquital; Campeche...Costa Grande, Guerrero...Piedras Negras* where there was no university before, so people remain (*se arraiga*) in their places of origin and consequently, young people achieve their goal of finding a job in their *entorno* (locality) after two years of study.

No doubts, young people from distant regions have benefited from the implementation of the UTs. However, there are two issues which require broader investigation. The first is how socioeconomic conditions of context are influencing this "equity criterion" and secondly, why Mr. Nava and, likewise the SEP, assumes that "people remain in their places when they find a job". So, let us address the first question.

III. Structural problems and the educational endeavour

Although the UT model has been spread across Mexico and it is covering 24 out of 32 states, social and cultural problems persist in each region. Mr. Miguel A. Cruz notes that despite the graduates of the UT of Tula possessing relevant academic instruction, naive attitudes prevail which inhibit their access to the labour market. He argued that:

It is very interesting that many [employers] said that the academic formation is good. The main problem expressed is with respect to values: When the young people are interviewed they do not know how to express themselves. They do not know their professional profile, they are afraid to express it openly, they have human relations problems, they have problems selling themselves, they have problems writing a CV. They do not know how to dress for the job interviews. These things are the main criticism from the industrial sector (*los industriales*). In the [psychological] tests they do well, but when they are interacting with their bosses (*jefes inmediatos*) communication problems come out.

These naive attitudes seem closely related to the socioeconomic background of the UT graduates. In this regard, the Rector of the UT of Tula, Mr. Javier Hernández thought that the graduates lack writing skills (*expresión*) and self-esteem and then he explained that:

this is because sometimes, our *jóvenes* come from very poor families where there is low-self-esteem, so it is necessary to empower them (*revitalizarlos*).

As we can see, the lack of writing skills amongst graduates exposes a low cultural capital of the UT students, who tend to come from low brackets of society. Going further in the relationship between low income and personal handicaps. Mr. Miguel A. Cruz, responsible for the Ex-Alumni department of the UT of Tula provides revealing illustrations of this connection.

(Researcher) Based in your interrelation with the UT graduates, which attitudes have you noticed?

(UT authority) What I have observed is that most of them do not have a clear mission. They do not know who they are, where they are and what they want. They need a vision, a mission. But I can say that they have values, curiously, this seems inconsistent with what I said earlier though. They do have values because [for example] when we call them to attend to the UT career service (*bolsa de trabajo*), they do attend.

But basically I see these young people as needing a job orientation...we have to give them some tools about how to deal with an interview, to know how they can "sell themselves", to enable them to market their own abilities (*producto-servicio*).

(Researcher) Does it have any relationship to naive attitudes?

(UT authority) Yes, in fact, the majority of companies where they have done their placements prefer easily manageable (*dócil*) and obedient (*sumisa*) people who will accept the salaries and the policies dictated by the company. This implies that their naive behaviours are reinforced in their placements. This also leads graduates to receive non-negotiated salaries, that is, how can I say; "this what I can pay you and that is all!"...

(Researcher) Does this have any link with their socioeconomic backgrounds?

(UT authority) Yes, absolutely, yes...for one reason; many of our TSUs come to the UT with *diez pesos* [less than a pound] in their pockets; some of them with nothing; if one of those students gets a job with a salary of \$1,500 per month [100 pounds, approximately], they feel rich!

Mr. Miguel A. Cruz helps to identify some links between low socioeconomic background and naive attitudes, which are a "bonus" for some employers who offer low wages despite the fact that they employ graduates. An expression that deserves attention is: "To sell themselves". This kind of function, as Diaz-Barriga (1995) argues, is related to the social and cultural capital among university graduates of privileged families. It is clear that the UT graduates lack this ability.

These barriers should be eradicated through other means, which implies a complex set of strategies in institutional, political and economic terms. It seems that no orientation of education (e.g., liberal, academic, general, vocational, technical) alone can reverse the structural disadvantages of regions.

A. Tackling naive attitudes. Beyond formal education

To overcome the lack of assertive attitudes, the Alumni Office (*Departamento de Egresados*) of the UT of Tula is trying to empower TSUs by implementing extra curricular activities. Miguel A. Cruz explains that he is giving a four hour course every Saturday in order to raise the self-esteem of graduates, which is "another serious issue". He illustrated this point by saying,

when graduates identify a vacancy and read that a requirement is *buena presentación* (good appearance), they automatically relate this to physical appearance and they do not take that opportunity. They become discouraged when they look in the mirror; they presume that good appearance means to have features such as 1.80 metres of height, blue eyes, blond (*guerito bonito*) and reality is not like that, but every Saturday I give this course which is not only focussed on developing job-seeking abilities but also to support those graduates who have lost their jobs [this course is based on] personality issues, how to crack the job interviews, good manners (*urbanidad*), communication skills.

Adapting the curriculum more directly to particular occupations seems not enough to help graduates access the labour market. Personality workshops were required as remedial strategies to facilitate the transition between school and work.

It is also worth mentioning that psychological perceptions such as "*buena presentación*" (good appearance) are a constraint in the process of choosing jobs. According to Mr. Cruz, UTT graduates feel undervalued in physical terms, which leads us to reinforce our assumption that economic calamities are not separate from human, psychological and social factors.

Decentralising higher education is a big step in terms of broadening educational opportunities for economically disadvantaged groups, but fairness should also be achieved by other means which, I insist, rarely depend on the educational policies. So,

We need to be realistic about what education can do and what other changes are necessary to maximize the effects of education and to realize our aspirations for economic and social betterment (Kevin and Kelley, 1997:250)

B. Explaining the lack of recognition of the TSU. Some technocratic rationales

Economic studies of education and development have not given due attention to the social and cultural complexities within particular contexts. From my particular point of view, this may be partially explained due to an emergence of technocratic ideas. George Psacharopoulos is a representative of this movement. His vision of the educational problems is expressed as follows:

Educational planner has been assigned to someone who by formal training is an economist, econometrician, or statistician, rather than an educator. There are several reasons for this tendency. In the first place, the majority of contemporary crisis symptoms in education are economic or financial in nature. Second, schools are immediately affected by the economic environment within which they operate: for example, a booming economy generates more revenue that can be allocated to the education system than does a period of recession. Third, taking a long-term perspective, schools can affect the economic environment itself, for example, by providing qualified personnel and by contributing to the growth of national income (1987:312).

Psacharopoulos is known as one of the most influential economists of the World Bank in education matters. His vision of education has been largely criticised by several authors due to its limited approach (Bennell 1996; Colclough 1996; 1997; Ruiz 1997; Flores-Crespo 2000). Psacharopoulos's approach to solving educational problems has also been spread by organizations such as the OECD. For example, this institution has been very keen in promoting the idea of vocational education for fostering economic growth. In its report on Mexico's educational policies, it was said that:

The effectiveness of a modern economy depends to a considerable extent on its technicians and middle managers: within the North American economic area, the development of these intermediate qualifications may in the medium term represent Mexico's opportunity (1997:179).

Notwithstanding this, the OECD also identified a problem in the opportunities for Mexico's modernization. It adds that:

If intermediate qualifications have not been developed earlier and have not expanded, despite the support they enjoy from many players in the economic sphere, it is no doubt because they come up against a deeper problem: the traditional attraction of the *licenciatura*, which defines the "professional" level (1997:179)

Interestingly the vision of the Mexican authorities is consistent with that of the OECD. Mr. Héctor Tiscareño, rector of the UT of Aguascalientes comments on the traditional features of Mexican society. He thought that the "first, the biggest and unique" problem of the UT model was:

the culture of the parents, the culture of some authorities and of some businessmen which was prevalent for 500 years in which we [ourselves] want to become in doctors, architects, accountants, that is *licenciados*. So, when somebody mentions the *Técnicos Superiores Universitarios* [TSU], a question arises: What is that? I think this is the main, unique and big problem; and this is understandable because there has been a heritage of 500 years in which parents desired that their sons become engineers, architects...This culture should be reversed little by little and this could take some years...

The Rector of the UTA, Mr. Héctor Tiscareño was asked about how this culture could be reversed. That is, where should this change come from? He replied:

basically from the educational authorities in the State and Federal level. There are some authorities who have clearly understood the role of the UT..., here [in Aguascalientes] we have an advantage: employers and the Government have accepted this [educational] model. In contrast there are some contexts where the businessmen have not.

In accordance with the rector's remarks, I would suggest that the acceptance of technical levels by employers is a key factor in explaining why technical educational options have not been promoted in Mexico. The representatives of the productive sector are, in the end, those who hire people and value individuals in accordance with their abilities, skills and attitudes which, apparently, should be related to their diplomas. To support this claim, Mr. Miguel A. Cruz of the UT of Tula recognised that:

We [the UT] are struggling against an ancient perception in which the employers prefer more a *profesionista* (diploma holder) than a *profesional* (professional) due to their [organisational] policies. I put this in pejorative words: technicians are seen as "the shoe" of the engineer and "the helmet" of the workman. Remember that in Mexico, the TSU is under-valued in terms of capacities and abilities...

It is reasonable to assume that if a technician feels "under-valued" by the representatives of the productive sector, he or she will tend to opt for other kinds of studies, such as commonly a B.A. Moreover, institutions or systems for certifying abilities and capacities were absent in Mexico until recent times. Knowledge thus was only guaranteed by a diploma without paying attention to the real qualifications of individuals.

When Mexico's government declared modernization as its main strategy of progress and thus created a development-oriented model of higher education, it assumed that industrial structures would change in the same direction as their desires. But the dream did not come true. Some employers still used traditional methods to reward technically trained people. In this regard, Mr. Miguel. A. Cruz of the UT of Tula pointed out that:

they [employers] usually say, "if they are a technician, they should receive a certain amount"... even, the *tabuladores* [the salary structure by duties and by levels of education] omits the level of the University Technician...[thus] a national promotion for recognising the role of the TSUs is urgently required. The technological universities have been operating for almost ten years. Yet we came across companies that do not know what the University Technician level is.

So, the traditional perception in Mexican society of the technical levels can partially be explained by the lack of acknowledgment from the productive sector. This message can be read by graduates and then they will pursue further education. In this sense, it is important to recognise individuals as agents whose capacity to discern will lead them to the most suitable level of education. I suggest that this perspective can be used to analyse the relationship between education and development instead of the functional approaches which offer a narrow view of individuals.

In Neza, the lack of recognition of the TSUs was also evident. When I asked Mrs. Esthela Maldonado, the person responsible for the Ex-Alumni department, about the reluctance expressed by employers to hire UT graduates, she replied that:

the problem lies in the *título* (diploma); because not all the companies know what the level of *Técnico Superior Universitario* is. They classify it within the level of upper secondary rather than higher education level.

What is noticeable is that the UT model has been operating since 1991 and it has not changed this perception. Why is that? Because the labour market rules still operate traditionally. This shows that in modernising a country through education, radical changes have to be also promoted among the representatives of the productive sector. In this sense, the rector of the UT of Tula, Mr. Javier Hernández, pointed out that:

in PEMEX (National Oil Industry) and the CFE (National Electrical Industry) fill their jobs vacancies through the trade union. So they cannot admit our TSUs.

Institutional arrangements are required in both sectors, public and private, in order to create relevant development-oriented models of education. Labour law restrictions and unfair selection processes confirm, again, that education cannot do it alone. Supplementary conditions in labour terms should be promoted and implemented. In this vein, Foster argues that:

Those factors which really give the impetus to early economic growth are far more subtle than the proponents of vocational education suppose. We would suggest that the crucial variables lie, instead, in the structure of incentives within the economic system and in the degree to which the institutional milieu is supportive of entrepreneurial activity. Without such a milieu no amount of vocational instruction can be effective since the skills acquired will not be utilized (1987: p.364)

I support Foster's argument and I would add that a holistic view of the relationship between education and development should be promoted in order to identify beliefs, values, inequalities, injustices and lack of opportunities within the complex environments

of the developing nations.

But, surprisingly, UT authorities still remain remarkably reluctant to accept that young people still want to study for a B. A. The General Coordinator of the UTs did not accept that there are a high number of UT graduates wanting to study for a B.A. He said that,

the percentage of graduates who want to go on with their first degree is not high. In accordance with our follow-up report only 3.8% out of 12,000 graduates up to September 1999, only 3.8% wanted to study *licenciaturas*.

This assertion is questioned by our data which shows that in Neza and Aguascalientes, 90% and 82% of respondents, respectively, desired to become bachelors. It is worth noting that in Tula, the most economically disadvantaged region of our three cases, 96% of respondents wanted to study a B.A, for two main reasons. The first is the possibility of attaining a better job (41%) and, the second is that the BA would help them to acquire more knowledge for their jobs (40%). So, once graduates perceive the restrictions dictated by the labour market, most want to achieve higher qualifications in order to get more challenging jobs.

Rather than a failure of the UT model, I would argue that this is a positive effect gained through UT education because, even when UT graduates come from low socioeconomic levels, they intend to study more in order to improve their personal and professional situation. In fact there is some evidence to show that young people from low socioeconomic brackets underestimate the levels of education required for occupations as well as the pay-off of higher levels of schooling (Nunez and Roazzi, 1999, see also Duncan Campbell in *The Guardian*, 25/08/01). It could be argued that the UTs encourage people to start a lifelong learning process.

Mexican authorities seems to confuse causes (lack of rewards in economic and social terms) and aspirations (social and economic advancement) with "symptoms" (cultural signs) of most people wanting to become *licenciados* rather than technicians.

The desire of graduates to go further in their studies seems justified. This should not be confused with the cultural distortions of Mexico's society or with a simple whim. It is necessary to avoid technocratic perspectives and to think more broadly concerning people's aspirations. To support this, Foster argues that

Aspirations of parents and students are largely determined by the individual's perception of opportunities within the exchange sector of the economy, destinations by the actual structure of opportunities in that sector. The nature of educational instruction has little to do with the process, and the schools are unfairly criticised for creating a condition for which they have not been responsible -except insofar as they turn out too many graduates (1987:362)

Another issue related to the functional idea of "knowledge for development" is the relevance of education, thus it deserves a careful analysis.

IV. The relevance of education. Towards a different understanding.

Relevance is one of the core issues in the relationship between development and education. Although this term could refer to the wider perspectives of academic instruction, because "above all, schools will be most relevant when students acquire the tools for lifelong learning" (Bowman, 1987:305), it is commonly used by modernist reformers of education such as international organisations like the OECD or the World Bank.

In Mexico, the relevance of education implies the establishment of strong links between education and the industrial sector. This idea has been intensively promoted during the recent times of the 1980s and 1990s although similar have been made during the whole 20th century (Villa, 1997). In its *Reviews of National Policies for Education in Mexico*, the OECD stated that:

For historical reasons the system generally functions independently of its social context. The relevance of courses can only improve as links with the economy, and with society as a whole, are strengthened, in upper secondary and higher education. There is a need to ensure that all sectors of economic and social life, not only larger firms, are associated (1997:215)

Therefore, this international organization recommended that

- ▶ Representatives from the economic and social spheres should sit on the various instances of higher education institutions.
- ▶ Curricula should be defined in co-operation with business and industry
- ▶ Institutions should be encouraged to carry out work, such as studies, research, projects, continuing education, etc., on behalf of companies.
- ▶ Work experience training should be introduced for students as part of the curriculum, with companies being offered a financial incentive to take on trainees (OECD 1997:215)

Business participation, industry-oriented curricula, and work experience training are strategies that the technological universities have adopted as distinctive elements of their educational model. It has been assumed that these connections are factors which trigger the local development of the areas where the UTs are established. The Rector of the UT of Aguascalientes gave us his understanding of the relevance of education. He said:

la pertinencia [the relevance] should ensure that graduates attain a job in accordance with the academic formation. This seems logical in any international educational context, but in Mexico it was not like that, the universities were manufacturers of unemployed people...so, the UTs were created based on a model which is very new...and to some extent, I think, we are meeting the needs of a specific market, which was unsatisfied in the past, by forming *profesionistas pertinentes* (relevant professionals), that is, when a manufacturing engineer is employed in production areas; a TSU in industrial maintenance is working in that area...there is nothing worse than an unemployed or underemployed graduate doing activities for which they were not educated; an accountant who is working as a salesman; or a medical doctor in another area.

Following this quotation, it can be said that this attribute of the UT model seems very narrow because is merely concerned with a mechanical relation between school and work. "Matching people to jobs is not a straightforward matter", as Alpin *et al* have argued (1998:18). Bowman (1987) also criticises the rigid definitions of the relevance of education and he argues that making the content of the curriculum too narrowly vocational can be dysfunctional for students. So, if universities teach tight skills, sooner or later individuals will acquire limited abilities. To avoid this, Skilbeck *et. a/* suggested that:

training for a specific occupation or even clusters of occupations is being supplanted by strategies for generalizable skills or general transferable education (cited in Tabbron and Yang, 1997:330)

Misinterpretations of the relevance of education threaten the potential abilities that may facilitate access to the labour market. For this reason, a wiser concept and application of the relevance of education in the UT model should be developed.

In order to understand more coherently the concept of relevance, the UT authorities were asked about this concept. The General Co-ordinator of the Technological Universities in Mexico, Mr. Arturo Nava, said that:

it has been proved that during long careers the knowledge becomes obsolete, on the contrary, if we design short courses which can be revised every three years, we can have a relative assurance that the relevance (*pertinencia*) of education is adequate for the UT context.

To think in terms of "adequate education for the UT context" implies a vast regional knowledge and a sophisticated methodology to trace socioeconomic trends and changes within particular zones. Education rarely is capable of preventing such changes and it usually begins to adapt to the new conditions. According to Mr. Miguel A. Cruz of the UT of Tula, in this region, graduates have been employed in the cement plants and in textile industries, but:

this happened when the UT began their courses. I can say that between 1993 and 1996 there was good access of graduates to these sectors. Once we filled these niches, we "got results" in other productive activities which were farther away from our context (*entorno*) for instance, electronics enterprises of Mexico City, the motoring industry, the mechanics industry (*metal-mecánica*), the painting industry, the paper industry which are based in The State of Mexico and on the other side, the niche settled in *San Juan del Rio, Queretaro, San José Iturbide...*

As labour opportunities are limited in certain areas, it is logical that educated people tend to migrate to more affluent zones. This claim is supported by our data collected through questionnaires and interviews. In Tula there is a higher propensity of graduates to leave their locality and settle in the regions mentioned by Mr. Cruz. A question emerges in this respect: Does the relevance of education fail in Tula? If we think of the relevance of education in narrow terms or mechanical relations, it does, but if we consider that the UT equipped human beings with the relevant skills which enabled them to migrate and then look for better prospects, it does not. But, before going on, it is necessary to make clear that while migration is a phenomenon that hampers regions and countries, its solution lies in other state policies in which education plays only a limited role.

So, I would argue that the relevance of education should be sought outside of macro structures and more attention should be given to the functionings (to borrow from Sen) that is, what individuals can do. The curriculum should transmit academic content that allows graduates to acquire and apply their expertise everywhere.

From my particular point of view, it is more helpful (and easier) to educate individuals with relevant capacities than to try to follow economic changes in broader contexts. Skilled and able individuals can move from one context to another and thus their knowledge can be transferred from one region to another. Otherwise, the modern idea of relevant education can be ephemeral, as it is currently in Tula.

V. The partnership with industry. Funding and mutual benefits

During the creation of the UTs, one of the characteristics most trumpeted was the capacity of this educational model to work hand-in-hand with the local enterprises. So, cooperation agreements should be developed in order to trigger regional "development". This section analyses, through the interviews with the UT's authorities, what objectives of this liaison have been achieved.

A. Funding issues

According to the OECD there are two visions of higher education: the modernist and the populist. In the former, its proponents are "hostile" to the idea of enrolment and tuition fees, while in the latter proponents are not opposed to enrolment and fees (OECD 1997:140). So, adopting the modern model of education implies changes in funding. As was said earlier, the UT model is based on this vision of education thus these institutions charge tuition fees to their entrants though they are able to receive loans or grants. The SEP proposed to the UTs a "funding paradigm" which is shown in Table 6.1.

Table 6.1. Sources and distribution of funding proposed to the UT model

Tuition fees	25%
Contribution of the productive sector (public and private)	25%
Funds from the state government (plus municipalities' government)	25%
Fund from the Federal Government	25%
TOTAL	100%

Source: Sep (1991).

It can be said that the two first sources of financing (tuition fees and the productive sector's contribution) should be considered as the UT's own income, which sums 50%. In order to contrast this proposal, Table 6.2 shows the evolution of the "funding paradigm"

in the three UTs selected.

Table 6.2. Sources and distribution of financing in the three UTs by year

	UTN			UTT			UTA		
	92/93	93/94	94/95	92/93	93/94	94/95	92/93	93/94	94/95
Federal subsidy %	53	45	45	61	48	48	37	33	41
State subsidy %	34	44	42	35	49	48	58	60	51
Own income %	13	11	13	4	3	4	5	7	8
	100	100	100	100	100	100	100	100	100

Source: CGUT-SEP in Villa (1997)

Historical data shows a meagre proportion of UTs' own income in relation to the total budget in the three UTs, and only in the UTA was a growing tendency observed. What is unclear is whether this increase was due to a top-up in tuition fees or greater participation by the productive sector. The UT of Aguascalientes charged Mx\$506 (£34 approximately) per month in tuition fees in 2000. When I asked the rector of this university about the current proportion of the UT's own income, he vaguely answered:

I do not have that information; but we are on the right path. In the long term (*el día de mañana*) the UT may generate a third of its total budget, however this will depend on how we are working with the productive sector, to whom it is necessary to sell education, sell training, technical assistance, this would be very healthy in financial terms.

In the case of the UT of Neza, Mr. Arturo Nava said that its own income in 2000 represented 20% of its total budget. If we compare this percentage with that shown in Table 6.2, an increase of 7 points in relative terms since 1995 is registered. But in this case, it is worth saying that the considerable difference between the UTN's own income and the other two UTs is explained by the fact that the UT of Neza is renting out a stadium within its campus.

Although the UT of Tula has also raised its own income by 11 points since 1995, the Rector of the UT of Tula, Javier Hernández, accepted that its financial goals were still

unfulfilled.

As noted above, it is not possible to identify if the increases in the UTs' budgets come from students' contributions or from the productive sector's endowments. We should remember that tuition fees is a very sensitive issue in Mexico's educational system. Like Britain,³⁴ this Latin American country is still debating who should pay for education and what are the equity implications³⁵ of these measures. A relevant point for our discussion is that, despite the fact that UT entrants come from low economic brackets, they are willing to pay tuition fees. This may be partially explained by the strong reliance of Mexico's society on education. In this respect, the *Observatorio Ciudadano de la Educacion* (OCE, 1999c) remarks that despite the economic crisis of 1994 which increased the inequality in income distribution and affected the majority of households' incomes, the lowest income groups maintained and, even more important, increased their expenditure on education by two percentage points from 1994 to 1996. Logically, as OCE says, poor households might re-allocate or cut resources in other services or goods such as food, clothes or entertainment to keep their education expenditure at a steady level. Now, let us move on to discuss whether or not businessmen also trust in educational benefits, as Mexicans from the most deprived households do.

B. The employers' participation in the UT activities. Who wins?

As the decentralisation of higher education took place, the monopoly of the Mexican state in the educational sector began to decrease. One of the advantages of this process is that "a greater degree of democracy is enjoyed by the participants in the decentralized administration process" (International Encyclopaedia of Education, 1986:1318). In

³⁴ See *The Times Higher Education Supplement* 12/01/2001 and 23/02/01. In the latter supplement one can read warnings such as: "Higher education cannot meet society's aspirations without more money" (Sir Williams' Report).

³⁵ The imposition of increased tuition fees in the National Autonomous University of Mexico (UNAM) led this institution toward its longest student strike.

accordance with this idea, Finlay (1998) identifies several participants, also called “stakeholders”, who are strongly related in the formulation and the implementation of Vocational and Education and Training policies (see Table 6.3).

Table 6.3. Examples of the VET stakeholders

<i>Individuals</i>	<i>Institutions</i>	<i>Government</i>	<i>Employers</i>
Students	Universities	Central government	Multinationals
Pupils	Colleges	Local government	Small/medium enterprises
Trainees	Schools	Individual government departments	Public sector
Parents	Training organizations	Government-sponsored administering bodies	Private sector
Lectures	Trade Unions	Political parties	Employer’s federations
Teachers	Examining bodies Professional bodies		

Source: Finlay (1998)

In this part we are concerned with a key stakeholder in the UT model: employers. How are businessmen participating with the UTs? Are they funding projects? What can we learn from this relationship between the productive sector and the educational sector? These questions are addressed through the in-depth interviews conducted with the UTs’ rectors.

The Rector of the UT of Neza, Roberto Reyes, was asked about the participation of employers in the UT budget. He replied as follows:

The main financing comes from the Federal Government and the State Government, the former gives 50% for the costs of operation and the latter the rest. The Federal Government gives the initial investment for installations, equipment, etc. The *empresa* (business sector) does not give money directly, however I am developing a study aimed at quantifying. When a company receives a TSU during the placements, the *empresa* appoints a supervisor...who invests time in the guidance of our students while being paid by the company, so from this viewpoint I consider that the *empresa* is contributing (*aportando*), though it is not money. If one quantifies the time in hours invested by the supervisor in the relationship with our student, I think that the company is also contributing.

Companies, as Mr. Reyes says, are contributing with supervision time to strengthen the relation with the UT. No money is given directly nor are there cooperation agreements. Meanwhile, in the case of the UT of Tula, its rector expressed a similar idea of the benefits received by the UT from the productive sector. Mr. Hernández pointed out that:

we cannot demand too much from the businessmen (*empresarios*) because at this moment, have no monetary resources as a consequence of the devaluation in 1994. Some of them are recovering from that crash; so the programmes and projects of cooperation between the UT and them are not a reality yet. We are still working on that apart from that, businessmen have "opened their doors"; they have relied on us (in the UT), this is very remarkable. Why? Because they put their means of production in our teachers' hands and in our TSUs' hands. Most of the time, this is difficult due to their suspicion in terms of intellectual property; so they have relied on us and this is a great honour! First, they permit us to visit their plants; secondly, students have been accepted for their placements; thirdly they appoint a person responsible for supervising the work of the students during the placement. This is a waste of time for them, despite students solving companies' problems, but anyway, it is not easy to appoint a worker to supervise a student, they have relied on us. They also allowed their workers to teach in the UT...this is a *gran vinculación* (remarkable relationship). This means money in spite of the fact that is a qualitative effort in this sense, we are speaking of a significant amount this is extremely important.

Although it is certainly fair to recognise that it is difficult to find placements for university students anywhere, expressions such as "We cannot demand too much from the *empresarios*", "They have relied on us", "They allowed their workers to teach in the UT", "They put their means of production in our teachers' and students' hands", and "This is a great honour", tend to exaggerate the role of the *empresarios* to the extent that this does not recognise the benefit to the productive sector of having students from the technological university. I would say that the partnership between university and industry should be understood as a complex system of interests and mutual benefits. If the

students are benefiting from industry's support, so do companies. For example, Mr. Héctor Tiscareño, Rector of the UT of Aguascalientes, underlined the "profits" gained by the employers through the industry-university relationship. He explained that:

there is a weak exchange between the businessmen *and* the university and vice versa because we have focused on the placement in which most businessmen are interested. [They] employ (*ocupar*) people who have good capacities (*buena capacidad*) for four or five months at a low cost (*les cuesta poco*).

To think about the industry-university relationship simplistically may lead us to overlook the complex set of interests involved in this partnership. As an illustration of this claim, the Rector of the UTN, Roberto Reyes pointed out that:

What is distinctive is that they [TSUs] are disciplined young people who work very hard (*le meten ganas*); they are not demanding persons (*jóvenes exigentes*). They do not think in the sense that "if you do not pay me this [high wages], I do not work". They are hard working, this has been very valued by employers.

According to the view of the Rector of the UT of Neza, it is a benefit for employers to have "disciplined" and non-demanding people who cannot protest about being poorly paid. This may be related to the precarious socioeconomic and cultural conditions in which UT graduates usually live. So, they might accept a low-paid job as this situation opens up a possibility for going up in the ladder of modern employment. In this case, employers can take advantage of this deprivation.

Conclusions

In spite of the UT model having adopted a "modern" focus of education which should foster economic growth, there is no consensus among UTs' authorities about how these institutions impact on the economic structure of their respective regions. Rather, what is clear is that education cannot easily eradicate structural disadvantages such as ancient labour laws, the relationship between naive attitudes and poor socioeconomic backgrounds, and traditional recruitment and selection processes.

The labour market is one of the main responsible for the lack of recognition of the University Technician level (TSUs), despite the acute cultural perceptions of Mexico's society. As UT graduates know how the employment system really works, they react by studying further education in order to improve their living conditions. This questions the functional idea that Mexico's economy needs technicians for its modernization.

As a narrow definition of the relevance of education is permeating the UT system, a broader understanding of this idea was proposed. If the knowledge acquired by the graduates can be applied everywhere, then the UTs' education will be relevant irrespective of the area of study or specialization.

During the interviews with the directive staff of the UTs, it was found that the liaison between university and industry has not achieved its original goals in terms of funding. In addition, I suggested that this partnership should be analysed critically in order to objectively identify mutual benefits for the partners. To overlook this fact obscures the analysis of the relationship between education and development.

CHAPTER 7

**The benefits of studying at
UTs. A quantitative approach**

Chapter 7

The benefits of studying at UTs. A quantitative approach

Introduction

This chapter presents the empirical results obtained through the application of questionnaires to 717 graduates in the three regions selected. It is divided into four main parts. The first depicts the general characteristics of the samples used for this research in each UT. Has the UT model met the expectations of youngsters? Do they have further aspirations as professionals? These questions are addressed in the second part. It is demonstrated that the traditional perception of education as a means of social mobility is independent of modern models of higher education. The third part argues that the socioeconomic background of the graduates follows the same pattern as their respective region in economic terms. This is a remarkable departure point from which to investigate how education works within particular contexts. The last part analyses two key issues: employment and unemployment among the UT graduates. Here, significant changes in earnings and job positions over time are stressed. Despite this, it was found that structured information limits, to some extent, how education functions within the development process. Thus this part will be integrated with the analysis of semi-structured interviews presented in chapters 8, 9 and 10.

This chapter finishes by concluding that education is not a panacea for eradicating social and economic inequalities: supportive conditions in the macro context are urgently required.

I. General characteristics of respondents

A. The UT of Neza. An urban profile

Four hundred and fifty one questionnaires were put to employed and unemployed graduates (n=451) during the First Ex-Alumni Meeting on the 12th August 2000 with the aim of broadening the vision of the TSUs' conditions in social and economic terms. According to the Ex-Alumni Department (*departamento de egresados*), the total number of graduates to September 2000 was 3,579. Thus, the sample taken for this research represents 12.6 per cent of the whole population. The sample of graduates was balanced in terms of gender, while the majority of respondents were single with an average age of 23 years (see Table 7.1).

Table 7.1. General characteristics of the respondents and the whole population in Neza

Sex		
	<i>Sample</i>	<i>Population*</i>
Female	225 49.89%	1770 49.5%
Male	225 49.89%	1809 50.5%
NA	1 0.22%	---
Marital status		
Married	106 23%	NTA
Single	327 73%	NTA
NA	18 4%	---
Average age of the sample: 23		

* Source: *Departamento de egresados*, UTN.

NA=No Answer

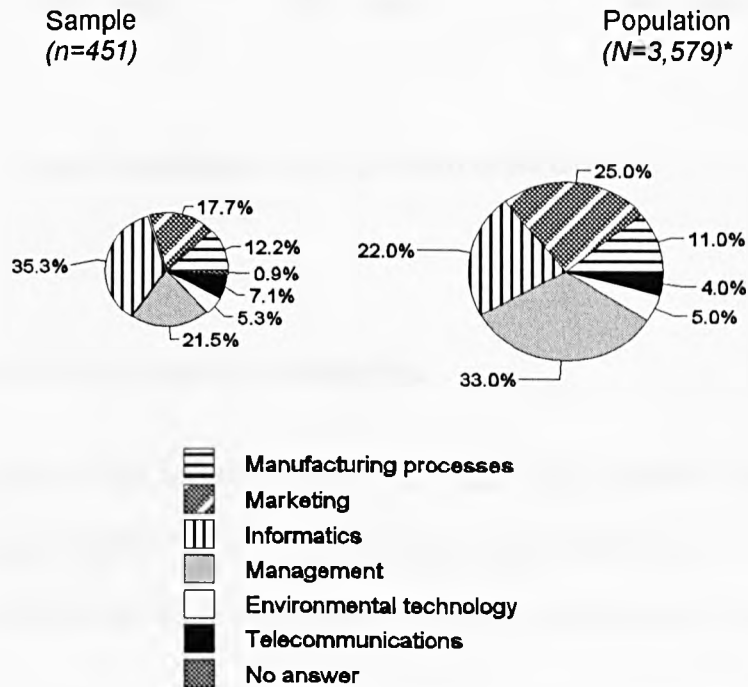
NTA=Not Available

To date, there have been twenty generations (*generaciones*) of graduates (*egresados*), divided into six careers: (a) Management, (b) Marketing (*Comercialización*), (c)

Informatics, (d) Environmental Technology (e) Telecommunications (*Telemática*) and (f) Manufacturing Processes (*Procesos de Producción*).

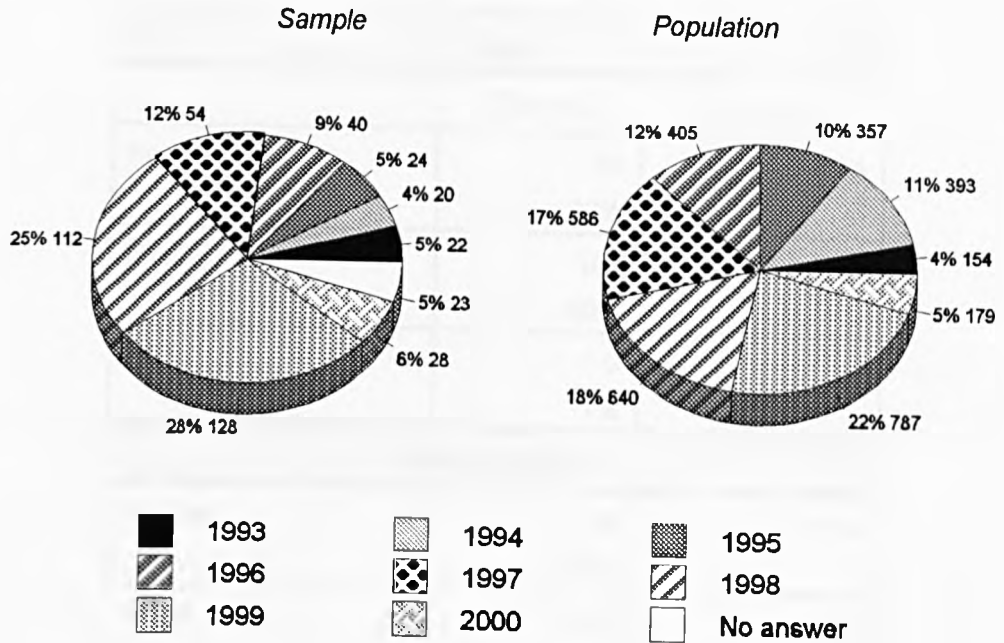
The sample of interviewed graduates comprised the six careers offered in the UT, and all generations (see Chart 7.1 and Chart 7.2). The number of graduates varied in accordance with career. It is necessary to take into account that careers such as Management, Marketing (*Comercialización*), Informatics and Manufacturing Processes (*Procesos de Producción*) were created in 1991, while Environmental Technology and Telecommunications (*Telemática*) began to be taught in 1994 and 1996, respectively.

Chart 7.1. Proportions of sampled graduates by career in Neza



*Source: Departamento de Egresados of the UTN.

Chart 7.2. Proportion of UTN's respondents by year of graduation



Source: *Departamento de Egresados* of the UTN.

B. The UT of Tula. Approaching inequality.

According to the CGUT (2000a) in the UT of Tula, 1,528 students have finished their studies. They are divided into five careers: (a) Industrial Maintenance; (b) Manufacturing Processes; (c) Environmental Technology; (d) Accounting; and (e) Electronics.

For this study, 177 questionnaires were applied (n=177) to employed and unemployed graduates during the First ex-Alumni Meeting on the 21st July 2000. This number represents 11.5 per cent of the whole population. The general features of the UTT's respondents are shown in table 7.2.

Table 7.2. General characteristics of the UTT's respondents and the whole population

Sex		
	<i>Sample</i>	<i>Population</i>
Female	69 39%	NTA
Male	106 60%	NTA
NA	2 1%	---
Marital status		
Married	36 20%	NTA
Single	137 77%	NTA
NA	4 2%	---
Average age of the sample: 22		

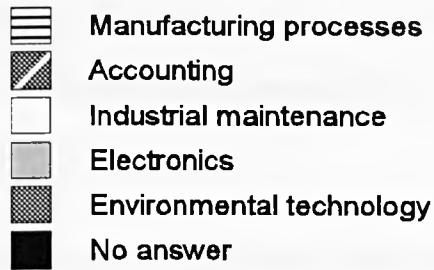
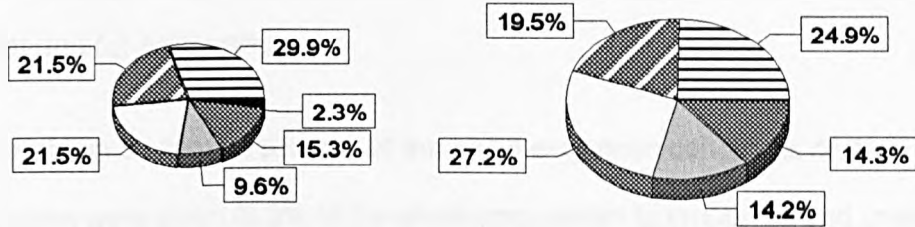
NA=No answer
NTA=Not available

In this case, the sample of graduates was also distributed across the five careers taught in the UT and all generations (see Charts 7.3 and 7.4). The variations in the number of students interviewed are explained by the time of creation of each career. For example, Industrial Maintenance and Manufacturing Processes have been taught since 1991; in 1994, Environmental Technology was created and Accounting and Electronics began to be taught in 1995.

Chart 7.3. Proportions of graduates by career

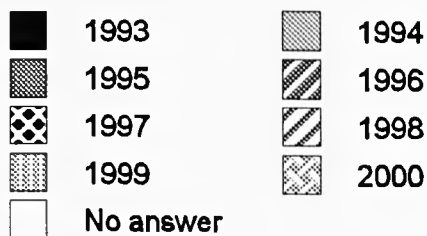
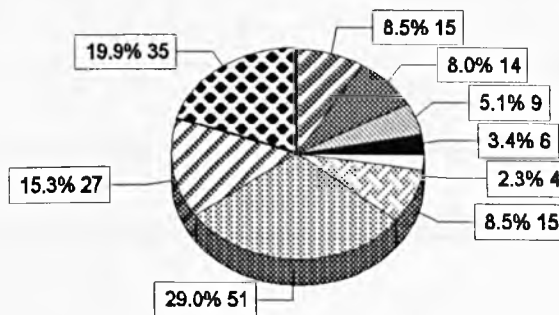
Sample
(n=177)

Population
(N=1,233)*



*Source: Departamento de egresados.

Chart 7.4. Percentage of the UTT's respondents by year of graduation



C. The UT of Aguascalientes. A case in the central part of Mexico

According to UT of Aguascalientes (2001), there are, to 2000, 1,395 graduates enrolled in seven careers: (a) Management; (b) Industrial Maintenance; (c) Manufacturing Processes; (d) Informatics; (e) Marketing (*Comercialización*); (f) Management Information (*Ofimática*) and (g) Accounting.

In order to obtain an “ample picture” of the socio-economic conditions of the TSUs, 89 questionnaires were given (6.3% of the whole population) to employed and unemployed graduates at different places and times. The first application was during an academic event especially organised for UTA’s graduates on the 5th August 2000. However, owing to low attendance, graduates were reached in their offices, houses and at the UT during August and September.

As in the two previous cases, the majority of respondents were single and the proportion of men was slightly higher than that of women (see table 7.3).

Table 7.3. General characteristics of the UTA’s respondents and the whole population

Sex		
	Sample	Population*
Female	40 45%	656 47%
Male	48 54%	739 53%
NA	1 1%	---

continues...

Marital status		
Married	21 24%	NTA
Single	66 74%	NTA
NA	2 2%	---
Average age of the sample: 24		

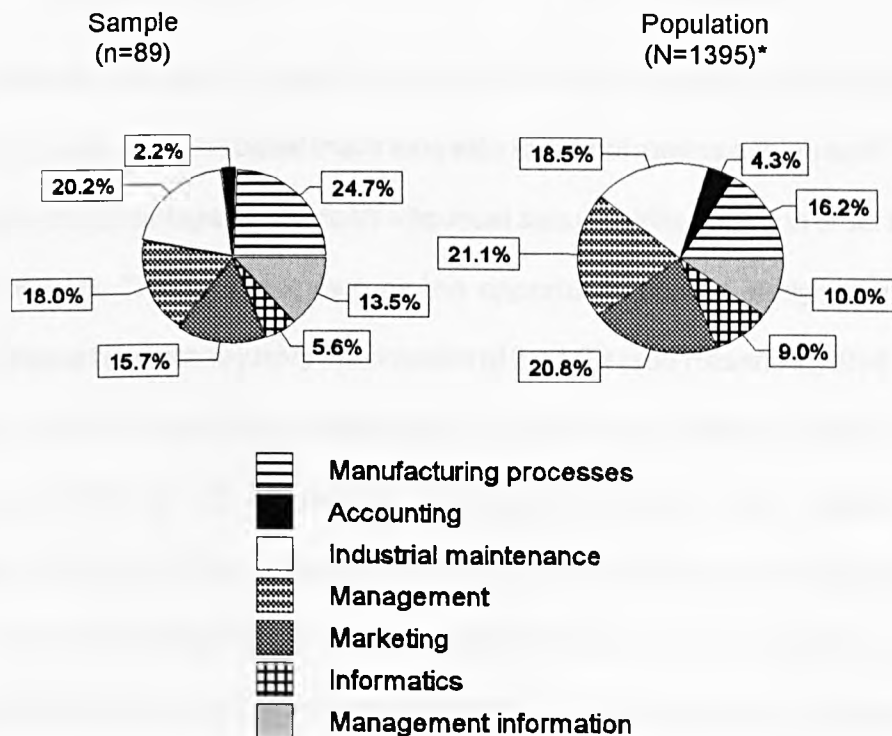
*Source: *Reporte de egresados* (UTA 2001)

NA=No Answer

NTA=Not Available

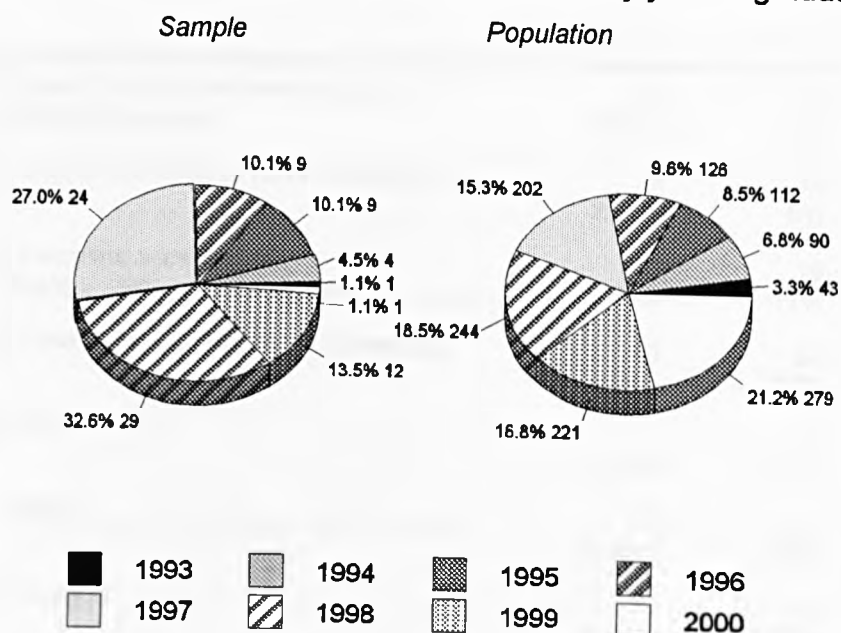
The 89 respondents were selected from the seven academic programs taught in the UT and from all generations (see Chart 7.5 and Chart 7.6). In its first year, the UT offered only three careers: Management, Industrial Maintenance and Manufacturing Processes. In 1992, Informatics began to be taught; in 1994 Marketing (*Comercialización*); in 1995 Management Information (*Telemática*) and Accounting in 1997.

Chart 7.5. Proportion of graduates by career in the UTA



*Source: *Reporte de egresados* (UTA 2001).

Chart 7.6. Percentage of UTA's respondents by year of graduation



Source: *Reporte de egresados* (UTA 2001)

II. Expectations and aspirations of the UT graduates

As argued earlier, educational options based on short periods of study such as at the UT, are commonly related to the belief that a long stay in school means a "high cost" for those economically disadvantaged individuals who must acquire skills quickly in order to access the world of work. This is also known as the opportunity cost of studying which was, indeed, a means by which to justify the creation of the UTs (see Resendiz, 1998 and SEP 1991). So, in order to know to what extent the UT model was suitable for students in each region and whether or not the cost of studying was crucial in the selection of an educational option, I sent a questionnaire which identified some reasons for studying at the UT. The results presented in Table 7.4 support the assumption that in the UTN there are indirect factors affecting the student's decision for selecting these universities, apart from the opportunity cost.

Table 7.4. Reasons for studying at UT?

	UTN	UTT	UTA
a. Due to the convenience of short academic courses	137 30.88%	72 41%	58 65%
b. Due to the need to have a job quickly	12 2.66%	15 8%	5 6%
c. I was not accepted at: UNAM___IPN___UAM___Other_____	152 33.70%	19 11%	5 6%
d. I wanted to acquire more knowledge	81 17.96%	52 29%	14 16%
e. Don't know	4 0.89%	4 2%	1 1%
f. Other_____	47 10.42%	11 6%	5 6%
No answer	18 3.99%	4 2%	1 1%
Total	451 100%	177 100%	89 100%

The majority of the graduates in the UTT and UTA decided to study in the UT for the “convenience of its short academic options” (41% and 65%, respectively). It is interesting that the proportion in the latter case is higher even though in this region graduates have a better economic position than their counterparts in Tula (as discussed in chapters 5 and 6).

In the case of the UTN, it is worth noting that, while the difference in relative terms is minimal, more students picked up the UTN as a “second choice” (33.70%) than those who selected this university due to its “short academic courses” (30.88%). This can be explained as a consequence of the low acceptance in public universities such as the UNAM (National Autonomous University of Mexico), IPN (National Polytechnic Institute) and the UAM (Metropolitan University). Though the type of curriculum differs, this finding corresponded well with some theoretical propositions raised by Middleton *et al*:

Vocational schools became second-choice options for academically able and often economically privileged students in places where there were not enough academic secondary schools to accommodate everyone (1993:38).

So, given a shortage of available places in the major universities of Mexico City, the UT of Neza has become in an "escape valve" for the growing demand for higher education.

Another finding worthy of comment is that, although students generally come from low income levels, a low proportion of respondents (UTN=3%; UTT=8%; UTA=6) attended UTs "due to the need to attain a job quickly". This fact reveals, through the questionnaires, that UT graduates valued education as a means to achieve not only economic benefits but also non-practical achievements.

In Mexico, education has been one of the most important social policy concerns, especially during the post-revolutionary epoch (1920-1970). The idea of education as a means for social and economic mobility has strongly permeated Mexican society. In accordance with the Mexico's Constitution, which was enacted in 1917,

Education aims to produce critically-minded, thoughtful, patriotic citizens capable of changing their present circumstances and furthering social and economic development (cited in OECD, 1997:33).

Therefore, the pragmatism of the UT educational model which is based on the belief of "studying and working" contrasts with the role that graduates attributed to schooling. This is supported by the fact that even though technical studies have been a means of attaining jobs, it is clear that TSUs still desire to study for a first degree (see Table 7.5).

Table 7.5. Do you want to study for a bachelor's degree?

	UTN	UTT	UTA
Yes	406 90%	170 96%	73 82%
No	27 6%	5 3%	11 12%
No answer	18 4%	2 1%	5 6%
Total	451 100%	177 100%	89 100%

For educational planners who assumed that in the early 1990s Mexico's economy needed more university technicians than "traditional" professionals, it may be frustrating to find that despite setting innovative vocational educational models, the common perception of tertiary education remains unchanged.

Why do TSUs want to study for a B.A.? Is this simply for the prestige of holding a Bachelor's degree (*licenciado*)? The next table shows interesting findings for such aspirations.

Table 7.6. Reasons for studying a B. A.

	UTN	UTT	UTA
a. To acquire more knowledge and apply it in my job	191 45%	68 40%	26 35%
b. The company is asking me for a first degree	28 8%	8 5%	1 1%
c. Due to the possibility of attaining a better job	131 31%	69 41%	31 41%
d. My parents expected me to	4 1%	1 1%	0 0%
e. For deeper understanding of my career	34 9%	14 8%	13 19%
f. The region and the country require more educated people	11 4%	8 5%	1 1%
No answer	7 2%	2 1%	1 1%
Total	406 100%	170 100%	73 100%

At Tula and Aguascalientes, a large proportion of graduates (41%) want to go on with their studies because they think that is easier to get a "better job" as bachelors than as technicians. This leads us to enquire whether the world of work and employers are recognising skills or abilities over diplomas. According to the TSUs' answers, few employers are asking for diplomas (option "b"). So, it seems that the decision to upgrade technical knowledge comes from graduates themselves. Strong influences from parents or employers is not discernable.

The acquisition of knowledge registered a significant number of responses (UTN=45%; UTT=40%; and UTA=35%), higher than that of option "c", i.e. attaining a better job (31%, 41% and 41%, respectively). However, both motives seem to be associated with the pursuit of achieving well-being. To complement this argument, let us ask what are the benefits of having studied in the UT? Are the technological universities expanding human capabilities? Accurate answers cannot be provided through a questionnaire, but an attempt made using the TSUs' answers, shown in Table 7.7.

Table 7.7. The main contributions of the UTs

	UTN	UTT	UTA
a. To find a job quickly	86 19%	44 25%	25 28%
b. To improve my monetary income	47 10%	31 18%	6 7%
c. To acquire innovative knowledge for my work	182 40%	59 33%	33 37%
d. To choose the job I desire	19 4%	6 3%	1 1%
e. To fulfil our personal aspirations (e.g. to be an educated individual, to think more analytically and critically, etc.)	71 16%	30 17%	17 19%
f. It has not been very useful at all	2 0%	5 3%	0 0%
g. Don't know	0 0%	0 0%	0 0%

continues...

	UTN	UTT	UTA
h. Other	4 1%	1 1%	1 1%
No answer	40 9%	1 1%	6 7%
Total	451 100%	177 100%	89 100%

Knowledge acquisition represents a highly valued benefit derived from the UT education, rated above finding a job quickly and the improvement of monetary income. The bulk of the TSUs answered in this manner (UTN=40%, UTT=33% and UTA=37%).

Although Todaro says that “most people (especially the poor) in less developed nations do not demand education for its intrinsic non-economic benefits but simply because it is the only means of securing modern sector employment”, the results in the UTN and UTA challenge this assumption. “Personal development” (option “e”) is considered by most (16% and 19%, respectively) as a direct benefit of the UT over the monetary benefits gained through education (10% and 7%, respectively). This reinforces the idea that some graduates rely on education as a vehicle for personal improvement, independently of the vocational orientation of the UT’s careers.

Finally, a strong link between being technically trained and having the freedom to choose a job is not discernable. The proportion of respondents for this option was small (UTN=4%, UTT=3%, UTA=1%). It seems that other factors besides education should be considered in expanding the capabilities of human beings for obtaining a worthwhile job.

III. The socioeconomic background of the UT graduates

To understand more broadly the relationship between education and development, it is necessary to focus on the contextual factors that influence educational policy. This part argues that UTs are mirrors in which regional disparities and inequalities are reflected.

As an approach, let us explore the household income of graduates' salaries which reveals interesting fluctuations by region (see Table 7.8).

Table 7.8. Graduates' household income (including them) per month

	UTN	UTT	UTA
a. Less than one Minimum Salary(MS) ³⁶	11 2.4%	6 3%	1 1%
b. Between one and three times the MS	61 13.53%	44 25%	10 11%
c. Between three times and five times the MS	89 19.73%	46 26%	12 13%
d. Between five times and seven times the MS	80 17.74%	36 20%	20 22%
e. Between seven times and nine times the MS	98 21.73%	22 12%	21 24%
f. More than nine times the MS	99 21.95%	13 7%	21 24%
No answer	13 2.88%	10 6%	4 4%
Total	451 100%	177 100%	89 100%

The current household economic condition of graduates at Neza and Aguascalientes seems to be similar and to contrast with Tula's. Both contexts are characterised by a low proportion of households with low income levels of 2.4% and 1% respectively, and a high number of households with high incomes (22% and 24%, respectively). With respect to Tula, the household economic conditions tended to be concentrated in the middle and lower income brackets. For example, 25% of the graduates' households registered an income between one and three times the minimum salary, while in the State of Mexico and Aguascalientes these proportions were only 13% and 11%, respectively.

³⁶ Mexico has three kinds of minimum salaries by region. The highest is known as "A", the medium stand for "B" and the lowest is "C". At the time that this research was developed, the minimum salary in the three UT zones was "C" which is equivalent to \$981 per month (£67 approximately). It is interesting to note that the same range of salary remained, despite the different degree of economic and social advancement in the three states.

Graduates' ownership of property such as cars and houses constitutes another basis for tracing TSUs' economic background. Table 7.9 also shows important variations regarding ownership.

Table 7.9. Have you got your own:

	UTN	UTT	UTA
House			
Yes	128 28.38%	29 16%	22 25%
No	241 53.44%	103 58%	52 58%
No answer	82 18.18%	45 25%	15 17%
Total	451 100.00%	177 100%	89 100%
Car			
Yes	128 28.38%	47 27%	44 49%
No	232 51.44%	98 55%	37 42%
No answer	91 20.18%	32 18%	8 9%
Total	451 100.00%	177 100%	89 100%

As was mentioned earlier, there are economic and social differences in the zones where the UTs are based. For example, in Tula only 16 alumni out of 100 owned their own house, while at Neza and Aguascalientes this proportion was 28 and 25, respectively. On the other hand, car ownership was significantly higher in Aguascalientes (49%) than in Tula and Neza (27% and 28%, respectively). It can be said that UTT graduates possess less property than their counterparts from Neza and Aguascalientes. This fact gives an overview of Tula's regional conditions, specifically in the capacity of people to own assets which are crucial to build up their entitlements. Now, let us move on to the next questions about regional mobility and migration.

Table 7.10. Were you born in this state?

	UTN	UTT	UTA
Yes	177 39.25%	142 80%	60 67%
No, where were you born?	267 59.20%	33 19%	27 30%
No answer	7 1.55%	2 1%	2 3%
Total	451 100.00%	177 100%	89 100%

As we can see, 60 of UTN's graduates were not born in the State of Mexico. This demonstrates that Neza is, indeed, a receptacle municipality. The majority of respondents (75%) were born in Mexico City and the rest in other states such as Oaxaca, Guerrero, Hidalgo and Veracruz.

On the other hand, the majority of the UTT and UTA graduates were locals (80% and 67%). Both universities, especially Tula, have a low proportion of immigrants (19%) compared with that of the UTN (30%). These percentages show similarities with their migration state balance. For example, Hidalgo is not an attractive region for people from other regions, while Aguascalientes, as noted above, gains more people through regional movements than it loses.

Table 7.11 shows the propensity to migrate of Tula's graduates. This raises several challenges in terms of social policy.

Table 7.11. What are your expectations in the short term (a year)?

	UTN	UTT	UTA
a. To open a business.	116 25.7%	40 23%	24 27%
b. To move to a different city	34 7.5%	24 14%	0 0%
c. To emigrate and work in a foreign country	43 9.5%	16 9%	4 4%

continues...

	UTN	UTT	UTA
d. To be devoted to teaching and research	53 11.7%	18 10%	9 10%
e. Don't know	41 9%	18 10%	9 10%
f. Other (specify)	103 22.8%	35 20%	28 31%
No answer	61 13.5%	26 15%	15 17%
Total	451 100%	177 100%	89 100%

Although the highest percentages were registered in the options "a" and "f", it is clear that migration was an aim expressed by the UTT's graduates (see answers "b" and "c"). These results coincide well with Todaro's viewpoint. He argues that there is "a relationship between the educational attainment of an individual and his or her propensity to migrate from rural to urban areas" (1994:384). Migration movements can act as a backward force in the relationship between education and development. How can a region perform well in economic and social terms if its educated population leaves the locality? It seems that supplementary conditions are required set up a virtuous cycle between schooling and the economy. Interestingly, in the prosperous state of Aguascalientes nobody considered moving from the region to a different city (option b).

The labour market conditions are strongly related to migration. For this reason and due to its importance in the study of education and development, employment deserves another section.

IV. Employment and unemployment. The TSUs' experience

According to some human capital critics (Alpin, et.al 1998; Diaz-Barriga 1995; and Livingstone, 1999) no matter how much educational attainment is held by an individual entering the labour market, what is also crucial are the informal contacts, social life and

cultural values of the person seeking employment. So, if the relationship between education and the labour market is controversial, there is also reason to doubt the causal and positive relation between schooling and development. Therefore, this section examines how the education provided by the UTs facilitates access to the world of work and how individuals can attain further achievements by being employed.

A. Employment. A basis for expanding people's capabilities.

Since the UT model is committed to educating individuals for intermediate occupations in the organisations' hierarchy, the next question is an attempt to assess whether or not TSUs have found a suitable occupation.

Table 7.12. Level of employment among graduates

	UTN	UTT	UTA
Working in a formal job	370 82.04%	138 78%	75 84%
No working	81 17.96%	39 22%	14 16%
Total	451 100%	177 100%	89 100%

A relevant point for our discussion is to note the high proportion of employed graduates in the three universities (UTN=82%; UTT=78% and UTA=84%). We can note similar percentages of employment and unemployment between the UTN and the UTA, whilst the UTT's percentages differ slightly. Although UT graduates in the three zones are well accepted by companies in employment terms, rough data says little about their job conditions (e.g. payment, satisfaction, etc.).

Another variable to partially corroborate the relevance of the UT model within each region is the duration of graduates' access to the world of work. Table 7.13 shows that UT graduates spend little time jobless.

Table 7.13. For how long did you look for a job after your studies at UT?

	UTN	UTT	UTA
a. Less than a month	146 39.46%	46 33%	38 51%
b. Between one and three months	98 26.49%	38 28%	13 17%
c. Between three months and six months	53 14.32%	25 18%	6 8%
d. Between six months and a year	25 6.76%	7 5%	2 3%
e. More than a year	14 3.78%	3 2%	2 3%
f. I was working before I finished my studies at the UT	33 8.92%	18 13%	14 19%
No answer	1 .27%	1 1%	0 0%
Total	370 100%	138 100%	75 100%

Over 60% of employed graduates in the three UTs found a job in less than four months, which is considered by the CGUT as a normal performance among all the UTs (in UTN, 1999). This fact should not be overlooked since university entrants come from the most disadvantaged groups of the population and to have a job can make the difference between a deprived life and one of greater opportunities.

In Aguascalientes, half the of UT's graduates attained a job in less than a month which is the highest proportion (51%) among the three UTs analysed. To support this, a study carried out by the UTA showed that 67% of the UTA's graduates considered that it had not been difficult to find their current job, while only 9% asserted that was too difficult (UTA, 1999). This may be explained as a consequence of Aguascalientes' economic performance. Therefore, it may be expected that graduates are more likely to meet their aspirations than those of Tula or Neza.

It is worth commenting that the UT model offers mechanisms to help students attain a job quickly. One of these mechanisms is compulsory placements (*estadías*) that have to be

taken once the curriculum has been covered. Apart from these efforts, the TSUs have also attained their jobs through other means which are not precisely related to their academic qualifications (see Table 7.14).

Table 7.14. How did you hear about the job?

	UTN	UTT	UTA
a. Through newspapers	66 17.84%	8 6%	10 13%
b. Informal contacts (e.g. relatives, friends, teachers, etc.)	190 51.35%	57 41%	33 44%
c. Through the UT itself Placement ___ Career service ___	69 18.65%	58 42%	25 33%
d. Other	30 8.11%	11 8%	6 8%
No answer	15 4.05%	4 3%	1 1%
Total	370 100%	138 100%	75 100%

The bulk of graduates in the UTN (51%) and the UTA (44%) were employed with the help of informal contacts such as friends, relatives, teachers, etc. These results confirm what human capital critics have argued: the level of educational attainment matters less than social factors in obtaining a job.

With respect to the UTT's graduates, a slight majority of graduates got their current job through university mechanisms such as placements and career services. In this respect, I should say that I observed plausible efforts made by the UT's authorities to establish strong links between technological education and the productive sector. Taking into account that Tula is the most deprived region, it is quite remarkable that 42 graduates out of 100 have found positions through the job-searching strategies designed by the UT. These kind of services show that to enhance people's lives, institutions are crucial.

Analysing the job occupations in which TSUs are employed sets down another basis for evaluating the UT performance. The first job destination of the UTs' graduates did not

vary significantly by region (see Table 7.15). A significant proportion of TSUs began work as administrative assistants and as qualified technicians. However, a remarkable similarity can be distinguished between the UTT and the UTA where 38% and 37% of their graduates, respectively, got an administrative position after studying. This is relevant since the UT model is apparently committed to forming technically trained people. It is also important to highlight the low proportion of UTA graduates who started work as qualified technicians (20%). This proportion is equal to that of foremen (21%), which represented the highest of these positions among the three samples of graduates.

Table 7.15. Graduates's first job destination

	UTN	UTT	UTA
a. Qualified workman	8 2.16%	6 4%	2 3%
b. Administrative assistant	113 30.54%	52 38%	28 37%
c. Director or manager	7 1.89%	1 1%	3 4%
d. Qualified technician	118 31.89%	45 33%	15 20%
e. Owner of your business	3 0.81%	0 0%	1 1%
f. Foreman	39 10.54%	15 11%	16 21%
g. Other (specify)	74 20%	17 12%	10 13%
No answer	8 2.16%	2 1%	0 0%
Total	370 100%	138 100%	75 100%

Few graduates started work as owners of their own business so they became job seekers after technological training. This trend was not reversed through time since percentage changes between the first job and current positions did not vary significantly (see charts 7.7, 7.8 and 7.9).

It is worth noting that through the question shown above and my observations, a vast range of titles were attached to employment positions. There were innumerable names given to specific occupations even though they did not differ in practical activities. For this reason the percentage of the option "other" is relatively high (UTN=20%, UTT=12%, UTA=13%). It was also observed that labelling job positions says little about the application of the knowledge provided by the UT.

Having analysed the employment level of UT graduates, it is important to determine their wage rates. So, let us turn the discussion toward economic factors. How much were UT graduates earning in their first job? The answer is addressed in Table 7.16.

Table 7.16. Levels of earning in graduates' first job per month

	UTN	UTT	UTA
a. Less than the Minimum Salary (MS)	12 3.24%	6 4%	3 4%
b. Between one to three times the MS	184 49.73%	77 56%	39 52%
c. Between three to five times the MS	120 32.43%	40 29%	24 32%
d. Between five to seven times the MS	36 9.73%	9 7%	7 9%
e. . Between seven to nine times the MS	11 2.97%	2 1%	0 0%
f. More than nine times the MS	3 0.81%	0 0%	0 0%
No answer	4 1.08%	4 3%	2 3%
Total	370 100.00%	138 100%	75 100%

As we can see, the majority of graduates from the three universities did not earn high salaries at the beginning of their working life. The bulk of earners were concentrated in the mid-low income group ("b"), so 50% of UTN graduates interviewed earned between one and three times the minimum salary, while at the UTT and the UTA, these proportions were 56% and 52%, respectively

To understand how people can thrive with their acquired knowledge, the next part explores how graduates' positions have changed over time.

1. Changes over time in occupations.

By means of analysis over time, is possible to see whether or not graduates have changed their occupations and, what is more important, whether they have improved their incomes over time. The next table suggests that important variations in job position have been experienced by TSUs.

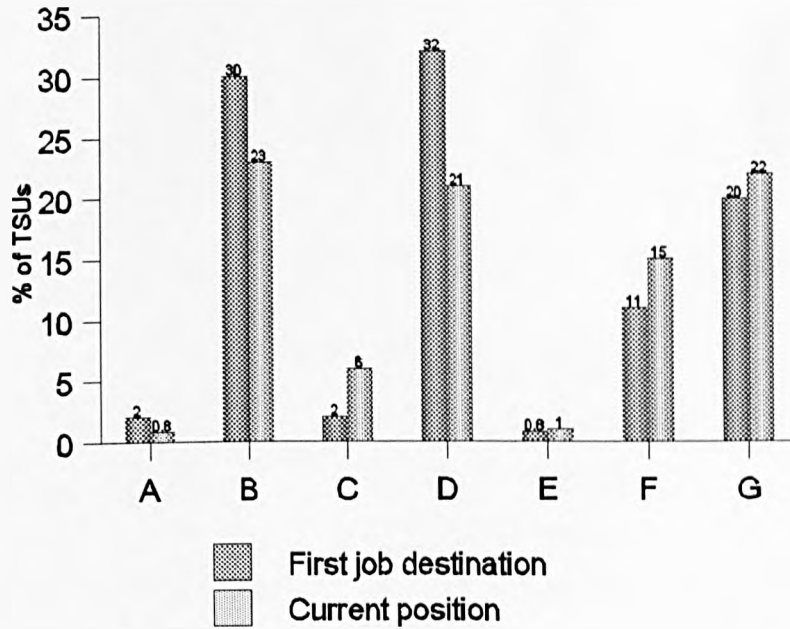
Table 7.17. Current job position hold by graduates

	UTN	UTT	UTA
a. Qualified workman	3 0.8%	3 2%	0 0%
b. Administrative assistant	86 23.24%	43 31%	26 35%
c. Director or manager	21 5.68%	2 1%	7 9%
d. Qualified technician	79 21.35%	37 27%	16 21%
e. Owner of your business	5 1.35%	1 1%	2 3%
f. Foreman	57 15.41%	17 12%	9 12%
g. Other	83 22.43%	25 18%	12 16%
No answer	36 9.73%	10 7%	3 4%
Total	370 100%	138 100%	75 100%

It is worth emphasising that these three UTs are not forming professionals for "blue collar" jobs commonly occupied by workmen, nor for "white collar" positions (directors or managers). The bulk of TSUs are concentrated in intermediate positions as the SEP expected (see SEP, 1991 and Reséndiz, 1998)

A longitudinal analysis by cross-referencing the first occupation held by graduates and the current one shows remarkable changes over time. Charts 7.7, 7.8 and 7.9 display this evolution in each UT.

Chart 7.7. Differences between first job destination and current position obtained by UTN graduates



A=Qualified Workman

B=Administrative Assistant

C=Director or Manager

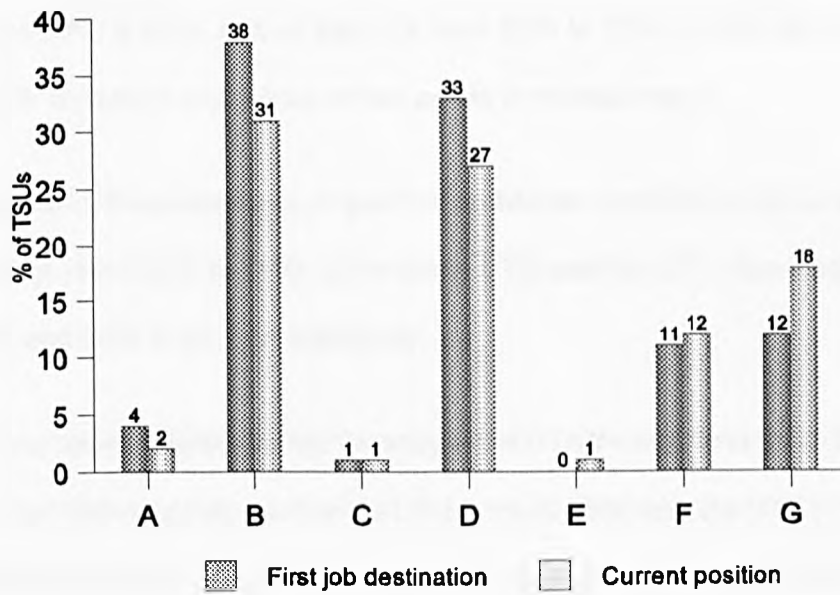
D=Qualified Technician

E=Owner of Business

F=Foreman

G=Other

Chart 7.8 Differences between first job destination and current position obtained by UTT graduates



A=Qualified Workman

B=Administrative Assistant

C=Director or Manager

D=Qualified Technician

E=Owner of Business

F=Foreman

G=Other

Chart 7.9 Differences between first job destination and current position obtained by UTA graduates



The number of administrative positions decreased in the three universities in relative terms from their first position to the most recent. At the UTN it fell from 30% to 23%, at the UTT from 38% to 31%, and at the UTA from 37% to 35%. Unlike the UTN and the UTT, the UTA showed a slight drop of two points in relative terms.

On the other hand, the percentage of qualified technician positions went up through time only at the UTA (from 20% to 21%), while at the UTN and the UTT, there was a fall from 32% to 23% and 33% to 27%, respectively.

Foremen occupations decreased significantly at the UTA through time (from 21% to 12%) contrary to the modest growth both at the UTN (11% to 15%) and the UTT (11% to 12%). These findings should be analysed in conjunction with the variations in income level in order to have a complete picture of the professional trajectory of UT graduates over time.

It is worth noting an increase of four and five points in relative terms of "white collar positions" (director or manager) at the UTN and the UTA, respectively. But in the former this can be attributed to the closeness of the UTN to Mexico City. Indeed, the majority of the UTN graduates interviewed who were employed in "high" positions were working in the largest city in the world. It is worth noting that these type of positions are scarce among UTT graduates. In Tula these occupations remained steady over time, thus it can be argued that to move up towards the top labour positions seems more difficult than in Neza or Aguascalientes.

An argument outlined in this research is that education development-oriented policies have rarely distinguished between what an educated person can do (human agency) or can be thanks to knowledge acquisition, and what opportunities exist within the macro-economic context. So, it is necessary to analyse the "supportive or complementary conditions that must prevail for education to be successful" (Levin and Kelley, 1997:240).

With the aim of exploring these conditions, Table 7.18 shows the reasons given by graduates themselves for attaining a job.

Table 7.18. Reasons for obtaining a job³⁷

	UTN	UTT	UTA
a. Employment opportunities in the state	26 7%	12 9%	7 9%
b. The <i>TSU</i> diploma	42 11%	21 15%	9 12%
c. Previous work experience	98 26%	23 17%	14 19%
d. Knowledge acquired at the UT	60 16%	31 22%	13 17%
e. Personal perseverance	60 16%	18 13%	7 9%
f. Social relationship of my family	38 10%	7 5%	8 11%
g. The placement (<i>estadfa</i>)	27 7%	15 11%	14 19%
h. Other	7 2%	3 2%	0 0%
No answer	12 3%	8 6%	3 4%
Total	370 100%	138 100%	75 100%

In accordance with the *TSU*'s answers, option "a" (employment opportunities in the state) was valued with the meagre percentages of 7% (UTN) and 9% (UTT and UTA), meaning that labour market opportunities seem limited for these professionals. This point will be carefully discussed in chapters 8, 9 and 10.

It is interesting that in finding a job, graduates valued their "previous work experience" and their "knowledge acquisition" over the *TSU* diploma. So, it seems that to climb up the "the winding hill" of the labour market, *diplomas* are not such relevant components as

³⁷ With the aim of facilitating the presentation of structured information gathered from the questionnaires this question was edited. Thus this table only presents the most important reasons chosen by graduates. The complete format of the questionnaire is shown in Annex 1.

knowledge.

Table 7.18 is also useful for assessing the impact of *estadías* (placements) on the professional trajectory of the UT graduates. Comparing the three universities, it is possible to argue that at the UT of Aguascalientes, the compulsory placements have been a successful strategy for creating access to the labour market. In fact, this represented 19% of answers given by interviewed graduates, over those of "personal perseverance" and "employment opportunities" (9%). The UTA itself reported that 34% of its total number of graduates were hired by the enterprises where they did their placements (UTA, 1999). That means that independently of the degree of regional economic advancement, this institution is facilitating the transition from school to work.

2. Changes in earnings over time

Changes in earnings over time permit us to tell if the UT graduates have the possibility of improving their monetary benefits and what kind of factors are involved in these variations. Table 7.19 shows the wage levels registered by the TSUs in their current job.

Table 7.19. Graduates wage levels per month

	UTN	UTT	UTA
a. Less than the Minimum Salary (MS)	4 1.08%	1 1%	1 1%
b. Between one and three times the MS	68 18.38%	39 28%	10 13%
c. Between three and five times the MS	115 31.08%	52 38%	24 32%
d. Between five and seven times the MS	81 21.89%	27 20%	17 23%
e. Between seven and nine times the MS	40 10.81%	8 6%	14 19%
f. More than nine times the MS	55 14.86%	7 5%	7 9%
No answer	7 1.89%	4 3%	2 3%
Total	370 100%	138 100%	75 100%

While 15% of the UTN's graduates are earning high salaries (more than nine times the minimum salary), in the regions of Hidalgo and Aguascalientes the proportions fell to 5% and 9%, respectively. This can be explained, as was mentioned above, as a consequence of its closeness to Mexico City where well-paid jobs are.

In accordance with a classification of specializations, the UTN has identified that the graduates from Informatics have "better opportunities in the labour market, better wages and positions as directors" (UTN 1996a:103), while the worst-paid career is Marketing (*Comercialización*). This was corroborated by this study, though I go further by saying that whilst people may be highly paid there is a trade-off in terms of time. That is, ex-Alumni from Informatics are the most well-paid, but their positions are also very demanding.

With regard to the UTT's graduates' salaries, it is shown that there is a concentration in lower income cohorts compared to those at the UTN and the UTA. For example, 66% of respondents earn between one and five times the minimum salary, whilst these proportions at the UTN and UTA represent 49% and 45%, respectively. It can be suggested that Tula's young people have a "hollowing" monetary basis and thus their aspirations can be also limited.

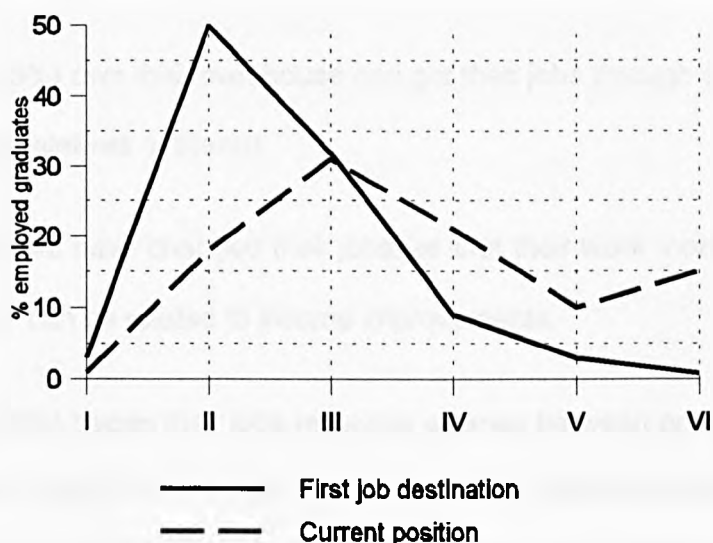
On the other hand, at the UTA the bulk of graduates stand in the higher income brackets. The wage level seems associated to the area of specialization. For example, the UT of Aguascalientes reported that the graduates whose salaries were the highest came from Manufacturing Processes, and the worst-paid graduates came from Management and Information (*Ofimática*).

What conclusions can be drawn from these data? First of all, that variations among regions require different social policies to set up a framework in which education can impact coherently on the process of expanding people's choices.

Once we have discussed graduates' current earnings and gauged the relative monetary improvement over time, it is necessary to compare first earnings against current ones (see charts 7.10, 7.11 and 7.12).

Each bracket concentrates a specific wage level. For instance, Cohort I captures the lowest earning rate, while Cohort VI, the highest. The black line stands for the proportion of graduates receiving a salary in their first job destination, whereas the scattered line represents the percentage of graduates receiving a wage but in their current job position.

Chart 7.10. Changes in wage levels of Neza's graduates over time



The peak of both lines represent the bulk of alumni per income group. As we can see, the "black" line concentrates the highest number of graduates in Cohort II which means that when graduates got their first job they earned between one and three times the minimum salary. The dotted line shows its highest proportion in Cohort III, meaning that there are more alumni earning higher salaries than in the past. Therefore, it is possible to argue that as time runs on, more TSUs gain more money.

A remarkable finding was that the dotted line tends to go up in the richest cohort. This “big jump” in the number of graduates earning more than nine times the minimum salary should be analysed carefully. There were 55 TSUs in this situation whose characteristics were the following:

- ▶ 75 per cent of “rich TSUs” are men, which demonstrates a gender inequality that is complemented by the high percentage of unemployed women (70%) who have studied at this UT (see Table 7.22).
- ▶ The difference between academic careers is also confirmed. 78 per cent of the best paid TSUs studied Informatics and only two per cent studied Marketing.
- ▶ Most (45%) own their own house and got their jobs through an informal contact such as relatives or friends.
- ▶ 73 per cent have changed their jobs, so that their work mobility - among other factors - can be related to income improvements.
- ▶ Most (60%) began their jobs receiving salaries between one and five times the minimum salary, but they had not received high payments before. This stresses the importance of job experience, networking, personal initiative and so on for improving the income level.
- ▶ Although 75 per cent of this rich bracket answered that they wanted to study for a B.A., this proportion was lower than that shown in the whole sample (90%).

Now, let us analyse the results regarding the changes in wage levels of UT graduates in Tula and in Aguascalientes.

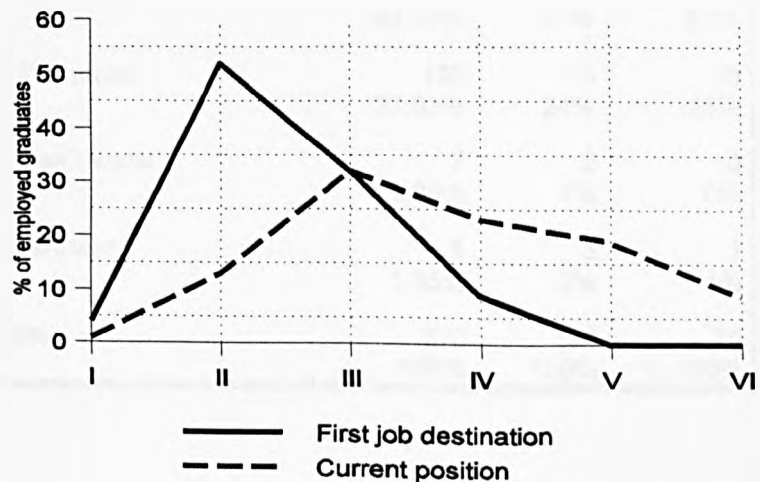
Chart 7.11. Changes in wage levels of Tula’s graduates over time



As in the UTN, the peaks of the “black” and “scattered” lines in the UT of Tula are concentrated in Cohorts II and III, respectively, so there was also an income improvement for the majority of alumni over time. However, in this case, as both lines approach the richest cohorts (V and VI), they move downwards more rapidly than in the cases of the UTN and the UTA. This is an indicator that there may be a shortage of highly paid jobs for educated people.

In the case of the UT of Aguascalientes, interesting differences were found. The cross-regional variations reflect to some extent, the pattern of economic progress of each region in Mexico.

Chart 7.12. Changes in wage levels of Aguascalientes’ graduates over time



As we can see in Chart 7.12, the gaps between the two lines in the richer cohorts IV, V, and VI show that between the first and the current job there are more alumni who have improved their incomes significantly over time. This sharply contrasts with the charts drawn up for the UT of Tula. There are bigger proportions of TSUs earning more money in their current jobs than in their first, so this finding leads us to presume that educated people can improve their earnings more easily in Aguascalientes than in Tula.

Despite a general improvement in graduates' incomes in the three regions analysed, the fluctuations in the space drawn between both lines raises research questions. How could Mexico's government widen these spaces in Tula's region, for example? What factors should be involved in this expansion? To address these questions, it is necessary to look at contextual factors to understand more broadly the relationship between education and development.

Once it is argued that TSUs have improved their income over time, it is crucial to ask whether that growth in monetary terms is related to job satisfaction. Apparently Table 7.20 suggests that the majority of graduates are doing well in personal terms once they are employed.

Table 7.20. Level of satisfaction in graduates current job

	UTN	UTT	UTA
a. Too little	26 7.03%	16 12%	12 16%
b. About right	232 62.70%	84 61%	43 57%
c. Too much	100 27.03%	33 24%	19 25%
d. Don't know	7 1.89%	2 1%	0 0%
No answer	5 1.35%	3 2%	1 1%
Total	370 100%	138 100%	75 100%

In all cases the percentage of graduates who got “too much” satisfaction is almost equal (UTN=27%; UTT=24%; UTA=25%). However, the data on satisfaction degree in the UTA’s graduates requires a special comment. Unexpectedly, the highest proportion of graduates who got “too little” satisfaction from their jobs were concentrated in the UTA whose region seems to be affluent. Due to these reasons, it is necessary to go further through in-depth interviews to understand how educated people link job satisfaction to monetary income and other variables (see chapters 8, 9 and 10).

Now I turn to a discussion of knowledge flexibility and the benefits brought to UT graduates.

3. The relationship between knowledge and labour changes

In order to examine the capacity of educated workers to adapt to different activities - which is a learning aim of the UTs - this study found that 61% of respondents in Neza have changed their jobs. In Tula and Aguascalientes, this proportion was lower (51% and 55%, respectively). It is interesting to note that despite the different socioeconomic conditions, both regions registered similar percentages of graduates who have changed their job. Because of this, it is necessary to go further and investigate the causes of such observations.

With the aim of having a broader perspective, Table 7.21 shows the reasons for changing job. It is worth saying that the main reason is related to economic necessity: to obtain a better salary.

Table 7.21. Reasons for changing job³⁸

	UTN	UTT	UTA
a. To have a better salary	120 53%	43 61%	19 46%
b. To enhance job shifts and job conditions	22 10%	6 9%	1 2%
c. To improve job environment	12 5%	0 0%	2 5%
d. Personal reasons (e.g. partner, change of residence, etc.)	3 1%	1 1%	2 5%
e. I received a job offer from relatives or friends	4 2%	2 3%	0 0%
f. To acquire more knowledge	27 12%	11 16%	16 39%
g. Other	18 8%	0 0%	0 0%
No answer	19 8%	7 10%	1 2%
Total	225 100%	70 100%	41 100%

Although the graduates from the three institutions answered proportionally on the main reasons for changing their jobs, the case of Aguascalientes deserves more attention. There, more graduates preferred to move from their last job in order to become a more trained and educated worker. This fact contrasts with the cases of Neza and Tula where most graduates pursued better wages. It seems that within relatively prosperous regions, educated people have more freedom to acquire further expertise.

B. Analysing unemployment among TSUs. Failures of education?

Despite the low percentage of unemployed graduates, this kind of respondent provided important clues for exploring more deeply the links between education and development. As a starting point, Table 7.22 shows the profile of unemployed technicians by each UT.

³⁸ This question also was edited under the criteria explained in the previous footnote.

Table 7.22. Selected characteristics of unemployed technicians

	UTN	UTT	UTA
Age average	23	22	23
Percentage of unemployed women	70%	43%	64%
Percentage of local inhabitants	49%	89%	71%
Percentage of unemployed technicians who desire to study for a first degree	86%	94%	79%

It is paradoxical that the UTN and the UTA have the highest rates of female unemployment (70% and 64%, respectively) when these regions have better economic conditions than Tula. It seems that economic advancement is not always hand-in-hand with gender equality. Sen (1999) argues that female employment and female education can be "very crucial" for the economic fortunes as well as for well-being and freedom, so these findings call into question the functional idea that education works directly to achieve development.

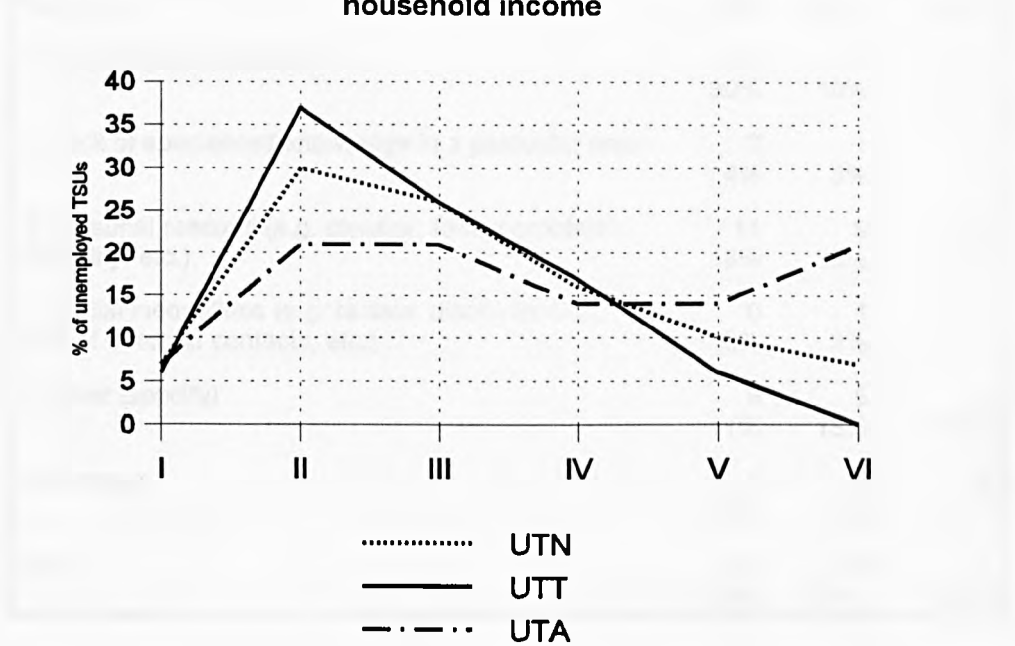
Another finding is that unemployed graduates still want to read for a first degree. What is more interesting is that this common desire is stronger in poorer regions such as Tula, where nine out of ten unemployed technicians want to continue their studies. Why do so many graduates desire to go on with their studies? It is simple, because they are seeing education as a "magic passport" to greater social mobility and better opportunities as Cline remarked (1962). However, this "magic passport" cannot be obtained easily for everybody. The next part shows that, in some regions, a significant number of unemployed graduates are concentrated in the poorest cohorts of household incomes.

1. The economic background of jobless graduates.

As was expected, graduates' unemployment is concentrated in the low income household group (Cohort II). However, it is crucial to emphasise the trajectory of the line drawn by the UT of Aguascalientes. This reveals that, in this region, the graduate unemployment structure differs greatly from that of its counterparts from the UTN and

UTT (see Chart 7.13).

Chart 7.13. Relation between the proportion of unemployed graduates and their household income



As we can see, in the case of the UTA, unemployed graduates come from all household income groups, even affluent ones (VI) while in the UTT and the UTN this observation is not repeated. Perhaps the unemployment experience for the UTA' s graduates is not as traumatic as for UTT or UTN alumni, as their families can economically maintain them during such a critical period. This allow us to say that contextual conditions should be analysed in further studies of education and development.

But how do TSUs explain unemployment? In structural or in personal terms? The next table investigates this concern.

Table 7.23. Reasons for not finding a job

	UTN	UTT	UTA
a. Lack of job opportunities in the labour market of the state	22 28%	16 41%	5 36%
b. Lack of job experience	24 30%	4 10%	2 14%
c. Lack of specialised knowledge in a particular area	3 4%	1 3%	1 7%
d. Personal reasons (e.g. disease, family problems, disability, etc.).	14 18%	9 23%	1 7%
e. Social inequalities (e.g. racism, discrimination, lack of informal contacts, etc.).	0 0%	1 3%	0 0%
f. Other (specify)	9 11%	5 13%	2 14%
No answer	7 9%	3 8%	3 21%
Total	79 100%	39 100%	14 100%

The majority of the UTN's and UTA's unemployed graduates explained their status as a consequence of two factors. The first is a macro economic problem directly affecting graduates' professional life (lack of job opportunities), while the second is what Amartya Sen (1984a) calls "functionings", which means what a person can or cannot do, or can or cannot be (lack of job experience). A shortage of this capability impedes graduates from becoming employed individuals and productive workers, thus to argue that education acts as a crucial variable of development is a misleading idea. Education requires positive circumstances to be successful.

According to the UTT's graduates, unemployment in this state is the main reason for not having a job. However, what is more interesting is that 23% of respondents - the highest in the three cases - considered that personal reasons such as disease, family problems and disability were significant for being jobless. This percentage contrasts diametrically with that of the UTA (7%). This fact shows that Hidalgo's socioeconomic situation is worse than in Neza or in Aguascalientes, and thus policies for improving standards of

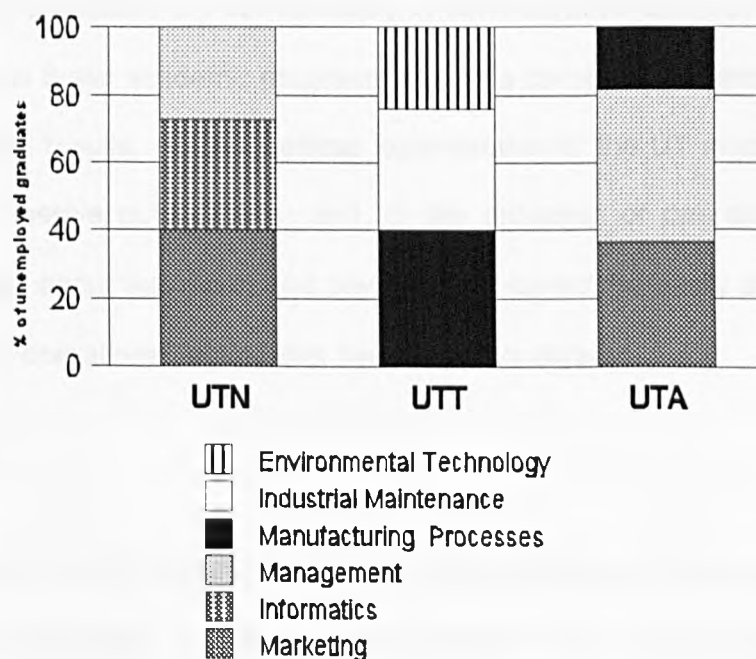
living, through education, should also be different.

2. Careers and unemployment. Beyond the relevance of education

One of the main attributes of the UT model is the relevance of education. This quality refers to the capacity of adaptation between academic courses and local needs, specifically, the demands of the productive sector. According to the SEP (1991), UT careers should be designed under this criterion. However, questions remain unanswered regarding this functional idea of education³⁹. This part provides an indicator to assess whether or not the desired relevance of education is being accomplished.

It was found that in the UTN and in the UTA, Management and Marketing careers overlap with the highest number of unemployed technicians (see Chart 7.14).

Chart 7.14. The three careers with the highest number of unemployed graduates



³⁹ For a critical discussion on the relevance of education in Mexico, see Flores-Crespo and Ruiz de Chávez (2001).

Searching for explanations for this fact inexorably leads us to some interesting public policy issues. Is it congruent that in technological institutions administrative careers are taught? During the in-depth interviews, this question was put to the General Co-ordinator of the Technological Universities, Mr. Arturo Nava. However he avoided giving an answer.

It is necessary to bear in mind that at the UTN and the UTA, Management and Marketing are the careers in greatest demand. According to the UTN Activities Report (*Informe Anual de Actividades*) for the academic year 1996-1997, 25% of the new entrants were enrolled in Management and 22% in Marketing (Vazquez, 1997). At the UTA, Management graduates represented 36% of the total number of leavers, however the highest unemployment rate was registered in this administrative career. Moreover, despite the fact that Marketing was implemented in 1996, this career also registered a high unemployment percentage (10%). So, why are the UT and educational authorities still promoting these careers if they have been aware, since the beginning, that the majority of unemployed graduates are concentrated in administrative careers? The answer is simple: because these academic programs ensure a considerable level of enrolment, which has three results: (a) the political legitimization of the UT model, and (b) the attraction of massive public funds; and (c) the reduction of operational costs. So functional ideas about education and development cannot be easily put into practice since there are operational factors that need to be considered.

Conclusions

Has education in the UTs expanded the human capabilities of individuals, and can it therefore be argued that it is a factor of development? This broad question cannot be easily addressed by taking into account only structured data. The information gathered through questionnaires needs to be integrated with that collected during the in-depth interviews.

Nevertheless, it was found that macro socioeconomic conditions in the three regions analysed seemed to be reflected in the TSUs' conditions. This illustrates the need to set up supportive conditions within regions to make education a real factor of development. Otherwise, the potential effect of education could be severely constrained.

Furthermore, it was evident that UT's courses have suited locals' need of studying a short course. This has given them the opportunity to have access to the labour market and thus to improve their economic situation. However, despite the facts that the majority of graduates were employed, they showed an interest in going further in their studies as they wanted to acquire deeper knowledge and to attain a better job. This unexpected outcome of education calls into question the functional idea which states that Mexico's economy needs technicians for its modernization (OECD 1997).

Graduates' aspirations point to a contradictory decisions by educational planners and this fact needs to be recognised in order to understand more broadly the relationship between education and development.

CHAPTER 8

Beyond the modern idea of education. The case of the Technological University of Neza.

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Introduction

Motivated by the modern idea of education, governments rest their hopes of achieving economic growth and development on adapting higher education to the real needs of the productive sector when structural inequalities have not been eradicated at all. The ways in which universities will react to this complex situation are unknown since their graduates rarely respond in the same way as politicians, educational planners, international organisations, or even employers. Knowing how educated people react, or why they do one thing instead of another, within a particular context, will be a basis for a broader understanding of the relationship between higher education and development.

By applying Sen's human capabilities approach, this chapter argues that although the UT is expanding "functionings" that are remarkably important for building up entitlements, a linked complex of structural disadvantages blocks their educational endeavour. On this basis, it concludes that "education cannot do it alone", in that a removal of "unfreedoms" demands public and private action. This simple but substantial argument has been overlooked in the existing literature - specifically in economics - which has led to a larger misinterpretation of the basic enquiry: "what is education for?" For example, on one hand, education has been regarded as a panacea for economic and social problems, an "engine" of development, etc. On the other hand, education has been identified as a "reproducer" of inequalities. From my particular point of view, both functionalist and deterministic visions reduce the notion of education to a simple factor of production, or to a neutral factor malleable by the "structure" when knowledge is "embedded in human beings" (Bowles, 1977) and they have the capacity to act within that structure.

My argument unfolds in ten stages. The first describes the general characteristics of the graduates interviewed. The second discusses some theoretical issues concerning structure and agency. Here the role of education is analysed with reference to the theoretical propositions of Amartya Sen. In the third part, unequal chances for choosing a UT are presented as an demonstration of the structural disadvantages that Neza's young people are facing even though the UT has promoted upward social mobility. This coupling of deprivations and opportunities is analysed in part four. Part five presents an evaluation of the personal and professional functionings achieved and part six explores why UT graduates wanted to study for a first degree. This part argues that the intention of upgrading a technical degree to one of bachelor level is justified. Part seven presents the way in which UT graduates link education with their quality of life.

While the UT has positively impacted on the "doings" and "beings", the real opportunities that students have to choose from within this context are constrained. Therefore, and in order to have a complete perspective on the human capabilities approach, part eight describes the lack of "instrumental freedoms" faced by UT graduates. Part nine shows how difficult it is to transform commodities into valuable functionings within this municipality of Mexico. As some of these problems are closely related to labour market conditions, part ten presents the opinions of representatives from the productive sector who objectively depict the strengths and weakness in the formation of TSUs. Interestingly, they have argued that there are differences between the qualifications of technicians and those of bachelors, thus showing that they support the aspirations of graduates to become *licenciados* (bachelors) rather than to hold a technical degree.

I. A profile of graduates interviewed.

After collecting information from 451 graduates of the Technological University of Neza (hereafter referred as UTN), a semi-structured interview was conducted with 26 University Technicians (TSUs) in order to understand more fully the way in which an academic

process impacts on both the professional and personal achievements of individuals.

The main criteria for selecting the UT graduates were: (1) their job situation (employed and unemployed) and (2) their wage level (high, middle and low). Out of 26 graduates, 23 were employed and the rest did not have a permanent job position at the time of interview. It is worth saying that, as a result of the proximity of this university to Mexico City, the dispersion of graduates in this region was wider than expected, thus it was difficult to find graduates to be interviewed. Table 8.1 shows the main characteristics of the graduates interviewed.

Table 8.1. Selected characteristics of graduates interviewed in Neza

High wage level							
<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>	<i>Current position at time of interview</i>	<i>Job satisfaction</i>	<i>Main expectation*</i>
A1	25	F	1993	Information technology	Co-ordinator of information systems	Fair	To broaden my professional prospects
A2	29	M	1995	Management	Foreman	Very high	To migrate to another city
A3	NA	F	1997	Manufacturing	Project leader	Very high	To run a business
A4	30	M	NA	Information technology	Manager	Fair	To change my job
A5	28	F	1995	Information technology	Foreman	NA	NA
A6	24	M	1997	Information technology	Head of technical support	Very high	To have a better job
A7	27	M	1996	Environmental technology	Foreman	Fair	To study
Middle wage level							
B1	22	M	2000	Information technology	Manager	Very low	NA
B2	22	M	1999	Manufacturing	Quality Control Supervisor	Don't know	To study
B3	32	M	1994	Management	Qualified technician	Fair	To teach
B4	31	M	1995	Manufacturing	Foreman	Fair	To run a business
B5	23	F	1996	Environmental technology	Qualified technician	Very low	To teach

continues..

<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>	<i>Current position at time of interview</i>	<i>Job satisfaction</i>	<i>Main expectation*</i>
B6	27	M	1994	Marketing	Director	Very high	To run a business
B7	NA	F	1993	Information technology	Engineer in systems	Fair	To leave the country
B8	25	F	1995	Management	Administrative assistant	Very low	To leave the country
B9	29	M	1998	Telecommunications	Qualified technician	Fair	To study
B10	24	M	1997	Information technology	Foreman	Fair	To run a business
B11	21	F	1999	Marketing	Administrative assistant	Very high	To emigrate
Low wage level							
C1	23	M	1997	Environmental technology	Qualified technician	Fair	To run a business
C2	20	M	2000	Marketing	Administrative assistant	Very high	To run a business
C3	NA	F	2000	Marketing	Qualified technician	Very low	To teach
C4	22	F	2000	Management	Administrative assistant	Fair	To run a business
C5	23	F	1999	Management	Qualified technician	Fair	To run a business
Unemployed							
<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>		<i>Main expectation*</i>	
D1	22	F	1999	Marketing		Don't know	
D2	22	M	1999	Environmental technology		To run a business	
D3	24	M	2000	Marketing		To run a business	

* This excluded the option "studying for a first degree" which was already included in the questionnaire
NA= No Answer

As we can see, the Table 8.1 shows that those graduates who have a high wage level (Code "A") belonged to the first generations of the UT students, while the low paid and unemployed technicians ("C" and "D") finished their studies more recently. This may be explained by the fact that as soon as educated people start gaining job experience and building their social networks they are likely to be better paid. Although this finding may be common to all workers - whether or not they are UT graduates - it is important to take into account the fact that people who entered the UT did not have a high chance of

studying in higher education, since they came from the relatively poor brackets of Mexican society. So the UT entitles people to participate in production activities.

In terms of specialization, it seems that a higher number of well-paid graduates are concentrated in careers such as IT rather than in administrative fields such as Management or Marketing. However, as we shall see, occupations related to IT imply more unfair job conditions than clerical jobs.

Following this discussion, the quantitative analysis showed that the careers of Marketing and Management registered high proportions of unemployed respondents (27% and 19% respectively) compared with those such as Manufacturing (15%) or Environmental Technology (12%) (see Table 8.2).

Table 8.2. Proportions of unemployed graduates by career

<i>Career</i>	<i>%</i>
Marketing (<i>Comercialización</i>)	27
Information Technology (<i>Informática</i>)	22
Management	19
Manufacturing Processes	15
Environmental Technology	12
Telecommunications (<i>Telemática</i>)	4
No Answer	1
Total	100

Besides having the bulk of the jobless (46%) in a random sample (see quantitative analysis), Marketing and Management also have more low paid graduates than high paid graduates in the non-probabilistic sample of this study. What is more interesting is that Roberto Reyes (2000), Rector of the UTN, reported that 23% of the total entrants in the school year 1999-2000 chose Management as a first option, while 15% selected

Marketing. So 38% of entrants to the UT of Neza picked up careers whose current graduates were having problems in finding a job owing to a constrained labour market. These findings question the rationales for the relevance of education proposed by educational planners.

It seems that what students are demanding is incompatible with the "real needs" of the productive sector, since employers are not able to offer well-paid positions in the careers that most of Neza's young people have chosen. Why are the UTs offering these careers if, firstly, they are not technically-oriented careers and, secondly, they do not create better chances to attain a remunerative job than technical disciplines? An answer points to a contradiction in Mexico's educational policy. These "traditional" careers are attracting a high number of young people who are needed to fill the capacity of the UT. To have a large number of students helps to reduce the cost per student and to legitimise this modern model of higher education both politically and financially. From this perspective, it can be claimed that the UT model of education can combine the divergent interests of Mexican young people, employers, policy makers and rectors, and thus it is crucial to determine whether the aims of these groups of people can be combined in order to achieve, through education, what Sen calls "development as freedom".

Further discussion of this issue is needed. So, in order to understand the situation of Neza's young people, the next part discusses some theories about the ways in which social structure affects human beings' decisions.

II. Where education reclaims a place: Issues in structure and agency.

To understand what a university can do in favour of human beings, it is necessary to trace their socioeconomic backgrounds. The Mexican UTs are aimed, as the rectors have recognised, towards those young people who live in less privileged contexts and who did not have any chance to study at the higher educational level before the UT was opened.

Delivering education services in poor regions is thus a pursuit of "*equidad*" (equity), according to Arturo Nava, the General Co-ordinator of the Technological Universities. Yet the policy of offering higher education in deprived zones also needs to be analysed in broader sociological perspective.

The existing inequalities that the technological universities are facing cannot be overlooked since these factors may be affecting the "process for expanding the real freedoms that people enjoy" (to use Sen's words). Although Amartya Sen recognises the existence of "unfreedoms" in the process of development, which "leave people with little choice and little opportunity of exercising their reasoned agency" (1999:xii), he also argues that "with adequate social opportunities, individuals can effectively shape their own destiny and help each other" (Sen, 1999:11). The question is, how can a UT graduate avoid her or his "unfreedoms" in order to shape her or his destiny if as some sociologists of education have observed in some societies, educational systems may reproduce economic and social inequalities? For example, Samuel Bowles argues that:

schools have evolved in the U.S. not as part of pursuit of equality, but rather to meet the needs of capitalist employers for a disciplined and skilled labor force, and to provide a mechanism for social control in the interest of political stability (Bowles, 1977:137).

So, it seems that according to Bowles there is little room for shaping individuals' "own destiny", as Sen argues, because "schools often encourage students to develop aspirations and expectations typical of their social class" (Bowles, 1977:146).

For Bourdieu educational systems can contribute to the reproduction of the structure of power relationships and symbolic relationships between classes and therefore suggests that:

to study the laws that determine the tendency of structures to reproduce themselves by producing *agents endowed* with the system of predispositions which is capable of engendering practices adapted to the structures and thereby contributing to the reproduction of the structures. (1977:487 my italics).

If one accepts the structural perspective of Bourdieu or Bowles, one might derive the kinds of changes which could occur once we have certain deterministic movements or tendencies and “agents endowed” with “predispositions”. But Bowles and Bourdieu say little about the notion of human agency that leads us to acknowledge people as responsible persons who “act or refuse to act, and can choose to act one way rather than another” (Sen, 1999:190). Bearing this in mind, it is necessary to examine whether, through higher education, people are able to avoid or, even, to transform such structures by exercising their agency. Arguably, a reinterpretation of how structures affect human agency, and vice versa, needs to be discussed. When Sen recognises that there is a “complementarity between individual agency and social arrangements” (1999:xii), he lays a basis for such a reinterpretation. Therefore, the whole thesis analyses the relationship between higher education and the development of human beings by taking into account such “complementarity”.

Having stressed the necessity of theoretical explanations of structure and agency in the educational sector, let us move on to discuss our empirical evidence.

III. Choosing a university at Neza: Unequal chances.

As discussed above, it is important to trace the socioeconomic background of UT graduates in order to know whether their aspirations as technicians correspond with those of their parents or their respective social classes.

The quantitative analyses showed that the bulk of respondents (33.7%) had studied in the UT because they were not accepted in the main public universities of Mexico City such as the National Autonomous University of Mexico (UNAM); the National Polytechnic Institute (IPN); and the Autonomous Metropolitan University (UAM). Academically speaking, the UT graduates did not qualify, through a national examination, for entry to these three public universities. Most of them had to choose the UT as a second choice.

Apart from being rejected from these universities, economic restrictions also limit people's choices in educational terms.

Economic restrictions also influence the academic preferences of Neza's young people.

When I asked a graduate why he studied in the UT, he replied as follows:

Because of my less privileged economic situation and the short distance between my house and the UT. Apart from that, the UT educational model and its curriculum suits me. Before coming to the UT, I studied Electric Engineering in the National Polytechnic Institute for three years, but I had to quit it due to economic problems (A2).

Sadly, this graduate had to drop out of his studies due to lack of money. There were no institutional mechanisms such as scholarships or grants to support this graduate in his studies in the IPN. Moreover, it is evident that this TSU could not afford the cost of studying for more than three years. Despite the differences between the educational model of the IPN and the UT, the latter allowed him to resume his studies. The process of choosing a higher education institution involves, as the same graduate said, "several factors", such as the economic situation; the length of study; and the expected job opportunities (A2). In his reasoned answer, this technician underlines the difficulties of choosing when people have to meet their needs in the short term. For this reason and given the existing inequalities in Mexico, the short courses provided by the UT have been suitable for almost 31% of Neza's respondents.

In this vein, a graduate who occupied a foreman position said that if he had the chance to study for more than three years he would choose the UAM, but he selected the UT because he "needed to give money in order to contribute to the household income" (B10). Similarly, and as a result of economic restrictions, a female graduate "did not have any other option" (A3): she had either to study in the UT or return to her home city (Morelia⁴⁰). These accounts support the claim that before the creation of the UT, it "was very difficult

⁴⁰ Morelia is the capital of Michoacán state in the mid-west of the Mexican Republic.

to have access to any university due to economic problems" (A3). In addition, some young people "had to wait to be accepted" in other schools in order to study for a higher education career (C5).

It is difficult to predict what would have happened if the UT had not opened its doors in this region of the State of Mexico. I would say that as there are tremendous social and economic inequalities in Mexico, this vocational-oriented model of higher education is an option for meeting, to some extent, the academic needs of Neza's young people. Furthermore, although this academic institution has had a considerable number of drop-out students, it has also avoided exposing some girls and boys to a more deprived situation by enrolling them onto their academic courses. For these reasons I would not blame the UT as a "reproducer" of inequalities from one generation to another since it has helped to remove some of the obstacles facing locals. A female graduate underlines the importance of the UT at Neza by saying:

I wanted to study a short career since I needed to work because my father had emigrated to the USA, so when I was working in a corner shop I heard in the radio about this university and I came to it (B8).

Equally, while I avoid calling a UT "reproducer" of inequalities, I would not say that this academic institution is a unique "booster" of regional or national development. From my point of view, both the reproductionist and functionalist perspectives neglect the integral approach by which the relationship between education and development should be analysed.

An academic space should be regarded as a social opportunity for individuals and since "education and skill are embedded in human beings [...]" (Bowles, 1977: 141) these human beings need to be considered as "responsible agents" who act or refuse to act, and can choose to act one way rather than another (Sen, 1999:190). My view does not omit that there are structural disadvantages - in Sen words, "unfreedoms" - rather, I follow

his idea that we should see human beings in a broader perspective.

Since Neza's young people are choosing their universities in the face of economic and academic restrictions, the term *equidad* (equity) needs to be discussed broadly and to be used more carefully⁴¹, even though poor young people are benefiting from education provision.

The graduates' passages shown here highlight to an alarming extent the difficulties of studying in the major public universities of Mexico, which young people have good reason to choose⁴².

IV. "Culture inherited" or social mobility? Illustrations from Neza.

As was said earlier, despite the fact that the UT of Neza has been selected by most graduates as a second choice for studying a higher education level, it is fair to say that this institution has been a means for social mobility. During the interviews, it was found that most of the graduates interviewed have attained a higher level of schooling than their parents.

More interesting was the fact that the schooling of graduates' parents was not associated with the level of income of technicians. That means that some graduates could be well-paid irrespective of their parent's educational backgrounds. This fact underlines the benefits of education in regions such as *Ciudad Nezahualcóyotl*.

⁴¹ Another misinterpretation of "*equidad*" in the higher education system in Mexico is discussed by Flores Crespo (2000a).

⁴² One of these universities is the National Autonomous University of Mexico (Unam) where tuition fees are almost nil (Mx\$0.20), and whose academic and research quality are widely recognised.

When a graduate in Marketing was asked what level of education her parents had achieved, she said:

They finished only the primary school thus they felt very proud when I finished my studies. They could not study due to economic problems. Once they let us [to her brothers and sisters] know that their heritage would be our studies.

For me it was very difficult to write my thesis so when the examination board told me: "You have passed, now you are a TSU", I started crying, it was a very dramatic time! Then I saw my parents very happy and I felt a huge satisfaction; "I got it", I said (B11).

Studying cannot be regarded as a simple process of attending school. For some less privileged young people, to finish a degree is a valuable "heritage". Acquiring knowledge and socializing within an academic space make education a relevant issue in terms of social policy. This point is supported by a graduate who said:

When you go to university you not only do it for taking courses but so you become more concerned of things that are happening in politics, religion...If I had not studied, it would take me longer to understand certain things. This is the difference between studying and not studying (B10).

For this graduate of *Informática* (IT), the UT was not a limited space in which only courses were provided. Independently of the type of teaching or the curriculum content, he could develop his reflective capacity. This point stresses the wider impacts of going to school irrespective of the type of courses taught (general or vocational).

Interestingly, an unemployed graduate answered that her father had studied Civil Engineering while her mother went only to primary school. The low schooling of her mother was explained by this graduate as follows: "this was for *machismo* because my grandmother supported her sons rather than her daughters" (D1). Despite that, this graduate recognised that there was no discrimination against her by her parents and hence that she could attain a higher level of education than her mother. In this case the idea of "culture inherited from the past" was not corroborated; rather this fact stresses the importance of the UT as means of social advancement.

V. Evaluating functionings of the UT graduates

With the aim of assessing the impact of the education provided in the UT, I will use the seven functionings described in Table 8.3. As described above where functionings are the achievements of a person, that is, "what he or she manages to do or to be" (Sen, 1985a:10).

Table 8.3. Functionings to be evaluated by category

<i>Personal Improvements</i>	<i>Professional Achievements</i>
1. Being able to feel confident and self-reliant.	5. Being able to acquire the knowledge required in a job position.
2. Being able to visualize life plans.	6. Being able to look for and to ask for better job opportunities
3. Being able to transform commodities into functionings	7. Being able to choose jobs desired.
4. Being able to develop further abilities.	

It is important to bear in mind that the quantitative analysis showed that only two out of 451 respondents answered that their studies at the UT were "not useful at all", whereas 40% (182) of graduates recognised that the UT helped them to "acquire innovative knowledge" for their work. Furthermore, 16% (71) of the respondents considered that this technical institution contributed to "fulfilling their personal aspirations": for instance to be "an educated individual and to think more analytically and critically". This proportion is six points above, in relative terms, the option "to improve my monetary income," which was given by 47 graduates (10%). This data reinforces my argument that the UT has been an academic space for contributing to the expansion of professional and personal achievements. However, I would not say that structural "unfreedoms" have been removed by delivering technical education in relatively poor regions. Let us move on to analyse, first of all, the things that the UT has done well.

A. Personal Improvements: Raising theoretical difficulties.

In his article *Unequal education and the reproduction of the social division of labor*, Samuel Bowles argues that:

given the existing institutional arrangements, the ability of a school to change a child's personality, values, and expectations is severely limited. The responsiveness of children to different types of schooling seems to depend importantly upon the types of personality traits, values, and expectations which have been developed through the family (1977:147).

Although my subject of analysis is university graduates rather than children, this does not preclude the observation that Bowles seems to nullify the capacity of *any academic space* to change the attitudes and aspirations of pupils. Family influences are, for Bowles, determining factors of personality and expectations. The structural perspective of Bowles is empirically inconsistent with my findings.

As a consequence of studying in the UT, some interviewees mentioned feeling more "self-confident" and "secure" persons (A1, B2, B3, B10); "more mature" and "open" (A2, A7, C5); "more accountable and committed" individuals (A6, A7, B2, C2) and "aware" of things happening in context (C2). Such benefits were achieved independently of the graduates' labour situation and of their wage level. In fact, an unemployed graduate mentioned that his main personal changes were:

The way of thinking, my expectations and the development. When I began my studies in the UT I did simply because I could not stand doing nothing (*por no quedarme*); but once I finished, that I worked, I wanted to study more just for personal development (*superación*). My dream is to become an engineer... My mentality changed...I know that I can achieve things (*sé que puedo hacerla*) (D2).

Since the academic expectations of this graduate have changed, and he is now trying to study for a first degree, I cannot accept the idea that "students' and parents' aspirations and expectations concerning both the type and the amount of schooling are strongly related to social class" (Bowles, 1977:146). Studying in a UT represents a first step - but

"a great leap" - for achieving further stages of personal and professional development.

A female graduate whose wage was highly ranked said that thanks to the UT,

I have met many people. If I had not studied, I would still be trapped in the same social cycle. So, when I realized that I had the "weapons" and the "tools", I had the courage to jump outside from that social circle and start to look for better opportunities; to know different people, to look for other jobs. I think the UT gave me a lot of benefits (A5).

Being able to feel confident ("to have courage") and to look for "other" job opportunities are two "functionings" which are inexorably linked in the last passage. Another graduate also underlined the way in which "doings" and "beings" are working together:

...I changed some attitudes; for instance, in the past I was very doubtful to do and to say things, but as I am getting to know my working area much better, this [doubtfulness] is less recognizable (A2).

Functionings appear to be a suitable mechanism for understanding more coherently what education can do in favour of human beings. As we can see, what a person can do in specific work may be complemented, or even improved, by "states of existence" such as not being shy to do or to say things. In the case quoted above, shyness was a characteristic of this graduate which gradually vanished as he was involved in productive activities.

On the other hand, some graduates accepted that if they had not studied, they would not have been able to speak as easily and openly as they do: "I am no longer shy," a jobless female said (D1). Another graduate pointed out that in the past she was "very shy" but that now she is a "self-reliant person" (A1). This graduate is occupying a position as Coordinator of Information Systems and thus she is a well-paid worker.

Bowles suggested that, "to some extent schools introduce common elements of socialization for all students regardless of social class" (1977:147). I would add that,

independently of the type of education provided (technical or general), personal attitudes can be modified inside school walls, especially if pupils come from less privileged sectors of society. A graduate who noted that her personal attitudes had changed highlighted the way in which an academic space contributed to this transformation. She said:

I was a shy person; I could not even speak with people but as I was getting involved in the academic activities of the UT such as giving presentations, interacting with people from companies and so on, I started to change. For example, in my current occupation I have to treat many people and I do not feel that sensation [of being shy] anymore (C4).

Although Bowles also argues that the ability of a school to change a "child's personality" is limited, he also points out that "discipline, respect for property, competition, and punctuality are part of the implicit curriculum of virtually all schools" (1977:147). In this sense, the UT's case provide us with evidence. A graduate comments becoming a more "diligent" (*dedicada*) student:

In the upper secondary school I was reluctant to learn and I only studied to pass the exams. When I entered the UT I became a more diligent student. Teachers taught me how to study, which I had ignored. For these reasons, this school deserves my recognition because it taught me things that I did not know (C3).

This graduate was also able to "learn how to learn and this is quite important for the rest of my life" (C3), she said. Thus, the UT cannot be seen as "limited" or a "reproducer" space since it is forming human beings who have aspirations and expectations, as well as difficulties and tribulations. Being involved in a learning process is crucial for human beings' development. A graduate, whose parents studied at secondary school level, considered the UT to be beyond a technical institution when he pointed out that:

somebody said that the school contributes to the formation of human beings and I have no doubt about it (A6).

So knowledge helps “to thrive us as human beings” (B2), as another graduate said. The UT graduates are recognising an important role of the UT as an academic space where their “beings” have improved. This fact calls into question the deterministic perspective of Bowles in education and inexorably leads us to think about the role of a person as a responsible agent who is “fundamentally distinct from (though not independent of) the role of the same person as a patient” (Sen, 1999: 190). No doubt, this claim raises theoretical challenges since “action and structure normally appear in both sociological and philosophical literature as antinomies” (Giddens; 1979: 79).

The way in which structure and agency interact, with education as an external force, is a fertile area for future research. As an attempt to approach these complexities, this work uses Sen’s idea of “the deep complementarity between individual agency and social arrangements” (Sen, 1999:xii) with the aim of understanding what education can do for people within a complex of structural impediments.

During the interviews with graduates, it was found that such “complementarity” was implicitly mentioned by them. When Sen argues that “the freedom of agency that we individually have is inescapably qualified and constrained by the social, political and economic opportunities that are available to us” (1999:xi-xii), he recognises that people have to deal with difficulties beyond their capacity to act or re-act. Empirical evidence for Sen’s ideas was found when a graduate answered my questions as follows:

(Researcher) What were the main changes in your personality before, during and after studying at the UT?

(C2) It was a radical change. When I was studying in the UT I was not a very mature person and now this has changed.

(Researcher) Would you attribute such changes to your personal effort or to the role of the UT?

(C2) Both. You can have perseverance, but if the context is adverse, it is difficult to develop yourself. The context could influence you negatively, [at the same time] you may be also involved in a nice atmosphere. So both perseverance and context can be integrated in order to make you an accountable person.

So, individuals' "perseverance" is not enough: contextual conditions should exist to improve the function of being a "more accountable person". This simple recognition is basic for realistically assessing the impact of educational policies.

This section has questioned the structural view that suggests that academic institutions reproduce values and culture from one generation to another, since human agency plays a key role in the relationship between education and development. Based on the information given by graduates, it can be argued that the UT of Neza is an academic space which has worked as a mechanism for upward social mobility and as a social opportunity for expanding some "beings" of locals. Personal improvements such as self-confidence, more accountability, self-reliance and "not to being ashamed" of talking to people were found to be effects of studying in the UT.

It is important to say that I have looked only at part of a broad problem in social theory by providing some empirical evidence gathered from UT graduates in Mexico. I think that further analysis will shed light on the duality between structure and agency. Doing this will surely allow us to find another theoretical framework for the study and understanding of the relationship between education and development.

Now it is necessary to examine what graduates can *do* once they have acquired technical skills.

B. The professional achievements of UT graduates. Mission completed?

This section will evaluate those functionings that Sen calls "human abilities". The question to be addressed here is, what can a TSU do with the knowledge acquired in the UT of Neza?

When we consider that 82% of the respondents got a formal job and 39.5% of them were employed in less than a month, we can say that the TSUs were accepted relatively

easily in the labour market. Since “unemployment contributes to the social exclusion of some groups, and it leads to losses of self-reliance, self-confidence and psychological and physical health” (Sen 1999:21), the UT is playing a useful role by providing relevant skills for performing productive activities. Obviously, these labour market indicators are not a unique gauge to measure the success of this educational model; neither do they constitute a sound basis for arguing that people have fulfilled their aspirations as human beings.

As the majority of respondents pointed out that the UT has helped them to “acquire innovative knowledge” for their jobs, it can be said that the functioning of “being able to acquire the knowledge required for a job position” is satisfactorily tested. Additional information gathered for the qualitative analysis confirmed this point.

Apart from benefiting Neza’s young people in personal terms, the academic courses provided by the UT curriculum have promoted skills for the world of work. In graduates’ words, this institution provides “the tools and means” for working (B2). An unemployed graduate supports this point by saying that the UT “gives you *lo que más necesitas* (the knowledge required) thus there are possibilities to get a job in the short term” (D2). So, “there may be more chances to crack the restrictions of the labour market if you are academically well-trained (*preparado*)” (C2). Arguably, the technical education provided by the UT has enabled students to participate in production activities.

By studying for a technical career some graduates have met their professional expectations. For instance, a graduate who occupied a foreman position said that if he had not studied, he would not have “specialised work, I would be a workman, a technician in electricity or something like that”(B10).

Equipping students with practical skills for improving their chances in the labour market is a function that the UT of Neza has done well, especially given that UT students come

from less affluent sectors of Mexico's population. Additionally, job experience has been another "bonus" for creating opportunities in the restricted labour market of Mexico.

Job experience gives people a greater capacity to do more specialised tasks. This accumulated expertise is a benefit in the building of a professional career. According to a graduate - aged 25 - finishing a course in two years has larger benefits because,

I think that the short courses provided by the UT have a great advantage compared to longer careers that you finish when you are 26 years old: the acquisition of job experience for employment in the labour market (A1).

This graduate added that she felt "very capaz" (competent) to perform her assigned tasks. In fact, she considered that her current position was below her abilities (A1). This point is important since it highlights a common "over-training" phenomenon in which there is a mismatch between the abilities acquired and the abilities required that may be frustrating for graduates. This fact starts to reveal problems in the Mexican labour market.

During the interviews I noticed that, as I was asking UT graduates deeper questions about their job conditions, they seemed aware of their opportunities in the labour market. Initially, they mentioned the positive aspects of the link between the UT and the world of work, but eventually the graduates themselves highlighted the problems that are faced in the productive sector. This observation emphasises the importance of the qualitative approach in the study of education and development.

It was found that some graduates considered their studies at the UT as the beginning of their "productive life" (A4). This type of education "gives us some basics for building up a professional career", as another TSU said (A2).

As technicians start dealing with the problems of the labour market, they discover the limitations of holding a technical degree even though they can find a job quickly. A graduate from the career of Environmental Technology recognised that:

I am equipped with knowledge and thus I can deal with any situation. The UT gave us the "weapons" to do something for ourselves (*salir adelante*); I am very grateful to the UT...but the wages for technicians are very low (C1).

The simple fact of finishing a technical career does not mean that all UT graduates are in a fit state to make a lot of money, "this is false" (C2). Besides the level of schooling, there are many factors that can explain wage rates such, as job experience, informal contacts, regional and national conditions, and even luck in finding a "good job". What was noticed in this case was that some graduates with the highest wages were not occupying technical positions, whereas most graduates ranked in the group of lowest wages held a position of "qualified technician" (see Table 8.1). One might infer that technical positions at Neza are not highly rewarded. Do these facts explain why, despite their rapid access to the labour market, 90% of the UT graduates wanted to study for a first degree? This question is addressed in the next section.

VI. Why the UT graduates want to study for a first degree

According to the quantitative analysis the two main reasons for studying a first degree were: "to acquire further knowledge" (45%) and, "the possibility of obtaining a better job" (31%). These explicit reasons point towards two things. The first is the necessity of acquiring more expertise, which may be theoretical or practical. The second is the need for a more remunerative labour situation.

On the other hand, encouraging graduates to go further in their studies may be seen as another effect of having studied at the UT. This is remarkable since, as has been said repeatedly, these higher education institutions are committed to preparing less favoured young people. This fact must not be underestimated since in deprived areas of other countries there are civil organizations trying to "overturn the notion that people from poor

backgrounds should forget about college".⁴³ Therefore, the desire to study further should be seen as a positive effect of the UT rather than a failure.

But, going back to the labour market problems, according to some graduates, employers are giving more importance to their *papelito* (diploma) than to their knowledge. In this sense, a high-paid graduate noted that:

Although in recent times technological education is becoming popular, there is a degree of *discriminación* (discrimination) in the labour market. This is due to the fact of being a technician nor the lack of expertise but to the idiosyncrasy of employers who have overvalued the diploma. The diploma of bachelor is required to occupy a "white collar position" irrespective of your knowledge. This is a limitation for the students [in terms of] climbing the job ladder (A2).

In a more secure way, another well-paid graduate pointed out that:

I think that I have the same knowledge as a bachelor, though in Mexico if you say that you are technician, you are undervalued. Here the diploma is very important. A TSU cannot occupy the same job position and thus there is a gap in the wage rates (A4).

It is clear that graduates are pursuing higher job positions, but that, the "limitation" lies in the TSU diploma, as two graduates remarked (C1, A6). A graduate whose job occupation was foreman noticed that:

According to the publicity for promoting the UT model, the TSUs are suitable for positions between "white collar posts" (*la alta gerencia*) and operative works. This limits the role of the TSU, so it would be more convenient to say that these professionals can be employed in any position (A2).

⁴³ Duncan Campbell reports on inequalities experienced by Latin American and Black minorities in the educational system of California, USA. An organization called South Central Youth Empowered through Action (SC-YEA) is trying to deal with these difficulties (*The Guardian*, 25.08.01).

This "limitation" has also, paradoxically, been promoted by the General Co-ordination of UTs itself⁴⁴. The clash between the objectives of the "original" UT model pursued by Mexican educational authorities and those of graduates deserves broader consideration. When the OECD (1997), as well as educational planners, believed that Mexico needed technicians to modernise its economy, they paid little attention to the fact that these technicians would *aspire* to earn wages which were not commonly offered for "intermediate qualifications".

Rigid schemes of what education *must do* for an economic structure through the formation of "human capital" have omitted the wage structure of Mexico and it paid little attention to the capacity of persons as "responsible agents who to act or refuse to act" (Sen, 1999).

In this case, UT graduates do not have the same preferences as politicians or educational planners. As graduates gain personal and professional achievements, they still pursue the conditions to "thrive" (to borrow a term from a graduate) and education is playing a key part in this process. It is very unlikely that UT graduates will remain static or resigned to holding a technical diploma, even though they come from relatively disadvantaged backgrounds. This aspiration calls into question the objective of preparing technicians for Mexico's economy.

Here the problem is to know objectively if there are big differences between the qualifications of a technician and those of a bachelor. Attempting to address this question some graduates have pointed out that "in Mexico the diploma of the TSU is not recognised" (B1). However, when I asked some graduates if they had problems finding a job for this reason, some replied, "not at all; sometimes employers give more

⁴⁴ The General Co-ordination of Technological Universities (CGUT) published a book which was entitled *Universidades Tecnológicas. Mandos Medios para la Industria (Technological Universities. Preparing Intermediate Qualifications for Industry)* (2000, México: SEP-UT-Noriega).

importance to practical skills than to the diploma". Another graduate said that in his company there was no "bias in the selection process" (A6). I therefore have some reason to doubt the existence of a "terrible" diploma disease.

As the interviews became deeper, additional comments were found to support my scepticism. It seems that, aside from the "undervaluation" of the TSU diploma, some gaps were found in the knowledge acquired by technicians. A graduate who was the Head of Technical Support said that:

What I learned in the UT has been very useful. But, it would have been much better to study for a first degree in order to acquire more *experiencia* (experience) in other areas (A6).

This quotation points to shortage of academic competence for performing productive activities. This is consistent with another graduate's account. She said that, "as you start dealing with problems in the labour market, you realise that your knowledge is elementary" (A5). So, the knowledge provided by the UT may represent only the basic requirement for starting a productive career, although to some extent, the diploma is still a proof of the knowledge acquired. On this topic, a graduate accepted that:

In the past, I did not think that "*el papelito*" (diploma) was important to attain a better job such as manager, but now I changed my mind, the diploma "*abre las puertas*" (broadens your perspectives) (A1).

Thus, there are differences in the qualifications of a technician and a bachelor. This is supported by a unemployed graduate who noticed that when he was working, he possessed "more knowledge than the rest of the workers" - who were graduates from a technical upper secondary school called *Conalep*" - but a bit less than the engineer" (D2).

Furthermore, if people want to be involved in academia, the TSU diploma is not enough. For example, a technician who wanted to do research found she needed a first degree

(B5).

To sum up, the aspiration of UT graduates to become bachelors is justified since the “white collar positions” are occupied by those professionals with higher educational attainment than the technical level. Though this may be seen as a result of diploma disease, graduates themselves underlined differences in the knowledge acquired by a technician and a bachelor. The fact of the desire to study for a B.A. after a technical qualification should be seen as a positive effect achieved in the UT - rather than a failure of it - since it shows that the UT is giving the basics for starting a larger process of learning.

VII. The quality of life and education: Two issues inextricably linked.

Having evaluated the impact of the UT on its graduates through “functionings”, it is necessary to explore those factors that may improve the quality of life of these young people. Therefore, I asked graduates a broad question: “what would you do in order to *“vivir mejor”* (live better). The aim of this question was to identify not merely what a person achieves but also what opportunities a person has to choose from (Sen, 1985a).

It was found that some graduates valued the “academic level” as a element for achieving a better *nivel de vida* (quality of life) (B11). In a more explanatory way, another TSU pointed out that:

A person that *se prepara* (grows up academically) could broaden her perspectives and meet their expectations contrary to those who *se estanca* (remain static) in academic terms. For the latter person it seems more difficult to achieve her goals because of her level [of schooling] (A6).

This graduate was asked to be more specific regarding the term “*se prepara*” and he spontaneously replied: “to complete the first degree”. This reinforces the idea that the UT sets a basis for a larger process of learning because:

One never stops learning. My best option would be, in the short term, to complete my degree of engineering and then to pursue a master course. I'd like to study to know more about manufacturing, know more people, acquire theoretical knowledge, all this would be an excellent opportunity! (B2).

As we can see, studying is not only related to productive aims. The acquisition of more knowledge would be an "excellent" chance for socialising as well. The relationship between education and the labour market is only one piece of the puzzle. "Working is important, but for doing well in your job you need to be *"preparado"*, so the company benefits from you and you may benefit from the company," as a graduate said (C3).

Equipping students with practical skills for work is a thing that the UT has done well, but it is necessary to investigate what opportunities technicians have for enhancing their standard of living.

A graduate whose job satisfaction level was "very high" mentioned that for having a better standard of living, he, "first of all" needed to complete a first degree and:

once having finished this, then look for a better job and emigrate to another country to work, but not as a wet-back! (C2).

To aspire to emigrate from the country "not as a wet-back" shows a capacity of this graduate to lead his life as he prefers and this is partially thanks to his studies. The reasons for emigrating were also remarked upon by this TSU. He said that:

Mexico lacks good job opportunities and this is general, in the whole country. I have some cousins in other states such as *Guerrero* and *Michoacán* and we agree that there are not jobs that can meet our needs (C2).

Employment, as one graduate said, is "a departure point for anything else, if you are ambitious you thrive and then get what you wish" (D1). So, the UT graduates agreed that education sets a basis for choosing. The key point is to explore what opportunities are

available in the region to enhance "human freedoms".

VIII. "Instrumental freedoms": Blocking the educational endeavour at Neza?

According to Sen, "the instrumental role of freedom concerns the way different kinds of rights, opportunities, and entitlements contribute to the expansion of human freedom in general, and thus to promoting development" (1999:37). Sen distinguishes five "instrumental freedoms" (i.e. political freedoms, economic facilities, social opportunities, transparency guarantees and protective security). In methodological terms it is difficult to consider all these *means* of development in analysing the effects of studying in a UT. Therefore, this research considers only economic facilities and social opportunities, as being the most convenient for evaluating whether UT graduates are expanding their capabilities.

One of the principles of the Human Capital Theory (HCT) is that, if a person is better trained, she can become more productive, and thus her future earnings will be higher. Under this theoretical framework, it was thought that investment in human capital would boost the economic growth of nations. Hence allocating public money to the educational sector was profitable for a nation. Nevertheless, this idea said little about "why economic growth is sought in the first place" (Sen, 1997) nor, moreover, about what type of job opportunities are available for trained or educated workers. It was believed that trained people would take jobs without restrictions, however, this assumption was soon questioned due to the segmentation and fragmentation of the labour markets.

Although Amartya Sen recognises that the HCT places humanity at the centre of attention, he also criticises this approach for its focus on the agency of human beings in augmenting production possibilities, leaving little room for explaining "the ability of people to lead the lives they have reason to value and to enhance the real choices they have" (Sen, 1999:293). When Sen speaks of choices, he leads us to think about what options

a trained or educated person can select to improve her life. Following Sen's approach it is necessary, after having evaluated graduates' functionings, to analyse whether UT graduates have the means to flourish within their respective contexts. This will give us a wider picture of Sen's human capabilities approach as applied to the analysis of education and development.

A. Economic facilities

Economic facilities "refer to the opportunities that individuals respectively enjoy to utilize economic resources for the purpose of consumption, or production, or exchange" (1999:39). Arguably an educated or trained person may be more likely to maximise such opportunities since schooling, as Bracho says, intrinsically has an "exchange power" by which people can access "employment, level of income, and other personal and social benefits" (2000:251). Sen (1999) supports this point by saying that the majority of people have few resources other than their labour power, which may be combined with their skill and experience. So, this section examines how the UT graduates are trying to change their workforce in the region of Neza.

In order to explore the graduates' perception about their respective contexts, I asked them if they considered that the region of Neza was providing opportunities in personal and professional terms. I avoided mentioning the word "job" in order to find out what importance graduates put on this issue. Through graduates' answers it was found that most of them related "professional opportunities" to employment and only a few graduates made a clear distinction between professional and personal opportunities. Among the latter group, a TSU who held a position of "qualified technician" remarked that:

In professional terms, this region does not give you opportunities. There are no companies that could hire me, the job supply is scarce. In personal terms, there are no spaces to develop your intellectual abilities or where you can go to *entretenerse* (for leisure) (B9).

This quotation starts to unveil the lack of chances that UT graduates have to expand their “freedoms”. Where are the institutions for developing graduates’ “intellectual abilities” and for passing their free time? If education acts as a factor capable of encouraging people to do things and to have different aspirations, the instruments for meeting such expectations should exist, or larger impacts of educational policy may be blocked.

As a graduate said, “many graduates are working in Mexico City; my job was situated two hours from my house at Neza” (B10). It is worth mentioning that I did not interview any graduate in his or her job within this municipality. The bulk of interviews were conducted in the UT itself and in the graduates’ workplaces, which were in Mexico City.

A graduate in a *Procesos de Producción* (Manufacturing) career explained that he had tried to look for a job “in the nearest neighbourhoods”, but that local companies did not offer him a position (B4), so “it seems that job opportunities are concentrated in Mexico City” (A6). From the unemployment side, a graduate said that Neza is a zone characterised by micro-business, “so we have to look for a job where the enterprises are” (D2). This means that, as another graduate remarked, “micro-businesses” are not employing UT graduates, and “everybody is a job seeker” (B6).

If Neza fails in providing fair job opportunities for UT graduates, how can Mexico’s government expect, through the creation of the UTs, to “encourage juveniles to remain in their place of origin and subsequently take up work there” in order to contribute to the “development of that region” (SEP, 2000:81), when graduates themselves pointed out that “there are no job opportunities” (A5).

Due to the shortage of remunerative job opportunities in Neza, UT graduates are “exchanging” their labour power in the capital of Mexico, and the possibilities of becoming involved in other economic activities such as creating enterprises seem nil, even though 26% of respondents wanted to start a business (see Chapter 7). The problems involved

in running a *negocio* (business) were partially explained by a graduate of *Marketing* who believed that the main restriction was the lack of "economic facilities", so that:

if you ask for a loan it is equal to *firmar tu sentencia de muerte* (signing your death sentence). So, you need to save for a while in order to accumulate the capital required (C2).

Given that education or training produces a synergetic effect, it is not surprising that individuals seek options beyond being employed in a company. The key problems are that the lack of easy access to finance can limit the expansion of the economic "entitlements"⁴⁵.

For these reasons, when higher education is heralded as a "booster" of economic growth or development, an inflated idea of education emerges and the factors that form that "virtuous cycle" of economy and schooling are ignored. Therefore,

We need to be realistic about what education can do and what other changes are necessary to maximize the effects of education and to realize our aspirations for economic and social betterment (Levin and Kelley 1997:250).

1. Where does the information about opportunities come from?

In Chapter 5, I noted that although the feasibility project of the university of Neza said that 500 questionnaires were sent to employers in order to identify their needs in terms of the labour force, the results of this survey were never displayed. As a complement of this "missing information", it is worth stressing the knowledge about productive activities at Neza that graduates displayed during the interviews.

⁴⁵ According to Amartya Sen, entitlements "refer to the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces" (1988: 47).

For instance, an unemployed graduate (D1) commented that micro-businesses were the most common enterprises in this municipality of the State of Mexico. She explained that:

Neza has developed little by little; there are many *micro-empresas* (micro businesses) in this zone [...] The majority of these enterprises are *maquilas* (assembly plants) which are not formally registered [with the Ministry of Finance]. They operate in hidden places and they *comercializan* (sell and buy) their products with the big companies in Mexico City.

(Researcher) Do you know some near to your house?

(D1) Not only near my house, they are everywhere!

(Researcher) Could you specify what kind of *maquilas*?

(D1) They assemble rug bags, clothes, shoes, belts, furniture...

(Researcher) So, that means that there may be jobs available; have you ever looked for a position in these enterprises?

(D1) No, because payments are very low, even below the minimum wage. The work is paid by the number of goods manufactured (*a destajo*); that is, "as many goods as you make is what you earn", perhaps 100, 200, 1000 units! In these companies workers do not have health insurance, they can never be absent and, if so, they are either fire out or their payment is reduced dramatically. These are the problems.

It is clear that fair job opportunities are not available at Neza. This explains why UT graduates are moving to Mexico City to "exchange" their labour. In spite of the emigration of educated people⁴⁶ which can be regressive regionally, the fact of moving from one region to another should also be interpreted as a positive functioning of the UT graduates. They are not resting on their laurels, but have the capacity - thanks to being students of the UT - to seek out professional opportunities when the local economy cannot provide them.

Another graduate - whose expectation was also to emigrate to another city - confirmed that in Neza there are many micro businesses, the wage rate is minimal and therefore that "there are no economic facilities by which to have an "acceptable life" (A2).

⁴⁶ On this, see the Mexican newspaper *La Jornada* (01.09.01) which, based on national statistics, reported the growing "brain-drain" of Mexican professionals to the USA.

2. Revealing “unfreedoms”: Technical positions and working time.

If I were to weigh the role of the UT of Neza according to the rapid access of its graduates to the labour market, I would say that the UT could be considered as a successful case. However, this criterion is misleading since it says nothing about the job conditions of UT graduates and neglects to analyse what people can do or be once they are employed. So, the aim of this section is to explore the ways in which graduates are expanding their freedoms as workers.

Although a female graduate was earning a highly ranked wage, she said that her working time was longer than eight hours⁴⁷ a day and that she was not paid for the extra time. Sadly, in Mexico this would not be a novel finding if she had not mentioned her career. She said that:

Contrary to other careers, *Informática* (IT) requires more working time because you depend on information requirements and you have to solve technical failures anytime. So, we do not have *una jornada laboral fija* (fixed working time) (A1).

Similarly, another well-paid graduate who could not enter the UNAM to study Management noted that:

When I came to the UT, I found the career of *Informática* (IT) quite interesting, but it is very demanding, contrary to clerical jobs (A5).

This well-paid graduate also said that she wanted to resign her job “at any time” due to the long working day. She and other employees of her telecommunication company were trying “to negotiate to work one hour more a day in order to avoid coming on Sundays” (A5).

⁴⁷ This is the legal maximum working time per day in Mexico.

There were similar statements from other IT graduates: one of them said that his working time “varies”, that he starts working at 9:00 am, but “*nunca sabe cuando termina* (I do not know at what time I will finish). He explains the reason for these unfair conditions:

On one occasion, the server of the Sony company was broken and they asked us for urgent technical support, paying any amount. I thus worked from 11:00 am to 2:00 or 3:00 am (B1).

I did not ask this graduate if he was paid for the extra seven or eight hours that he worked giving technical support to Sony. However, extra payment is not the most important compensation for that working time. Perhaps this was an exceptional example, but in general terms being employed longer than the legal time may affect worthwhile activities. For example, a graduate admitted that he did not have the chance to study for his first degree due to his long working hours. He added, “if you are not committed to the needs of clients, there will be another person behind you that would do your work” (B1). This means: no choices at all.

The way in which the constraints of the labour market produce unfair job conditions is an issue awaiting discussion in Mexico. Given the tremendous shortage of jobs, employers can be tempted to set their own rules in the labour market, neglecting the well-being of employees. As an example of this complex problem, one graduate’s account is as follows:

My job contract states that my working time is eight hours, but I work twelve or fifteen hours daily; this happens everywhere. There is a competitive labour market in which it is assumed that if you want to work, go ahead (*adelante*), if not, there will be another person who does want to “take it or leave it” (A2).

Certainly, the violation of labour contracts happens everywhere, but in the case of the UT graduates, this “unfreedom” is limiting their main aspiration: to study for a first degree. This affects graduates’ well-being, even though their wages are ranked in the top of our

classification.

According to a graduate of Environmental Technology, to have a better standard of living, he would have to resign his job because it is very demanding: "sometimes you have to come to work on Saturday" (A7), he said. The lesson is that money is not enough for enlarging people's freedoms.

On the other hand, it was noticed that none of the graduate interviewed mentioned institutional support - such as trade unions - for defending their rights as workers. This raises the lack of another "instrumental freedom" in Neza: protective security. Although Sen's definition is focussed on "destitutes", what is interesting is that this author conceives development as a process where both institutions and agents converge. The former are part of the means of development. For this, "to protect" disadvantaged people by providing "fixed institutional arrangements" would expand people's freedoms.

The lack of remunerative jobs locally, specialised work that is characterised by demanding conditions, poorly-paid jobs and a lack of institutional arrangements for defending the rights of graduates as workers all function to limit a larger expansion of graduates' entitlements. For example, the vision of running a business becomes a blur when working time "varies in accordance with the activities assigned" (C2, C3) or when employed graduates cannot achieve further achievements despite earning high salaries because "the problem is the lack of time" (C1).

It may be thought that the UT itself is not responsible for all of these "unfreedoms". Certainly, I would not blame the UT for the employers' attitudes, as the solution should be found beyond educational policy. However, the next part of this chapter will discuss how the UT model is failing to ameliorate social and educational inequalities.

B. The lack of social opportunities in Neza: A cause of inequality

According to Sen, social opportunities include the arrangements that society makes for education, and these influence the individual's substantive freedom. In relation to instrumental freedom, "illiteracy can be a major barrier to participation in economic activities..." (Sen, 1999:39). Since my subject of analysis is university graduates, we cannot talk about "illiteracy" as a barrier to productive participation. I am concerned with a technical degree of higher education (*Técnico Superior Universitario*, TSU).

Prior to the creation of the UT of Neza, there were few universities, and they were mainly private, so "the UT is the only choice", as a graduate pointed out (C2). For this reason and others previously discussed, we ought to recognise the UT as a social opportunity at Neza. Before the UT's creation in 1991, the higher education institutions in this region were, in a graduate's words, "not recognised" in academic terms (B3). So, in the past, Neza's young people were socially excluded from public and highly qualified higher education services.

One of the effects of having studied at the UT is to encourage its graduates, independently of their social or economic background, to pursue a first degree. This is explained by two main factors. The first is that better job positions - which also represent higher earnings - are occupied not by technicians but by bachelors or engineers. According to the quantitative analysis, only 6% of graduates surveyed occupied positions such as "Manager" or "Director". The second factor is that there may be gaps in knowledge acquired by technicians which could be filled by first degree courses. Therefore, 90% of respondents wanted to study for a first degree as they perceived that better job prospects would be available if they became bachelors or engineers.

Taking into account that: (a) the aspiration to become a *licenciado* or *ingeniero* (bachelor or engineer) is remarkable since these young people have experienced unequal opportunities to choose a university, (b) that they come from the less privileged sectors of society and that (c) white collar positions are rarely occupied by technicians but rather by bachelors, it is unfair that the UT was denied the opportunity to provide first degree courses on its campus.

In 1991, the UT model allowed for the continuity of technical levels within these institutions, so that graduates had the chance to study for a bachelor's degree in their local UT or in another higher education school. The UT of Neza began to offer the *Segundo Ciclo* (Upgrading Process) as a complement to the technical level and eventually the diploma conferred will be that of bachelor or engineer.

Although the UT of Neza is an institution equipped with all the facilities for teaching technical levels or undergraduate courses, for unknown reasons⁴⁸, the *Segundo Ciclo* was stopped in all the UTs, causing disenchantment - and political conflicts⁴⁹ - among graduates. One of them said that:

With the equipment that the UT has and if it offers the first degree, surely this university would be an academic institution with a great potential. I do not know who was responsible for this failure [the stopping of the *Segundo Ciclo*] (B3).

Although the Mexican Secretariat of Public Education recognised that "given Mexico's situation and the decision of graduates to continue their studies, it is fair to respond to this aspiration" (SEP, 1991:22), the General Co-ordination of UTs (CGUT) has not yet

⁴⁸ The decision to stop this upgrading process is presumed to derive from political conflicts between a former under-secretary of higher education and a former under-secretary of technological education who, it was said, saw consolidation and the expansion of the technological universities as a threat for the technological institutes.

⁴⁹ On this see the Mexican newspaper *El Universal* on 1st July and 8th August, 1999.

given a coherent explanation for the cancellation of the Upgrading Process (*Segundo Ciclo*). So, who holds “the responsibility for this failure” (B3) is still unknown.

If we agree that the UT graduates come from relatively poor backgrounds, it must be recognised that, “in economic terms, studying was very difficult” (B8). Because of its short courses, the public education provided by the UT has been very suitable for people who need to work in the short term. Despite this, graduates desire to go further in their studies, but the “the problem is that the UT *te limita* (limited you); you cannot aspire to study for a first degree” (B3). This graduate goes further when he explains that:

I am grateful for the UT, but I feel a sort of resentment (*resentimiento*) towards it because the name of *Técnico Superior Universitario* (University Technician) limits you, you are undervalued. The educational authorities did not give us the opportunity of continuing to the first degree.

(Researcher) Did you want to study to acquire knowledge or to change your diploma?

(B3) The world of knowledge is very wide, though you finish a *licenciatura* (first degree), there will be more things to learn

(Researcher) But, do you think that it is necessary to go to school to acquire that knowledge?

(B3) I am looking for that knowledge by studying in the Poli [National Polytechnic Institute]

Two lessons may be drawn from this passage. The first is that graduates may require a deeper knowledge than the UT provides and secondly, that the place for acquiring this expertise is, basically, a school. Fortunately, this TSU is attending a public polytechnic institute (Poli), but what is happening to the rest of the UT graduates? When I asked a graduate if he was studying, he replied negatively because the UT stopped the *Segundo Ciclo*. He added:

The UT sent us to another university in which we could study a *posgrado* (post-graduate) [sic] course to validate our technical degree.

(Researcher) Which university?

(A2) The *Universidad Tecnológica Americana*, UTECA.

The UTECA is a private university which, according to another graduate (B1), charges Mx\$2,000 tuition fees a month just for finishing the *licenciatura*. In addition, this school is not such a “prestigious” institution (B1). Although graduates “have the chance to validate their previous studies, the problem was to stop the Segundo Ciclo” (C3) because such *revalidación* (validation) is not taking place in public universities - free of charge - but in private schools.

Given Sen’s argument that “different kinds of freedom interrelate with one another” (1999:37), it might be thought that different kinds of “unfreedoms” also interrelate with one another. By tracing graduates’ backgrounds it was found that they have had unequal chances to choose between options in higher education. In addition, due to economic and social disadvantage, they *could* study in the UT, but when they wanted to pursue higher levels of schooling, in order to attain better job conditions, the UT denied them this right.

Furthermore, Neza’s young people cannot be full-time students because they need to work to maintain or support their households. “To continue my studies I need plenty of time to be full time student since I have to practice in the labs, but at the same time, I need to work” (B5) a graduate claimed. Another graduate in *Informática* (IT) also pointed out that:

To study for a first degree seems a bit difficult because I need to work and to study at the same time. My work is very demanding besides it is very far from my house and in this region you do not find a job easily. I would like to study, but to do it I need to find a part-time job (B10).

If, as has been shown, the representatives of the productive sector are employing these graduates for longer hours than are legally allowed, how can graduates be “part-time workers” in order to be full-time students? A graduate who worked in a clothes factory argued that the “strongest” restriction on studying for a first degree was:

the working time, there are some *turnos fijos* ("fixed" working hours) in this company and I would need time to study, but the company cannot manage (B2).

As a complement to the poor job conditions, there were few educational opportunities in some companies, which limits the larger impact of schooling in productive terms. Inconveniences seem to continue throughout graduates' careers. In the past, graduates "could not afford to go to school and now time is the main constraint in going" (C3).

Despite being employed and earning a wage, UT graduates do not have the freedom to do or be "what they have reason to value". Arguably, this is not only the responsibility of the UT of Neza but rather a problem in the face of which an integral social policy needs to be developed. However if this public university would provide first degree courses, as was originally planned, without charges during weekends or by using distance tools to reduce costs and, simultaneously, if cooperation agreements could be signed with companies which employ a considerable number of graduates, the direct and indirect costs of studying a BA or BSc could be reduced significantly. The benefits of giving first degree courses in the UT were underlined by a well-paid graduate who said that:

My work is very demanding in terms of time. When the UT offered the *Segundo Ciclo* for upgrading our level of technician to one of engineer, I asked for a permit in the job. That allowed me to study and work at the same time. Unfortunately, the *Segundo Ciclo* was stopped (A7).

Apart from offering first degree courses, the UT could also ask for assistance from the boards of knowledge certification to validate practical expertise in the work place, with the aim that graduates would not attend schools regularly, at risk of losing their jobs.

Stopping the *Segundo Ciclo (Upgrading Process)* in Neza significantly harmed the economic situation of graduates, and new inequalities may yet emerge thanks to this unfair action. Furthermore, if the process of upgrading qualifications takes place in private and poor quality universities, a deterioration of graduates' qualifications may result.

In sum, stopping this opportunity limits graduates' aspirations. Political action seems desirable in order to remove the "unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency" (Sen, 1999:xii).

IX. Transforming commodities into functionings at Neza

A central argument in Sen's theory is that well-being has to be understood in terms of what people can or cannot do (Sen, 1988). Functionings are different from goods, and Sen goes on to say that:

In getting an idea of the well-being of the person, we clearly have to move on to functionings, to wit, what a person succeeds in doing with the commodities and characteristics at his or her command (Sen, 1985a:10).

In this case, one of the most important commodities possessed by graduates is their pay as employees. Monetary benefits can be seen as a means for the transformation of more valuable functionings and thus the achievement of well-being. In order to identify the limits of this conversion, I asked graduates what they would do if they earned 50% more than their current wages.

A graduate in Management answered that if he was better paid, he would like "to complete a first degree and to learn English" (C5). This graduate also explained his reasons for not studying at the moment. He said that:

This job is very demanding. My working time is from 8:00 to 17:00 pm, but I have to stay longer and I am finishing at 19:00 or 20:00 pm. That is the reason for not studying (C5).

As was said earlier on, "unfreedoms" may be related and if so their removal becomes a more complex problem. However, in this case, the UT can rectify its policy and give the chance to graduates to continue their studies on its own campus without charges and with flexible time tabling.

I would say that stopping the *Segundo Ciclo* in the UT of Neza is an unfair policy because it is widening the gap between those graduates who can afford to study in a private university and those who cannot. Moreover, it was found that graduates with high wage levels would pursue study for a master's course if they earned more money, though a restriction would be "the working time" (A2).

Amongst graduates who earned a low wage, the problem of studying was much greater. One of them said that in a case of earning more, he:

would use that money for completing my first degree because tuition fees are very expensive. They charge me almost Mx\$8,500 for four months (C2).

If this graduate earned between one and three times the minimum wage, which means that his income is not sufficient to afford the tuition fees or that 60% of his wage would be needed to pay a private university. Another TSU with the same wage level mentioned that if she had a higher income, she would save it to pay the tuition fees (Mx\$3,000), though in this case, she said, her company would support her during the first term, "but from then onwards I would have to pay it" (C3). When this graduate explained how her company (a brewery) was "supporting" her, another unfreedom emerged. She said that:

We have accepted bad job conditions without complaint (*hemos aguantado*) expecting a job opportunity, so the manager offered us a specific amount of money to complete our first degree, though this should be in a private university because the UT only gives technical careers. We were very worried about saving money to enter the school, so the manager proposed to pay for us the first term (*cuatrimestre*) (C3).

The wait for job opportunities has pushed some UT graduates to work under unfair conditions with the aim of entering the university and becoming bachelors. The wages of this graduate are classified as low and she works "in accordance with the activities assigned", so she does not have fixed working hours. Two questions arise from this fact: What would have happened if the UT had provided the *Segundo Ciclo* (Upgrading

Process) without charging money to its students? And, does the fairness criterion trumpeted by the General Co-ordinator of the UT have a limited meaning under these circumstances?

The project of transforming graduates' incomes into further valuable achievements (e.g., studying for a first degree) faces unfreedoms which are closely connected. Although breaking out from such complexity is beyond the educational system, the UT model is failing to reduce such inequalities by denying the opportunity to graduates of upgrading their technical expertise to the level of bachelor.

The last comment, but not the least, regards institutional support for removing "unfreedoms". During the interviews it was found that none of the graduates mentioned financing schemes such as scholarships, grants, vouchers, etc. for completing their first degrees. On the other hand, when I asked graduates what would happen if they were fired from their jobs, they answered that they "would knock on some doors" (A2), "to look for job chances, searching on the *internet*" (B2) or would "look for a job in a private company" (C5). One graduate mentioned the network which he had built up thanks to his job, as a means for entering the labour market. "I have known people who have offered me job positions," she said.

Unlike the case of Tula (Chapter 9), none of the graduates mentioned the UT's career service as a main supportive institution. So attention should be given to the way this service is operating in the UT of Neza.

X. The other side of the coin: What employers say about the University

Technicians

According to the SEP (1991), the relationship between university and industry (*vinculación*) must begin by discovering the specific needs of the enterprises and organizations of the region where the UT is based. However, in the case of the UT of

Neza, the “needs of business” were not included in its feasibility study (SEP, 1991a) and therefore, we do not have an overview of “what knowledge, abilities (*destrezas*) and attitudes” were considered by employers as important in preparing a TSU (SEP, 1991:47).

This final part of my argument displays the opinions of the seven employers interviewed (see Table 8.4) who commented on four issues: (a) their relationship with the UT, (b) the practical abilities of UT graduates, (c) the attitudes that characterise these professionals and (d) differences between technical levels and bachelors’ degrees. Clearly, these perceptions form part of the broad picture of the links between education and development.

Table 8.4. Enterprises visited by sector and number of TSUs employed

Sub-sector	Number of TSUs employed
MANUFACTURING	
Environmental Lab	4
Clothes manufacture	15
Electronics equipment	NA
SERVICES	
Telecommunications	3
Telephonic services	NA
Agency of recruitment in electronics and telecommunications	NA
Manpower exchange group	NA

NA: Not Available.

In the first five cases in this table, the person who was interviewed was the manager of human resources, though in the case of the environmental lab, I had the opportunity to talk to the boss of two graduates. It is worth noting that none of the employers made any negative comment about the UT graduates; rather, they objectively assessed the

strengths and weaknesses of TSUs as well as underlining some failures in their links with the UT.

A. Deficiencies in the relationship between the UT and industry

The relationship between the UT of Neza and the regional enterprises lies not merely in hiring graduates. In fact, the SEP proposed “a funding paradigm” for the UT in which the productive sector would provide 25% of the total budget of the UT. Although figures from this “funding paradigm” have not been published, it appears that this goal is far from being achieved (as discussed in chapter 6, section V.A).

The SEP also argued that in order to ensure that many students could continue their studies, a Trust of Grants and Loans (*fideicomiso de becas y créditos*) should operate in each UT. The funds should come from “the federal and state governments, the *empresas* (enterprises) and other private sectors (*otros particulares*)” (1991:48). This research showed that the support provided by funding schemes has not been enough, either for studying for a technical career or for a first degree.

In the clothing manufacture, the manager of human resources interviewed argued that the UT is “failing in sending me people when vacancies are available”. Although this may not be completely the responsibility of the career service of the UT - since graduates are responsible for looking for a job - this complaint is consistent with the argument of another employer who remarked on his weak relationship with the UT. He said that:

Four years ago, we attempted to establish some links with the UT, but there was a lot of bureaucracy and the objectives were not clear, thus I did not insist because - sorry for being pedantic - we have many alternatives. We cannot ask constantly if they [referring to the UT] want to have some links. It is worth saying that we have some persons in a small group called “*divulgación tecnológica* (technological diffusion) which is aimed at contacting universities in order to provide them with equipment, books, speakers, placements, training for their teachers. In this sense, we have links with the Itam, the Tec, the Unitec, the Technological Institute of Tlalnepantla, the Poli (IPN), and of course with the UNAM, with the *Universidad Veracruzana*, the *Universidad Autónoma de Querétaro*, the Iteso and with the *Universidad Autónoma de Guadalajara*.

On the other hand, during my meeting with the manpower exchange group, I put a question on the table: "Do you have more links with the UT apart from the placements?" Ten employers replied negatively. So it seems that the relationship between the UT and the employers is not totally consolidated, which is a major shortcoming given that this link (*vinculación*) is one of the pillars of this modern model of higher education.

B. What the UT graduates can do. The opinion of employers

It was found that none of the employers questioned the role of the UT graduates in the labour market. In fact one of them explained that when he proposed hiring a UT graduate, his boss was "very pleased" because of the capacity of technicians to adapt easily to practical tasks: "they are ready to work", he claimed. Meanwhile, the employer in the clothes company highlighted the reasons for this suitability. She explained that:

In this type of school the career of *Procesos de Producción* (Manufacturing) is properly taught. We need people in areas such as times and movements and quality control. As technicians work with practical abilities (*están más cerca de la planta*), they are employed here.

On the other hand, although the manager of human resources of a transnational company argued that UT graduates possess enough knowledge (*bases adecuadas*) to succeed within the competitive world of work, the representative of the chamber of recruitment said that the technical diploma was not recognised and thus its holders were paid less than other professionals. This point supports the argument that, as UT graduates face bad job conditions, they want to become *licenciados* (bachelors) in order to improve their professional situation.

The difference between technicians and bachelors will be discussed below (section D). First, it is necessary to discuss the weaknesses of graduates as noted by employers.

C. Some points of view on graduates' attitudes

In comparing graduates from a private technological institute (TEC de Monterrey) with those of the UT, an employer mentioned the characteristics of the TSUs. She said that UT graduates:

have technical knowledge as well as *the courage (ganas) to work and to learn*, contrary to those graduates, Tec graduates want to earn a lot of money without having job experience.

The Tec is one of the most expensive private institutions in Mexico, which is selected by young people from the upper class, their demand for high wages may be explained by their affluent situation⁵⁰. It may not be so urgent for the Tec's graduates to find a job, or at least, not so much as UT graduates who need to support their households financially. The "courage to work and learn" may rest on the need to have an income to maintain or support their households, as most come from the relatively disadvantaged groups. Therefore, in order to have a clear perspective of TSUs' attitudes, it is fair to trace their social contexts since naive attitudes and relatively poor socioeconomic backgrounds can be closely related (see Chapter 9).

The relationship between TSU's contexts and their individual attitudes was commonly named by employers as an explanation for TSUs' actions. For example, the manager of human resources in the clothes company stressed that:

the lack of culture [sic] of these people is evident. I do not know *if this is caused by the region*, but I have interviewed some people with problems of communication and appearance (*apariencia*) (my italics).

⁵⁰ The manager of human resources of the transnational in electronic equipment complemented this point by saying that graduates from these schools tend to demand high wages for the simple fact of having studied in the Tec.

Could disadvantaged conditions explain people's attitudes? To what extent can education modify such attitudes⁵¹? Under what circumstances? These questions need to be addressed with further research. However, I would like to say that other UTs have noticed these attitudinal problems among their graduates and therefore have implemented "personality workshops" in order to empower local young people (see Chapter 9). In this case, the UT of Neza is not providing such institutional support, even though the international experts who evaluated the UT system recommended the enhancement of graduates' attitudes with the aim of improving their access to the labour market (CGUT, 2000a:16).

To continue to discuss the relationship between context and people: in an employer's words, "the UT graduates are very shy to say: 'I am a technician'. He then added that:

We have in this company some German technicians who occupy positions of directors and this is because of their mentality, because *their context (entorno) has motivated them to achieve these goals*. However in Mexico the *entorno undervalues these professionals*. Furthermore, as far as I know, these graduates [referring to UT's] study at technical level because they were rejected from other universities and not by their own decision. So they [UT graduates] have a long-standing stigma (*tiene una connotación que vienen arrastrando*) (my emphasis).

This employer clearly stressed the influence of particular context on personality traits. Because of this, it is essential to analyse the relationship between education and development, through the lenses of structure and agency approach.

Amartya Sen argues that "the freedom of agency that we individually have is inescapably qualified and constrained by the social, political and economic opportunities that are available to us" (1999:xii). So, it is vital to remove various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency (Sen, 1999). I suggest that people will not achieve development, merely by being educated or

⁵¹ On this, see Latapí (1998) who reflects on "how to educate in an adverse context" (*Educación en un entorno de desaliento*).

trained, if they are still facing contextual handicaps. Therefore, an integral framework of social policy needs to be designed, in which the UT operates as a social opportunity which is integrated with complementary public and private supports.

Attitudinal handicaps such as insecurity or shyness come out when the UT graduates start to interrelate with their colleagues or work mates. The manager of human resources of the transnational company pointed out that one weakness of these professionals is that they look "insecure" when they have to discuss particular issues. This attitude, he said, was not discernable with graduates from, for example, the *Tec de Monterrey*. In this school they "have been concerned with equalising technical and humanistic formation and this is perceived when you can speak with them openly".

Other employers explained the "shyness" of UT graduates as a consequence of their ages: "they are afraid because they are very young, for some, this has been their first job". However, despite this justification, she also insisted that,

They need to be more open persons, to be more secure and to know how to communicate (*facilidad de palabra*) since this company has contacts with many people. Furthermore, they need to have a *actitud de servicio* (to be customer-facing).

Among the employers of the manpower group, one said that the lack of maturity of UT graduates was an impediment to hiring them even though the wage was not low (Mx\$6,000).

According to some employers, shyness and insecurity prevail among the TSUs. This shows that even though the UT has precipitated an attitudinal change, it cannot remove those ways of thinking or behaving which are related to structural inequalities. Complementary measures need to be integrated with the educational endeavour in order to improve personal achievements.

D. Different educational levels as explanations for graduates' desires.

The aim of this part is to examine, through interviews with employers, the differences between the qualifications of a University Technician (TSU) and those of a bachelor. This part will discuss to what extent the diploma disease is affecting graduates' careers, as well as giving an overview of the general strategies that TSUs could adopt to overcome this situation.

I begin by saying that when I asked the manager of human resources of the environmental lab why they have hired graduates from the UT of Neza, she replied as follows:

We do not need to have a doctor *honoris causa* to do environmental analysis, do we? We do need *preparados* (prepared) and disciplined people, so the UT graduates have some experience in activities such as quality control

This employer claimed that higher educational levels (*doctor honoris causa*) are not required for what the UT graduates do. Furthermore, she highlighted two attitudes required for doing environmental analysis: "being prepared" and "being disciplined". What this employer meant by "disciplined people" was explained as follows:

young people tend to adapt more quickly to particular ways of working than those people who have worked here for a long time. So, new workers are more adaptable to new systems of working, this is what I meant by "disciplined people"

"Adaptable" and "disciplined" are two different concepts: they are not synonymous and cannot be used interchangeably to describe graduates' attitudes. While "adaptable" refers to the capacity of human beings or things to be altered for new use discipline is "training imposed for the improvement of physical powers, self-control, etc." (Collins English Dictionary 1998). The latter concept seems closer to a state that is achieved through coercive force and the former is a quality of human beings or things. "Versatile"

may be a proper synonym of “adaptable”. Since I did not ask further questions on this issue, it is difficult to discern what this employer really meant by “disciplined people”: perhaps it was just a semantic problem. However, we should not overlook the fact that an economically deprived situation may force graduates to be “disciplined people” and that must not be confused with the capacity of being adaptable.

To return to analysing what distinguishes a UT graduate from an engineer: the boss of two TSUs in the environmental lab claimed that:

Some explanations are more easily understood by engineers than by technicians. This may be explained by *lo que estudiaron* (the schooling level). What I have noticed is that UT graduates have a middle qualification (*preparación intermedia*) between one of a graduate from *Conalep* [upper secondary school] and that of engineers. So, the UT graduates know more than the former but less than the latter.

Having said this, the graduates’ boss added that UT graduates ought to know more about “Physics, Chemistry and English, especially in reading rather than speaking”.

This shortage of theoretical knowledge is not exclusively a problem of TSUs in *Tecnología Ambiental* (Environmental Technology). Graduates from *Informática* (IT) are “weak” in knowing how to plan and design an information system, as another employer said. Despite this fact, the same employer remarked on the capacity of UT graduates to continue to learn which may lead them to be “better than engineers”.

Arguably, the qualifications of a bachelor or engineer differ from those of UT graduates. These qualifications “are different and they cannot be compared” as an employer suggested. She added that:

It is like comparing a sociologist with an accountant, so their *formaciones* [qualifications] are absolutely different. The kind of knowledge and *la forma de actuar* (the way of acting) varied.

(Researcher) Could you be more explicit?

(Employer) The technicians are more narrow-minded ("*cuadrados*") in their way of acting and thinking. Furthermore, writing is not their strongest area (*no se les da*). For example, they write or structure an idea vaguely, they don't know how to write [sic]. This qualification seems to have been missed in their schools and in this company, they have to write reports.

This claim is supported by Silva who also found deficiencies in analytical abilities in students of *Informática* (Technology Information). This author argues that "abstract reasoning, logic and analytical capacity and problem solving" should be promoted in the learning process (*procesos de formación*) of UT students in *Informática* (Silva 2000).

During the interviews with the employers, strong evidence of the diploma disease phenomenon was not discernable. In fact, in the clothes company, in the manpower group, in the environmental analysis lab and in the electronic equipment transnational, the possibility that a technician could earn more than a bachelor was not denied at all. In the transnational, for example, the human resources manager for Mexico and Latin America said that:

In this company, the diploma is a basis that guarantees that the holder has a minimal theoretical knowledge, but this does not imply that the diploma does all the work ("*trabaje por la gente*"). We do not recognise *titulos* (diplomas). We do recognise the *habilidades* (abilities) of people.

He then described the abilities which are highly valued in the employees of this big company.

We select people under the following characteristics: zero job experience, good academic level, no less than 70% of English as foreign language and a strong reasoning capacity.

"Intellectual activities" appear to be a bonus for being employed in this foreign company, though the following pedagogic questions emerge: How can reasoning capacity, logic, analytical thinking and capacity for solving problems be developed? Should the UT shift its vocational orientation to something more general? Does this require a longer period of study? How could less privileged young people compensate for the opportunity cost of studying on longer courses? All these questions need to be addressed by further research in order to implement a coherent framework of social policy. I do not intend to discuss the elements of this model of public policy; rather I am concerned with providing an explanation for graduates' aspiration to become *licenciados* (bachelors).

It is clear that employers expect more than practical skills in their employees. Despite recognising that a technician can be better paid than an engineer, the administrative manager of the environmental analysis lab also pointed out that there were no UT graduates occupying white collar positions. She said that:

TSUs have been employed here recently, however, in the long term it could happen, but they need to be more *preparados* (prepared).

(Researcher) In which areas do the UT graduates need to be more prepared?

(Employer) ...despite the fact that they have been equipped with practical skills, they require more *preparación* in the use and interpretation of statistics since these activities are commonly done by managers.

(Researcher) Which level of education do managers attain?

(Employer) They studied a *licenciatura* (first degree)

Once again, the aspiration of the UT graduates to study for a first degree is justified. But how will they fulfill this aspiration? For some employers, providing educational opportunities within their plants is still difficult. A manager of human resources said that:

to be honest it is difficult to give that kind of opportunity because the technicians have to work in different turns as operators. This is easier for people who occupied administrative jobs and thus they have *horario fijo* (fixed working journey), perhaps a negotiation to fix this would be possible, but it is difficult for technicians. Education is a support but they do not enter this company to be educated, they come to work...

Apart from highlighting the fact that UT graduates occupy particular positions which do not allow them to have much free time for studying, the claim of this employer about the role of education in her company chiefly omitted the idea that education may be an investment and may allow individuals to improve their production possibilities. If this basic vision is overlooked, how could we expect employers to agree with the idea of achieving, through education, "development as freedom"? Nevertheless, there are other cases which provide a different perspective on what education can do for people and for society. The employer of the transnational company explained some hiring policies. The scope of his vision deserves to be quoted at length.

(Researcher) But, why do you want to form people in this company when many enterprises prefer to save training costs?

(Employer) This has been done for 20 years in Mexico. Through the German Chamber, we formed a group of companies to do this. This focus differs from that of the USA companies that think "why should I spend money if I can save it? Our policy come from a European tradition..."

(Researcher) What are the benefits of this hiring policy?

(Employer) We have particular and general benefits. The former is that we hire qualified people. We have the chance to observe them and to form them in accordance with our needs. The general benefit is that, though they do not stay working here, we are contributing to society, and the whole country, by providing a person with *más alfa preparación* (higher schooling) than that offered in the university.

It is worth mentioning that the graduate employed in this transnational had a "very high" level of job satisfaction, so by comparing graduate and employer evidence, we can show that their accounts can be considered reliable.

It can be argued that from the evidence collected from the companies, a diploma disease was not discernable. Although employers did not deny that technicians could earn more than bachelors, they also noted deficiencies in the intellectual abilities of the technicians. Therefore, it seems very difficult for a TSU occupy a strategic position while they lack abilities such as a logical way of thinking, reasoning capacity and an analytical perspective on solving problems. How to bridge this gap in knowledge is a challenge for

Mexican policy makers.

In short, there are significant differences between a technical qualification and that of engineer or bachelor, and thus the aspiration of UT graduates to become *licenciados* is not just a whim but a reasoned decision.

To understand how education encourages developmental processes it is necessary to look at the ways in which the labour market is operating, since several “unfreedoms” have been identified in this part of the virtuous cycle.

Conclusions

When the UT of Neza was created in 1991 under the modern idea of being a boost in local and regional terms, social and economic inequalities were neglected. As a result, the way in which this academic institution is contributing to the improvement of the living conditions of its graduates differs from that expected by the Mexican authorities.

Although a high proportion of UT graduates were unable to attend the public universities of Mexico City because of their failure in a national examination, and because of their economic restrictions, the UT did prevent their exposure to a more deprived situation. Given this fact, it is unfair to call this technological university a “reproducer” of inequalities.

If we were to do so, the role of this academic space would be severely reduced and we would be making the same misunderstanding as the manpower planning principle that specific workforce is suitable for particular job occupations, and thus that economic growth will be attainable through this correlation. Both deterministic and functionalist perspectives, miss the points that “education and training are embedded in human beings” (to borrow from Bowles), who have the capacity of act or react in accordance with their aspirations, motivations and expectations, and that expectations of UT graduates

are not compatible with those of the educational planners of the employers.

Through its short courses, the UT has met locals' needs to study for a technical career, for the immediate needs of the productive sector. So, Neza's young people have been equipped with relevant skills for getting a job quickly, which is remarkable since, before the creation of the UT, they were socially excluded from educational services. This benefit has allowed graduates to build up their entitlements and participate in productive and social activities. Furthermore, personal improvements such as promoting confidence and self-reliance, overcoming shyness, and so on were effects achieved through involvement in a learning space. Thus the UT represents an important social opportunity within this Mexican municipality.

One of the most important benefits of studying at the UT is that graduates, independently of their class or socioeconomic background, feel motivated to study for a first degree. This reasoned decision responds to the needs of human beings to improve their poor job conditions. Lack of local and remunerative occupations, low wage rates, and long working time - which sometime is illegal - are more than two "unfreedoms" from which UT graduates are trying to escape by studying for a first degree.

However, the process of upgrading a technical degree into a bachelor's degree involves graduates in further difficulties. When the UT, for unknown reasons, stopped the possibility of upgrading to first degree courses within its campus, it harmed the economic and academic situation of Neza's young people. No free public universities are upgrading graduates to be bachelors, while private universities in Mexico City, whose academic quality is questionable, are accepting UT graduates to convert them into bachelors. This unfair policy may precipitate greater social inequalities because only those TSUs who can afford the direct and indirect costs of gaining a higher qualification will go to prestigious universities, whereas those who do not have the money for further study may have to continue to deal with the unfair job conditions.

Although UT graduates showed their will to expand their functionings and to realise their desired quality of life, structural disadvantages repeatedly appeared. The challenge is to remove these unfreedoms which, as Sen argues, "leave people with little choice and little opportunity of exercising their reasoned agency", because it is clear that education cannot do it alone.

CHAPTER 9

**A coupling of modernization
and deprivation. The case of
the UT of Tula**

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Introduction

To understand how education impacts on the lives of human beings, it is necessary to examine the contextual conditions in which people thrive since "our opportunities and prospects depend crucially on what institutions exist and how they function" (Sen, 1999:142). Following this idea, this chapter argues that the Technological University of Tula has impinged on graduates' lives in two ways. On one hand, studying a technical career allows students to acquire practical skills which meet the needs of regional employers and, therefore Tula's young people attain a job very quickly. Though the first job destinations are mainly characterised by their poor conditions, this step taken by UT graduates represents a "giant leap" toward more valuable achievements.

On the other hand, as graduates accumulate job experience and come to understand how the "world of work" functions, they need to study for a bachelor's degree in order to obtain a better job. But, this aspiration cannot be met due to the lack of social opportunities in Tula, hence UT graduates tend to migrate from the region. Even though the migration of graduates can be regarded as a personal achievement, it is more likely that affluent young people would do it than those who occupied low-paid jobs, whose families could not afford the cost of studying outside of Tula. This fact produces two regressive effects. The first is a greater inequality between "educated-affluent" people and "educated-non-affluent" individuals. The second effect is a regional effect commonly known as "brain-drain".

This argument challenges the development-oriented models of higher education based on matching specific levels of education with the needs of the productive sector within relatively disadvantaged regions, since graduates are pursuing aspirations that neither employers nor government can meet. It can be argued that education not merely responds to the desires of the productive sector, but also “shakes” the awareness of human beings.

This argument unfolds in eight stages. The first describes the characteristics of the graduates interviewed where a clear tendency to migrate is corroborated. The second part applies Sen’s human capabilities approach in order to evaluate the personal and professional “functionings” of the UT graduates. Here the degree of “freedom” these professionals could exert as educated individuals is explored. The third part comments on graduates’ aspirations of studying a first degree which is more closely related to the real demands of the labour market in terms of knowledge rather than as a cultural manifestation of society as some Mexican civil servants believe.

The fourth part argues that despite the fact of pursuing a higher level of education in order to attain better job opportunities, impediments to the fulfilment of the educational aspirations of graduates include low-paid wages, a lack of free higher education institutions that offer the bachelor’s degree, long working hours and discrimination against women. So, the process of development - understood as freedom - is far from being achieved with the simple implementation of a technological university.

Under Amartya Sen’s propositions, the fifth part analyses the quality of life of the UT graduates and is concerned with the idea of choosing rather than accumulating goods. The sixth part explains how graduates can transform commodities into valuable functionings. Here it can be argued that the UT seems trapped in a vicious cycle in which macro economic conditions impacted significantly upon the process of enlarging people’s choices.

In the seventh part, the opinion of nine employers interviewed regarding the academic formation of the UT graduates are presented. Here it can be argued that there exist differences between a technical level of instruction and that of bachelor since employers stressed the lack of analytical skill of the UT graduates and the necessity of equipping students with "deeper" knowledge .

The last part concludes that, far from merely allocating a practical workforce to the immediate needs of the regional companies, the education provided by the UT can surpass its modern rationale by encouraging human beings to look for better opportunities which cannot be met locally. A removal of such barriers are desirable in order to expand the human capabilities of Tula's young people.

I. The general characteristics of the UT graduates interviewed

Of the 144 respondents, a non-probability sample of technicians was designed in order to conduct an in-depth interview with the aim of identifying "hidden" factors in the relationship between their academic instruction and their lives. The main criteria for selecting the UT graduates were: (a) their job situation (employed or unemployed) and, (b) their wage level (high, middle, low) in accordance with our own criteria. Twenty six graduates were interviewed, of which 19 were employed and seven unemployed. As we can see in Table 9.1, this sample includes University Technicians (hereafter referred to as TSUs) from different ages, sexes, years of graduation, career and job situations, occupations, levels of job satisfaction and main expectations at the time of interview.

It is worth saying that during the interviews the majority of graduates replied confidently to all questions and expressed their opinions freely and clearly independently of their socioeconomic situation, career or wage level. Interviews mainly took place in their houses or work places. They also agreed to come to the UT, and were always in a very friendly mood. For these reasons, I have no doubts about the accuracy of their

testimonies.

Table 9.1. Selected characteristics of the graduates interviewed in Tula

High wage level							
<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>	<i>Current position at time of interview</i>	<i>Job satisfaction</i>	<i>The main expectation*</i>
A1	22	F	1997	Accounting	Treasurer in a local government	Very high	NA
A2	25	M	1995	Industrial Maintenance	Qualified Technician	Fair	To open a business
A3	25	M	1995	Industrial Maintenance	Qualified Technician	Very high	To migrate to another city
A4	24	M	1997	Accounting	Administrative Assistant	Fair	NA
A5	24	M	1997	Accounting	Administrative Assistant	Fair	To open a business
A6	26	M	1996	Environmental Technology	Head of Operations Area	Very high	NA
A7	24	M	1998	Manufacturing Processes	Head of Manufacturing Control Area	Fair	To migrate to a foreign country
Middle wage level							
B1	20	M	1999	Manufacturing	Qualified Technician	Fair	To migrate to a foreign country
B2	21	F	1999	Manufacturing	Qualified Technician	Very high	NA
B3	19	M	1999	Electronics	Qualified Technician	Very high	NA
B4	21	M	2000	Accounting	Head of an Administrative Area	Very high	To open a business
Low wage level							
C1	21	F	1998	Manufacturing	Administrative assistant	Fair	To study
C2	24	F	1999	Environmental Technology	Operator	Fair	To get a better job
C3	20	F	2000	Accounting	Administrative assistant	Fair	To migrate to a foreign country
C4	22	F	1999	Manufacturing	Secretary	Very low	To teach
C5	25	M	1996	Manufacturing	Qualified Technician	Very low	To migrate to a foreign country
C6	22	F	1999	Environmental Technology	Operator	Very low	To migrate to another city

continues...

Code	Age	Sex	Year of graduation	Career	Current position at time of interview	Job satisfaction	The main expectation*
C7	21	F	1999	Accounting	Administrative Assistant	Fair	To migrate to a foreign country
C8	20	M	1999	Environmental Technology	Administrative assistant	Fair	To teach
Unemployed							
Code	Age	Sex	Year of graduation	Career			The main expectation*
D1	29	F	1994	Manufacturing			To open a business
D2	25	F	2000	Industrial Maintenance			To migrate to another city
D3	21	F	1999	Industrial Maintenance			NA
D4	26	M	1996	Manufacturing			To migrate to another city
D5	21	F	1999	Manufacturing			To open a business
D6	21	F	1999	Manufacturing			To migrate to a foreign country
D7	25	M	1999	Industrial Maintenance			To open a business

*This excludes the option: "studying a first degree".

NA= No answer

Two lessons can be drawn from the Table 9.1. The first is that there are more unemployed women than jobless men. This observation is worthy of further analysis. The second is that of 26 graduates interviewed, ten wanted to migrate from Tula irrespective of their job situation or wage level. So it is clear that the aim of the UT to encourage "juveniles to remain in their place of origin" (SEP, 2000:18) is far from being achieved. But, before going into detail about the limits of the relationship between education and development, it is necessary to examine the benefits of having studied in the UT of Tula.

II. The Benefits of studying in the UT of Tula

As we saw in Chapter 7, graduates considered that the two main benefits of studying in the UT were (a) to have "acquired innovative knowledge for their work" (33%) and, (b) to have "found a job quickly" (25%). So, the UT has been a key factor in equipping human beings with relevant knowledge in order to be employed, which is a good basis for further achievements. This fact may make the difference between a deprived life and one characterised by better social and economic chances. But, to argue that regional

development will flourish as UT graduates get a job within Tula is a misleading idea since an academic institutions play a key but limited role in “the process of expanding the real freedoms that people enjoy” (Sen, 1999:3). Therefore the impact of education should be evaluated through “functionings” which, according to Sen, could be activities (like eating or reading or seeing), or states of existence or being (e.g., “not being ashamed by the poverty of one’s clothing or shoes” Sen, 1985:197-8). He also argues that a set of functioning form the human capabilities that help human beings to lead “the kind of lives they value-and have reason to value” (Sen, 1999:18).

During the interviews, it was found that all graduates, independently of their wage level or the labour situation, recognised the positive impact of a UT education on both their professional prospects and on their personal future. So, while a well-paid graduate argued that “the UT helped us to facilitate the entrance to the labour market” (A5), an unemployed technician mentioned that “the UT broadens our perspectives for still studying” (D3). Although these graduates’ accounts constitute an indication of the benefits of studying in the UT of Tula, an accurate definition of their achievements should be presented.

For this research, seven functionings will be evaluated by taking into account the quantitative analysis shown in Chapter 7 and also by using the narratives of UT graduates in Tula gathered through in-depth interviews. To proceed with this assessment, it is necessary to classify these functionings in two categories: (a) personal improvements and (b) professional achievements (see Table 9.2).

Table 9.2 Functionings to be evaluated by category

<i>Personal Improvements</i>	<i>Professional Achievements</i>
1. Being able to feel confident and self-reliant.	5. Being able to acquire the knowledge required in a job position.
2. Being able to visualize life plans.	6. Being able to look for and to ask for better job opportunities
3. Being able to transform commodities into functionings	7. Being able to choose jobs desired.
4. Being able to develop further abilities.	

A. What can a graduate be thanks to the UT

As was argued earlier, the UTs are targeted at the educational demand of those young people from less privileged regions. For this segment of people, as the Mexican government recognises (SEP, 1991) a long stay in school is a "burden" for graduates and their families since the former have to work in order to support or to maintain their households. This high opportunity cost of studying has been reduced by offering short term courses at the UT since entrants "do not have too much money" and, eventually, they also have a "high probability of having a job" (D5). Arguably, under this point of view the implementation of the UT within Tula has responded to the existing conditions of locals. But, going to school may also represent a turning point in the life of people who have been excluded from these kinds of opportunities.

For example, a female graduate argued that the main contribution of the UT was "simply", to gain independence once she left her house during her studies and thus she could become a "self-sufficient person". She proceeds by explaining:

I had a job, which, I could attain because I was studying. So, the UT helped me to be more accountable and it facilitated the transition to independence (C1).

terms of social policy. Allowing Tula's young people to acquire knowledge for being employees is a first step in expanding human capabilities, since it allows people to obtain an income with which they can transform their "commodities" into more valuable achievements (to use Sen's terminology). But, to do it, they will also need an institutional framework that supports their aspirations. I will take up this point later.

According to graduates, some others benefits of studying in the UT were those of learning "how to teach"; "how to work in groups", "to learn from other people", "to study by myself" and "to value what my parents have done for me". In addition, improved self-discipline was underlined as a consequence of having attended the UT. For instance, a graduate recognised that: "I did not have the habit of studying, so the time that I spent here in the UT helped me to change that attitudes; it was a positive change" (B3). This leads us to consider that the UT may work as a first step toward a life-long learning process. From a technical career, people might wish to study at higher levels of education.

Having described some of the personal achievements fostered by the education process, it is appropriate to analyse what graduates can do with their knowledge acquired in the UT.

B. What can University Technicians do

As was argued in Chapter 7, the access of the UT graduates to the labour market has been very quick. Of 138 graduates with formal employment, 84 (61%) got their job position in less than three months and this is partially for two reasons. First, in a graduate's words, "the UT help us to acquire practical skills" (D3) which are developed as a result of its "curriculum based in 70% practice and 30% theory that suits the needs of industry" (A1) so, the "UT courses are focussed more on practice rather than in theory and this helps a lot" (B2) when one looks for a job.

The second reason is the effectiveness of compulsory placement (*estancia*) as part of the UT model. This mechanism for establishing strong links with the productive sector, has been "very useful for gaining experience" (A5) and "to widen the perspective about the real world of work" (A7). The quantitative analysis supports this assertion. Out of 100 graduates, 42 attained their jobs because of the implementation of strategies such as the *estancia*. In this sense, a female graduate argued that "I never thought that it could have been so easy to work in the company where I took my placement" (C3).

If access to the labour market is used as a yardstick to measure the success of the UT, then it would be considered a resounding success. However, a discerning analysis of the ways in which graduates can lead their lives as educated persons has been overlooked in the literature on education and development. Therefore, in order to fill this gap, I included two hypothetical questions in order to explore the extent to which they relied upon their knowledge to use it to get further achievements. The first question was: "based on your academic formation, would you be able to resign your job if were it not suitable for you?" and, the second question was, "If you were unemployed, what would you do to overcome this situation?" Both questions are related to the functioning number six and seven (see Table 9.2). Let us explore the way in which the first question was answered.

1. Are the UT graduates able to reject jobs?

Taking into account that the majority of UT graduates reported that then were confident about their academic formation, one might infer that further functionings can be identified through in-depth interviews.

Of 26 graduates, 16 answered that they would resign a job trusting in their expertise acquired in the UT. But, it was found that, on one hand, 12 of those interviewed replied by conditioning their answers in terms of "having a better job beforehand". Whereas, on the other hand, three graduates replied that they would not resign to a job position

because they were "learning a lot" in their current positions. Another technician seemed very cautious in his reply, he said that; "I have to analyse "many factors before leaving my job position".

Therefore, it can be said that, rather than presenting an accurate account of the capacity of graduates to lead productive lives, what was underlined was the importance of having an occupation as a basis for obtaining further achievements. There were not sufficient factors for arguing that thanks to the UT education, graduates could resign from a low-paid job.

The next part examines the type of achievements that graduates can use to struggle against employment difficulties.

2. Facing unemployment? An exploration of graduates reactions

According to Sen, unemployment "contributes to the social exclusion of some groups, and it lead to losses of self-reliance, self confidence and psychological and physical health" (1999:21). Due to these harmful effects on human beings, an exploration of the ways in which educated people could deal with a hypothetical unemployment situation is crucial for a broad understanding of the human capabilities approach.

I asked UT graduates about strategies or actions that they would undertake in case of facing a jobless situation. Although I was careful not to mention the career service of the UT, some employed interviewees commented on the importance of having this kind of services which has been very "supportive" (C4). In this regard, graduates constantly mentioned the name of the Head of the Alumni Department, Mr. Miguel A. Cruz, who has played a key role in facilitating the job searching. A well-paid graduate pointed out that he had attained his three jobs "thanks to the *bolsa de trabajo* (career service) of the university, whose head had let me know where job opportunities were" (A5). I found no reason to doubt these accounts since I observed dozens of graduates having a look at

the job prospect list of the university. Furthermore, I was invited to an exchange meeting in which employers, from a wide range of enterprises, offered their vacancies to the Head of the Alumni Department of the University of Tula.

As with employed graduates, four jobless TSUs recognised the work of the Alumni Department in the process of seeking a job. An unemployed graduate of Manufacturing course said that, "thanks to him [Mr. Miguel A. Cruz] I could know what job positions were available" (D6).

Another element for struggling against unemployment is the accumulated knowledge gained through a permanent activity. Work experience was raised as a key element for demanding better job positions. A low-paid graduate answered that he would resign a bad job, though "not at the beginning of the professional career" but

once you have gained experience; one has the capacity to demand better things. If you achieve this, there is no reason to be conformist (C7).

Even though graduates could lose their current job positions, they seemed confident about entering the labour market again by "selling" their job experience. It can be said that with academic knowledge on one hand and job experience on the other, graduates may have the chance to access the labour market more easily. They certainly felt confident about it as this passage confirms:

I am not afraid of being unemployed because I can work in any other enterprise. I know that I am very well-trained and I can do my work in any productive area thanks to the knowledge that I acquired in the UT (B1).

It is worth noting the expression used by this graduate: "I am not afraid" since UT rectors and authorities had highlighted the naive attitudes of Tula's young people. As was argued earlier on, the Alumni Department of the UT of Tula implemented extra curricular activities to foster graduates' self-confidence and "to empower them" (see Chapter 6).

Arguably, the Alumni Department of the UT of Tula has worked remarkably well as an institutional support for cultivating graduates achievements and, to some extent, for exposing the real opportunities that graduates might have. This supports the claim made by Amartya Sen presented in the beginning of this chapter which states that, "[...] opportunities and prospects depend crucially on what institutions exist and how they function" (Sen, 1999:142).

But job experience also has side benefits such as its creation of the possibility to build up a network of informal contacts⁵² which are needed to improve the quality of life of graduates. Graduates expressed that "a positive point of the job experiences is that you can establish social relations" (A4), therefore, in case of losing their jobs they may "contact friends" (B3). So, "with adequate social opportunities, individuals can effectively shape their own destiny and help each other" (Sen, 1999:11).

In short, institutional support, job experience and social networks appear as three supportive conditions of the UT development-oriented educational model which have been operated successfully. This helps us to argue that, when educational policies are put together with institutional actions, the process of expanding human capabilities can be more effective than the simpling expecting striking results with the opening of universities within poor regions. A complementary part of this idea relates to what people desire, that is, their motivations and aspirations which also have to taken into account in the process of development.

III. Reasons for studying a first degree. Real needs or people's whims?

Having discussed and evaluated some personal and professional achievements of those who have studied in the UT, it is fair to investigate the aspirations of graduates since

⁵² Further evidence of this can be found in the study of Purna Sen (1999), who found that social networks and educational attainment are two crucial factors which help women to resist and to struggle against domestic violence in Calcutta.

these can also be interpreted as effects of education. According to the quantitative analysis of 177 respondents, 170 (96%) answered that they wanted to study a first degree for two main reasons. The first is "due to the possibility to attain a better job" (40%) and the second, "to acquire more knowledge" (39%). So, it can be argued that studying a technical degree is a first step toward continuous learning.

It might be thought that this aspiration is exclusive to low-paid graduates who are trying to overcome poor labour conditions, but it was found that TSUs with high wages also wanted to become *licenciados* (bachelors). As people understand how the labour market works, they begin to express their desire to read for a B. A. in order "to attain a higher job position and, consequently to earn more" (A2).

On the other hand, an unemployed graduate also seemed interested in continuing her studies. For two reasons:

The first is my interest in learning and of enhancing my personal prospects (*desarrollarme*) and, secondly, because there is a competitive atmosphere which is growing in the productive sector, there is a fierce contest, so if you are not trained it is very difficult to attain a job as manager (D1).

According to Amartya Sen education can have "indirect and direct importance in the achievement of development". The former works through the enhancement of productivity and the latter has "its intrinsic value and its constitutive role in human freedom, well-being and quality of life" (1997:21). Following Sen's propositions, the last quotation illustrates both the indirect importance (to receive training for a "competitive productive sector") and the direct (to study to choose a job as manager). In arguing this, Sen helps to re-think education as a factor of human and social change rather than as a productive factor capable of moving a nation from one economic stage to another. In my particular point of view this is a remarkable contribution to the analysis of education and development.

Another interesting point raised in the last quotation was the awareness of the UT graduates who perceive a "fierce competitiveness" within the "productive sector" and react by pursuing a better academic background. They are agents who do not want to rest on their laurels, so they said that they wanted to study because they "do not want to have the same situation" (B1). Still, however, a key question: can graduates meet their aspirations within their regional context? This answer will be addressed in section IV. Now, let us discuss the reasons for studying a first degree.

As was discussed in Chapter 6, policy makers, civil servants, UT rectors and the OCDE explained that the aspiration to study a first degree can be explained by "the traditional attraction of the *licenciatura*" (OCDE, 1997). They assume that the UT graduates desire to become *licenciados* because there is not a proper recognition of the technical diploma by employers and society. But is the aspiration of upgrading technical expertise to one of bachelor only a cultural expression of a higher status? In order to address this question I would say that it is possible that a "diploma disease" exists in Mexico and specifically at Tula, since this phenomenon, as the OCDE recognises, "has an international dimension" (1997). But the high tendency of UT graduates wanting to study a first degree should have broader explanations beyond the "conservative thinking" of Mexicans, as a former under-secretary of higher education believed (Reséndiz in *La Jornada* newspaper 27.01.00).

As was said earlier on, graduates enjoy better opportunities in the labour market if they study a first degree instead of holding a technical level for their entire lives. Even though the majority of respondents, could have had a job and could have achieved some improvement as technicians, they link higher degrees of schooling with better social and economic chances. This is confirmed by a unemployed graduate who recognised that:

I did not have problems finding a job, however, I had difficulties when I wanted to have a better job because of the level [of technician]. Although the UT academic formation is solid, "the real world of work" demands a diploma of engineer (D1).

The differences between a technical qualification and that of bachelor require explanation, so the next part explains why the aspiration of the UT graduates to go further in their studies is justified.

"To be or not to be (a technician). That is the question"

While some Mexican educational authorities believe the problem of acknowledgement of the TSU diploma has a cultural explanation derived from the highly credential conscious society, 96% of respondents of the UT of Tula desired to study a first degree and not without justification. The general aim of the majority of graduates is to upgrade their technical knowledge by finishing their first degree, especially in engineering, as this process will help them to "climb up the organizational hierarchy" (B3) of their enterprises. Perhaps this promotion may allow or enable graduates "to earn more" (B1) as bachelors than technically trained people.

Differences between a TSU and a bachelor have been commonly overlooked by the OECD and the Mexican civil servants. However, UT graduates have noted a shortage of knowledge when they have embarked upon particular activities. For example, a well-paid graduate argued that:

...my current position implies a high level of responsibility which has been very difficult to deal with; I think that if I would have studied an advanced level of education I could manage my assigned tasks easily (A4).

According to this graduate, "assigned tasks" referred to activities such as "to undertake management actions", "to make decisions", "to establish public relations", "to treat and to report directors", "to manage people" for which, "he does not have experience" (A4). In general terms, these shortages of expertise may be related to personal abilities that

stem from individual's attitudes, an area in which UT students have not done very well in according to the UT rector and the Head of the Alumni Department (see Chapter 6).

Despite the benefits that UT short courses have brought to relatively deprived students, the technical expertise acquired by graduates need to be complemented with deeper knowledge in order to meet their aspirations in professional and in personal terms. In this regard, a graduate from electronics recognised that:

Although, as TSU, one acquires practical skills my current job position requires deeper knowledge. In the UT we studied some issues superficially (*por encimita*) (B3).

In a more radical view, the last point is reinforced by a well-paid graduate who said that:

I would criticise the UT due to its shortage of knowledge. I think complementary courses need to be given since certain topics were analysed very quickly (*sólo una embarrada*); this shortage has consequences in the productive sector (A7).

It is clear that graduates recognise differences between a first degree and a technical level. The testimony of an unemployed graduate who was studying a first degree in the Technological Institute of Tlalnepantla⁵³ (ITT), raised more elements of analysis for distinguishing a level of bachelor and one of technician. He argued that:

I do not regret having studied in the UT, but it has some deficiencies. This is what I have noticed since I began studying in the ITT where I had the possibility to compare both levels of education. For being an engineer, supplementary knowledge should be learnt in comparison with that of the TSU; here some issues are studied superficially (D3).

So, rather than a deep problem of "diploma disease", what was found was that, "at the end, the diploma is important" (C8) for attaining a better job position. The intensive character of the UT model has been questioned by graduates themselves who noted that

⁵³ Tlalnepantla is a municipality which belongs to the State of Mexico and it is an hour drive from Tula approximately.

the time of studying apparently does reflect the level of knowledge acquired. While a first degree course takes four or five years one of TSU takes only two years, though the latter may be “intensive, it does not mean that it is extensive enough” (D6). A graduate put this idea succinctly: “While a University Technician studies an issue in a week, the bachelor studies the same topic in a semester”(A4).

As was argued earlier, graduates know that “the world is becoming more competitive”, so they are trying to, “upgrade [their] level of education in order to read for a B.A” (D6) with the aim of improving their professional prospects”.

Apart from having reasoned aspirations, a graduate also claimed that “we all have the right to that opportunity” for further education (D6). Certainly, all human beings have the right to studying in according to the World Declaration on Higher Education held in Paris in 1998. It states that:

Higher education shall be equally accessible to all on the basis of merit, in keeping with Article 26.1 of the Universal Declaration of Human Rights. As a consequence, no discrimination can be accepted in granting access to higher education on grounds of race, gender, language, religion or economic, cultural or social distinctions, or physical disabilities (UNESCO, 2000: *Web-Site*).

It is necessary to investigate whether or not graduates aspirations and rights can be accomplished by regional conditions since these facilities contribute to the expansion of human freedom (Sen, 1999). This will be discussed in the next part, meanwhile it is fair to claim that studying in the UT has been “essential to jump up to a first degree” (D6). The degree of University Technician (TSU) has represented a solid basis for the promotion of a life-long learning process from which graduates can benefit both in personal and professional terms.

IV. Regional opportunities. Dealing with “unfreedoms”

According to Amartya Sen, “development consists of the removal of various types of

unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency" (1999:xii). This is consistent with the idea of connecting people's aspirations with their real opportunities. This part argues that there are two main barriers constraining the development of the UT graduates within Tula. Economic restrictions and social opportunities.

A. Economic facilities within Tula

Economic facilities, as the Nobel prize winner argues, refer to "the opportunities that individuals respectively enjoy to utilize economic resources for the purpose of consumption, or production, or exchange". He adds that "the economic entitlements that a person has will depend on the resources owned or available for use as well as on conditions of exchange [...]" (Sen 1999:39).

Within a legal social structure, owning money requires in most cases, an employment which is the source of a certain level of endowment. In Sen's words:

For much of humanity the only endowment that is at all significant is labor power. The majority of the world's people have little resource other than labor power, which may come combined with a variable amount of skill and experience (1999:162).

Through employment and wage income people can buy food, produce other commodities or exchange goods to enhance their well-being. This part analyses how the labour power of the UT graduates, their skills and experience are applied in Tula's labour market.

In order to begin to understand the economic facilities of Tula, it is useful to remember that in the state where the UT is based, Hidalgo, the bulk of its occupied population (31.27%) received salaries between one and two times the minimum wage when 17% of its population aged 15 and over had a schooling level of upper secondary and higher education (INEGI, 1999a). In accordance with the national statistics, Hidalgo does not seem an attractive region for educated people. This research supports that point.

During the interviews, it was found that graduates from various wage levels, stressed the lack of fair payments. In one case, a low-paid graduate pointed out that, at Tula, "there are many enterprises, but the negative factor is the low wage level" (C3). In another, a well-paid graduate comments on Tula's wage rates which are below "those paid in Mexico City or in the State of Mexico" (A5).

Interestingly, a female, unemployed from the career of Manufacturing Processes, argued that at Tula, "there are plenty of jobs for this career, but they are very badly paid". In fact, she recognises that one reason for choosing to be unemployed was the low wage rates: "if one does not have a real need to work, one can look for a better chance" (D5). This explains, in part, why there are higher rates of unemployment among more educated people: Being jobless for a university graduate may not be so painful as for those persons with low educational attainment who usually come from the poorest brackets of society. In this case, it was found that this graduate could survive without employment thanks to a temporary job provided by her parents in their small business. This represents an exceptional case because, as was argued earlier, UT graduates come from the poorest segments of the Hidalgo's society, so the question remains open: what happens in the case of those graduates who do have the necessity of working when they do not have family support? To address this question, the testimony of a graduate may be useful:

(Researcher) What do you think are the causes of low-paid jobs?

(B1) Sometimes, the responsibility is ours because we have not been able to demand fair salaries and we accept any payment...this is because people in this region are very poor, so *they accept being badly-paid* instead of being jobless; so we are responsible for the low wages paid in companies...

(Researcher) Could you please name some?

(B1) An example are the textile industries (*textileras*).

Having to choose between being either a badly paid graduate, or being unemployed is not indicative of a high quality of life. If the quality of life is determined by the options the

person has to choose from (Sen, 1985a), it can be argued that studying a technical degree does not automatically imply a happy life. Regional disadvantages significantly affect education policies. So, as the necessity of having an income increases, and the "needs" of certain employers have to be met by paying low wages, UT graduates may remain in an unfavourable situation. This point raises the importance of social arrangements which may act as restrainers (or facilitators) of the process of development.

If Amartya Sen argues that institutional support also acts as a condition for expanding people's real freedoms, a question remains unanswered: where are the trade unions that could claim fairer wages for UT graduates? None of the graduates mentioned this kind of support during the interviews. These neglected points give us a different perspective on the relationship between education and development in developing countries.

Graduates are finding opportunities in other regions outside of their local region and, thus, their schooling attainment has helped them to migrate. A graduate illustrated this claim by explaining that:

I always wanted to live in Querétaro, this city is beautiful; thanks to God I had a job opportunity there! That region has better wages than here [in Tula]; I also wanted to broaden my perspectives and to learn other ideas and to have another job environment (B1).

In migrating, this UT graduate is enjoying the life that he wanted by broadening his horizons and by familiarising himself with other ideas and environments. So this shows that education can have a positive effect in fostering people's functionality which is not necessarily in tune with regional conditions. Thus, to claim that opening a UT encourages regional development seems a questionable argument. This sets a considerable challenge for Mexican and international educational planners who need to widen their ideas about the role of education within developmental processes.

In doing so, the importance of Amartya Sen's work on development studies should not be underestimated. He has helped us to reformulate the idea of education as a factor of development by introducing a human interpretation. Thinking in a holistic way, Sen argues that "there is a complementarity between individual agency and social arrangements" (1999:xii) thus, educators could use Sen's propositions to investigate the impact of education on human beings and of how contextual conditions affect such links.

This research appealed to graduates' histories to highlight such "complementarity". Here are more examples. When I asked an unemployed female graduate about the regional opportunities at Tula, she replied as follows:

There is something lacking within this region and there is something lacking in myself. On one hand, although there are many enterprises in this region, there are not the job opportunities that we expected, and on the other hand, I need enthusiasm... (D4).

By exploring peoples' aspirations, motivations, needs, and, even, feelings; the relationship between education and development could be better understood. There is much that education can do for development but "it cannot do it alone" (to use Levin and Kelley's words), supplementary conditions are required and, remarkably, Sen calls these supplementary conditions "instrumental freedoms" which are political freedoms, economic facilities, social opportunities, transparency guarantees and protective security.

Within the "complementarity between individual's agency and social arrangements", education may occupy a relevant place as people's reasoning can be fostered by the academic instruction as the following history shows:

(Researcher) Does this region give you facilities for having personal and professional development?

(C1) There are opportunities, but we fear taking them, I fear starting....

(Researcher) What could help you to feel more confident?

(C1) Having deeper knowledge in my area; I only know something about manufacturing, but is not enough...

There are personal attitudes that may block graduates' chances within their context. Education can restore this lack of functionings as a low-paid graduate can, for instance, seek to upgrade their professional knowledge to feel more confident. The point is helpful to know whether or not there exist suitable social opportunities both to acquire "deeper knowledge" and, consequently, to overcome the handicaps.

B. The social opportunities at Tula

Following Sen, social opportunities "refer to the arrangements that society makes for education, health care and so on, which influence the individual's substantive freedom to live better" (1999:39). As stated in Chapter 5, higher education institutions were non-existent at Tula municipality, so the creation of the UT was indispensable (SEP, 1991a). Decentralising educational services to distant and poor regions was interpreted by the General Coordinator of the Technological Universities, Mr. Arturo Nava as "equity criterion", since it allows more people to access the higher education system. Arguably, young people from Tula have benefited from the implementation of the UT. According to them, their lives would not have changed if they had not had an academic space within which to develop their abilities. One of these abilities was to encourage UT graduates to be aware of opportunities given by the labour market and, thus to encourage them to pursue a first degree which is remarkable since they come from less privileged sectors of society.

Like any Mexican youngster, Tula's also have the right to meet their educational aspirations independently of their "economic, cultural or social distinctions", so "higher education shall be equally accessible to all" (to borrow from the World Declaration on Higher Education). However, this is not happening in Tula. Even though UT graduates want to "finish their first degree", there are no schools to help them to upgrade their knowledge. As a result they are

looking for a school which could validate my studies of technician in order to complete my B.A., I think in Querétaro it is possible to do this (A1).

Querétaro is the capital of the closest state to Tula and it was described by another graduate as "an important big city, where there are "job opportunities and everything one may want" (D1). It seems that Querétaro is becoming the ideal destination for the UT graduate who wishes to, and who can, upgrade his or her technical knowledge outside of Tula.

Despite the fact that graduates are able to move from one region to another for better opportunities, migrating also raises a question: who can afford the cost of moving from one region to another to study a B. A.? During the interviews it was found that well-paid graduates tend to leave Tula with the aim of studying a first degree, even though the majority of graduates had the same aspiration.

A well-paid graduate mentioned that he would like to study a B.A. in accounting, so he had considered some schools such as the Autonomous University of Hidalgo (UAH) which is public, but:

...they cannot validate (*revalidar*) my previous studies. I looked for another, for example, the *Universidad Mexicana* where they can do it, but I have to pay a year and a half in advance; I also had a look at the *Escuela Bancaria y Comercial* in Mexico City (A6).

It is worth noting that both the *Universidad Mexicana* and the *Escuela Bancaria y Comercial* are private institutions. So, the graduates' aspiration of upgrading their level of technical education has led "richer" young people to take first degree courses in private universities, such as the *Escuela Bancaria Comercial* in Mexico City during weekends, but it is clear that not all UT graduates can easily assume the cost of travelling to the "big" cities nearest to Tula in order to study.

This fact may widen the gap between those graduates who can afford the cost of education outside their region, and those who cannot⁵⁴. Although the UT contributed to the promotion of functionality by, for example, enabling graduates to look for better opportunities, this achievement it being restrained by economic restrictions. It can thus be said that there is a mismatch between “what a person is actually able to do” and “her real opportunities” (to use Sen’s terminology). A graduate confirms that, he would have liked to have studied an engineering career in a technological institute or in the National Polytechnic Institute (IPN) - which is in Mexico City -, however, he recognises that:

I missed application dates in the IPN, so I could not enter this school nor the state technological institute; my family also had some economic problems, so I might remain in this zone. For this reason I chose the UT, but my first option was the IPN; I never could leave this region...(B1).

This passage calls into question the core issue of the “equity criterion” in the educational system. Can “equity” exist within the higher education subsystem when graduates choose a public educational option in accordance with their low economic level?⁵⁵ Though it is evident that with the creation of the UT, people who had not had access to higher education before now could now study a technical degree, a broader notion of the “equity criterion” is needed since economic inequalities of Tula have strong repercussions on people’s choices concerning educational options. Some graduates families could only afford “short careers which are not expensive” (C1); other graduates “could not enter” the prestigious public universities for economic constraints (C7); or, these institutions have not “accepted them” (A4, A5, C1). So the question remains open: Can equity exist in the educational system when people make decisions in accordance with their economic

⁵⁴ Another effect of the lack of educational opportunities within Tula may be that graduates tend to study in poor quality schools (so-called *escuelas patito* in Mexico) eroding academic quality of higher education professionals.

⁵⁵ In our quantitative analysis, it was found that, of 177 graduates, 11% of respondents chose the UT of Tula because they were not accepted at the UNAM, IPN or at the UAM.

situation?

But, the cost of studying and the selection of the UT are subjects of another analysis and I do not intend to discuss this issue here since my concern is with the cost of upgrading the technical knowledge of graduates. In this regard, a low-paid graduate recognised that he would like to acquire "deeper knowledge" and to study an industrial engineering career, but he is having problems trying to:

Pay for my career; I cannot get a part time job and study at the same time because my family cannot support me; I could not afford it (C1).

The opportunity cost of studying prevails even for UT graduates who hold a job position. Thus, "education is now a privilege due to economic limitations" (A6), rather than a right equally accessible to all. For these reasons, some graduates are looking for opportunities outside Tula that allow them to compatibilize their higher education studies with their economic compromises. In this regard, a well-paid graduate explains:

I am married and this situation limits my possibilities [of studying]; I have to work. Fortunately I am having the chance to work and to study at the same time in the Technological Institute of Orizaba⁵⁶ (A6).

It is worth mentioning that in 1991, the UT model allowed for the continuity of technical level within the UT, so graduates had the chance to study a first degree in their local institution or in another higher education institution. The SEP assumed that; "given Mexico's situation and the decision of graduates of continuing their studies, it is *fair* to respond to their aspiration" (SEP, 1991:22 my italics). Therefore, the UT began to offer the *Segundo Ciclo* (Upgrading Process) as a complement to the technical level and eventually the diploma conferred would be that of bachelor. However, for unknown

⁵⁶ Orizaba is a city that belongs to another far state: Veracruz.

reasons⁵⁷, the *Segundo Ciclo* was stopped in the UTs, provoking disenchantment - and political conflicts - with the UT system among graduates. This unexplained measure is significantly affecting those graduates who cannot emigrate to other regions to study in a public institution and those who cannot afford the cost of studying in a private institution and thus greater inequality among graduates may be generated.

There were immediate and negative effects of having stopped the *Segundo Ciclo* in the UT of Tula. For example, an unemployed graduate explained that:

....I was in the final stages of completing my first degree at the UT in the *segundo ciclo* (upgrading process) and I asked for a permit in my job to finish my thesis, but suddenly the UT stopped this initiative and consequently I tried to return to my previous work. However, during that period the company was having some trouble and they could not hire me again until, they said, the beginning of 2001. So, I have no job and it seems difficult to have one at this moment because I want to finish my first degree, hence I cannot manage to work full time and to complete my studies at the same time.

If "development consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency" (Sen, 1999:xii), the key question is why the UT of Tula stopped the *Segundo Ciclo* when the majority of graduates wanted to upgrade their expertise and when this was a justified aspiration? A removal of existing unfreedom is desirable to meet graduates aspirations and this implies public action, since "the lack of political commitment, not of financial resources, is often the real cause of human neglect" (UNDP, 1991:1).

Setting up social and institutional arrangements that allow an upgrading of technical knowledge without charging money to Tula's young people would be desirable. However, the question is what kind of institutions will accept on such tasks? Would it be only the UTs? The UT could provide first degree courses, as it did in the beginning and, at the same time introduce an efficient scholarships scheme in order to reduce the

⁵⁷ As was said, the decision to stop this upgrading process was presumed to rest upon political conflicts.

opportunity cost of attending school. In addition, public bodies for certifying skills in the workplace would be useful as would cooperation agreements with the regional employers for jointly providing first degree courses within companies since time was identified as another constraint for studying. Working time as well as gender issues are analysed below. Both variables show how external factors obscures what education can do.

1. Working time

If "different kinds of freedom interrelate with one another" (Sen, 1999:37), one might infer that diverse kinds of unfreedom also interrelate with one another. Low-paid salaries; economic restrictions; lack of free higher education options that offer bachelors degrees and a neglect of "institutional relations" that allow specific boards to certify knowledge are combined with long working journeys that impede a further learning process.

Both unemployed and employed graduates argued that it is very difficult to study as they want because they "do not have time as [they] have to work during different shifts (*turnos*)" (A6). This means that they have to work constantly twelve hours a day for two days and then they rest for two; therefore graduates work only fifteen days a month. Although these "flexible" shifts do not exceed the legal hours of working, they do affect the time that could be devoted to studying a first degree.

According to an unemployed graduate, to make study and work compatible seems very complicated. She could not cope with this requirement since,

in the Technological Institute of *Querétaro* asked me to take four courses when I only wanted to study two...(D2).

On the other hand, it seems that the nature of certain technical jobs require more working time than, for example, clerical jobs. A graduate from the career of Manufacturing Processes explained that her "area demanded too much time" and then recognised that, "our shift is, in theory, nine hours, but we have to stay longer" (B2). In this regard, a well-

paid graduate stressed that:

..in this area, the work shift is very flexible. In theory I should work from 8:00 a.m. to 17:30 p.m. including a lunch break of an hour and a half; but I stop working at around 18:00 or 19:00 (A4).

Although this graduate recognised that "extra time was paid ", working longer shifts have side effects that may affect some groups more than others. For instance, those women who need to feed their babies or to travel long distances to get their houses. The way in which women are to deal with gender bias is discussed in the next part.

2. Gender bias in the labour market

The proportion of women of Hidalgo's population was 52% (INEGI, 2000) while its economically active female segment was 34% (STPS, 2000b). In educational terms, the schooling average of women was slightly lower than that of men (7.9 and 8.2 grades, respectively) (INEGI, 2000). The quantitative analysis showed that, of 39 respondents without formal employment, 16 were women (43%).

On the other hand, although the sample of graduates interviewed for this research was not randomly selected, it can be noted that the bulk of well-paid technicians are male, while most women are distributed in the most disadvantaged groups (see Table 9.1). Six out of eight graduates were earning the lowest wage rates and three of the seven jobless were women. This may be explained partially by the testimony of a female graduate who

... noticed that some enterprises in which I applied for a job position, *machismo* prevails. It seems that women are categorised for clerical work such as secretary or receptionist and we are neither suitable nor accepted in work based in the plant (C2).

Since the UT offers a vocationally-oriented career, they might imply that "heavy tasks" will be involved such as hammering or assembling. However, differences between the nature of certain jobs and gender discrimination should not be confused. An unemployed woman

from the career of Industrial Maintenance explained that she experienced problems in getting a chance in the labour market due to clear discrimination. In this sense, she reflected that "we, and I am speaking for those women who wish to work in maintenance, find that doors are shut down because employers are expected to hire only men" (D2). She highlighted the masculine vision of an employer of a transnational company by saying:

When I applied for my first job in a transnational company, the manager of the human resources department said that I should study cooking or sewing, but I tried to convince him to give me a chance...In another company they clearly told me: "woman, no thanks".⁵⁸

It is unfair that employers adopt a masculine bias when, of 100 inhabitants in Hidalgo, 50 are women.

Even though this accusation of discrimination cannot be generalised to all employers, these findings increase the need to develop further studies on equality within certain companies, especially textile industries. Another female graduate - with a four year old child - explained why she had not found a proper job. She said that:

...wages were very low and jobs were very time demanding, with shifts from 9:00 am to 9:00 pm with a lunch break of two hours. As well as they were very far from my house... and, moreover [I noted that] some textile industries required men, and they asked me for a first degree despite the fact that I have some job experience...(D7)

So, low wage rates, long shifts, and masculine values are factors that constrain "the process for expanding the real freedoms that people enjoy" (Sen, 1999:3). Therefore, the necessity of studying what a person can do as a result of education should be integrated with an accurate analysis of labour conditions provided by employers.

⁵⁸ The names of both companies were omitted in this narrative as well as the name of the manager of human resources of the transnational.

V. An approach to the quality of life of the UT graduates

The issue of quality of life has been discussed at length by Sen in his works (1985a, 1999). He argues that the "quality of life" a person enjoys is not merely what he or she achieves but also what options the person has had the opportunity to choose from. So a "good life" is partly a life of genuine choice, and not one in which the person is forced into a particular life" (Sen, 1985a:70). With this in mind, the aim of this section is to analyse briefly graduates' choices as part of their quality of life. As a first approach to graduates' quality of life and considering that they valued academic instruction as an important means of personal and professional development, they were asked about the possibility of choosing an educational institution again. So, an unemployed graduate answered that he would have chosen another higher education institution different to the UT and he explained why:

I took my placement in a cement enterprise⁵⁹ where I also worked. However, I was limited due to the technician diploma. There are many companies which ask for a first degree, so if I had studied in another university, I could have attained the job that I wished (D1).

Apart from stressing the necessity of holding a bachelor's degree, choosing a job was not shown by this TSU. This is compatible with the quantitative analysis which showed that only 3% of the total of respondents (177) had the freedom to choose the "job desired" after their studies in the UT. So, one might infer that other factors should be examined to argue that through education people improve their quality of life.

Although the delivery of educational services has favoured locals from relatively poor areas, different factors lead us to re-think the way in which the UTs could improve the quality of life of their graduates.

⁵⁹ "A company enterprise" is used instead of the real name of the company.

VI. Transforming money into functionings. Illustrations from Tula

As was argued in Chapter 1, the human capital theory based upon correlations and the function production have been the dominant approach in the analysis of the relationship between education and development which is understood as economic growth. Despite the importance of these studies, further research needs to be developed since the human capital theory "tell[s] us nothing about why economic growth is sought in the first place" (Sen, 1999: 295). How a person could use her economic benefits derived from her educational attainment is a missed point in the study of education and development, and Sen attempts to fill this gap by arguing that:

If a person can become more productive in making commodities through education, better health and so on, it is not unnatural to expect that she can, through these means, also directly achieve more - and have the freedom to achieve more - in leading her life (1999:294).

So, this part analyses what a UT graduate could do once they are employed and earning money in order to develop more valuable "functionings" and, thus, well-being. In other words, how are they using their money as means of personal and professional improvement.

Sen (1985) argues that a functioning is different from having a good, so well-being cannot be defined in the terms of the characteristics of goods possessed by a person, but rather by his or her achievements. In this vein, money must be transformed into valuable functionings. So, money, as a means, is a key part in the expansion of capabilities or freedoms.

If UT serves as a means to attain a remunerative job and thus to get a well-paid job, the possibility of transforming money into functionings seems more likely. A graduate confirms this point by saying that:

I got a well-paid job, so I live well; I can know other places, other people and, what is more important, my family is satisfied with my performance... (A7).

In this case money has brought personal satisfaction. But larger effects can be expected thanks to education. In accordance with the quantitative analysis, 23 out of 100 graduates hoped in the short term, to open a business. During the in-depth interviews, this expectation was corroborated by some graduates when I asked them what they would do if they earned 50% more in addition to their current wage. A female graduate replied as follows:

I would like to own a house for my office...I am also saving to study my B.A. in *Querétaro* because here in the capital of the state, *Pachuca*, they cannot validate my previous studies of TSU (A1).

Though this graduate mentioned how she was using her money instead of how she would use extra resources, it is worth noting that, despite the fact that she was earning a good salary, she had entrepreneurial intentions as well as educational aspirations. In the same way, another well-paid graduate said that if he earned more, he would allocate those extra resources "for saving up to run a big business and to continue studying; that is, to invest in myself" (A5).

So money can be used for the development of higher functionings such as running a business or studying a first degree. The limitations of opening a business were not sufficiently explored in this chapter to provide an accurate perspective, but in the case of educational aspirations, it can be said that the lack of social opportunities and economic restrictions are affecting the process of transforming commodities into functionings.

Educational institutions - this does not mean only schools - for upgrading or for validating technical studies are not placed within the reach of Tula graduates. In addition, the lack of economic facilities related to the wage level is discouraging people from higher education degrees. As an example, a low-paid graduate said that if she earned more she would save it in order to study, because

it always happens that when the application process for admission takes place I have money for the registration fee, but not for the whole course (C1).

Monetary resources are needed in order to expand functioning and, thus, the human capabilities of the UT graduates. Though UT graduates could attain a job quickly, the low wage rates still limits further achievement. These factors are exacerbated by the lack of social opportunities such as free higher education courses that offer a bachelor's degree. Arguably, a removal of such "unfreedoms" would be desirable if Mexico wants to develop a "high skill economy" where "all have the potential benefit from skills upgrading and lifelong learning" (Brown, 1999:239).

VII. The employers of Hidalgo state. Their perceptions of UT graduates.

In order to gauge how regional employers perceive the performance of the UT graduates in their respective job occupations; nine enterprises were selected for conducting a semi-structured interview. The aims of this data collection process were specifically to identify: (a) the reasons for hiring UT graduates; (b) the graduates' skills and their weaknesses in their qualifications; (c) the differences from other types of studies; and, (d) the links between educational attainment and wage levels.

Of nine enterprises, six belonged to the manufacturing sector, while only three are classified within the tertiary economic sector. Their activities, number of employees and number of TSUs employed are shown in the next table.

Table 9.3. Enterprises visited by economic sector, number of workers and number of TSU employed

Economic sector	Number of total workers (in that plant)	Number of TSUs employed
<i>MANUFACTURING</i>		
Cement industry	316*	50
Electrical	210*	2
<i>Maquiladora</i> of plastic	112*	4
Food industry	252	2
Glass manufacture	400	20-30
Coal manufacture	98-120	8
<i>SERVICES</i>		
Co-operative of services	75	2
Automobiles agency	--	3
Road haulage services	500	15-20

* Includes all job categories (e.g., with or without affiliation to trade unions)

In all these cases, the person who was interviewed was the manager of human resources. Commonly, he or she occupied a managerial position supported by a bachelor's degree. It is worth emphasising that the employers of Tula never expressed negative opinions about the UT's education or underestimated UT graduates, rather they objectively remarked on the positive and negative elements of their qualifications. This is broadly explained below.

A. Is the academic formation the most important element in entering the labour market?

One of the results of the quantitative analysis (see Chapter 7), was the discovery that access of the majority (61%) of UT graduates to the labour market had occurred in less than three months while only 2 per cent of these professionals found a job a year after their studies. So as time runs on, the percentage of UT graduates looking for a job decreases. Although enterprises are employing technicians in a short time, the reasons why the productive sector is employing this kind of workforce are not sufficiently

explained.

This part shows that practical skills, a willingness to work and a significant reduction of training costs form part of a complex which has been positively valued by employers for hiring UT graduates.

With regard to practical skills, an employer of a service company argued that: "the main reasons for hiring UT graduates is that we need people with practical abilities who work productively". This opinion is supported and extended by another employer in one of the most important industries within Tula: the cement industry. He says that:

If we compare UT graduates with those who have studied in other institutions; it can be said that the former have a better education than the latter; they have practical abilities. [Moreover] we have hired many technicians through placements because this mechanism helps them to be more familiar with a company's policies, and procedures, so we do not have to waste time in training courses...

This employer, apart from hiring practical-oriented workers, has also remarked on the advantage of placements as a method of reducing training costs by employing UT graduates. So, we can corroborate here the mutual benefits of the partnership with industry. As was said in chapter 6, even though employers are investing the appointment of a worker to supervise UT students, businesses are also gaining by training their future workers within workplaces.

Another manager for human resources pointed out that the UT graduates "have the idea of working immediately which is very important for us because we do less induction and thus we save time" in adapting workers to their positions. This point deserves further discussion. UT graduates want to begin "working immediately" because of their need for an income in order to maintain themselves or to contribute to the income of their households. In this regard, the employer in the food industry suggested that:

the main reason to employ UT is because of their willingness to work; this may be explained by their low economic background. They need to work and thus they show a big interest in our job positions; willingness to work is very important for this company...

From the perspective of equality, this quotation may raise a big a question. Assuming that most of the UT graduates come from low income brackets, would it be fair to them to accept any occupation irrespective of the job conditions? Could we interpret this quotation as a sign of reproduction in education and in the labour market?

In my view, it is unfair to call the UTs "reproducers" of inequality for two reasons. The first is that graduates are reacting against the bad job conditions of Tula and are thus looking for better opportunities. They are acting in order to overcome structural disadvantages. The second is that the UT has improved the economic situation of young people from one stage to another and they have been a key factor for upward mobility. The movements between different groups in social and economic terms is confirmed by the majority of UT graduates whose parents had a low level of schooling. More remarkable is that parents are committed to the academic advancement of their sons and daughters. In this sense a graduate pointed out that:

My parents only studied up to secondary school...Both my father and my experience in the UT have encouraged me and motivated me to learn (*preparamme*) (D1).

I do not intend to analyse my arguments through the lenses of reproduction theory since I am concerned here only with analysing employers' s opinions about the qualifications of the UT graduates. I would say, rather, that deterministic points of view obstruct our ability to understand human beings in a broader perspective as was discussed in Chapter 8.

B. Forming technicians within poor contexts

Having described the factors which have helped UT graduates to enter the labour market,

it is necessary to examine the main complaints of employers about the qualification of University Technician (TSU).

We should remember that through interviews conducted with the administrative staff of the UT, it was found that the main criticism made by employers about the academic formation of UT graduates concerned their attitudes. For instance, Mr. Miguel A. Cruiz, responsible for Alumni Department of the UT of Tula, stressed the poor performance in communication skills and human relations of UT graduates, specifically their naive attitudes. These points seem consistent with those expressed by employers within this region of the Hidalgo state.

While only two employers identified problems in particular areas of knowledge such as English and computing skills, the rest of the business representatives highlighted attitudinal problems of technicians, specifically, with regard to personal initiative. For instance, in the assembly plant, the person responsible for human resources pointed out that:

...the distinctive point of the academic formation of UT graduates is their practical abilities and the weak points are the [lack of] initiative and the [lack of] creativeness...

This employer also added that a subject that should be included as a part of the UT's curriculum is "personal skills". In this regard, the CGUT points out that "the formation of the *Técnico Superior Universitario* (University Technician) promotes the development of the student's attitudes and abilities, through its academic scheme in terms of "know-how" (*saber hacer*) "know" (*saber*) and "to be" (*ser*) which allows the formation of qualified professionals who can be aware of the regional and national needs and also committed to the development and application of technology" (2000a:37). However, the third part of the UT scheme ("to be") seems flimsy. This point was also highlighted by the international experts who evaluated the UT system in 1999. They recommended that it

would be important "to strengthen the attitudinal dimension of students in order to have better access to the labour market" (CGUT, 2000a:16). As a response to these problems, the directive staff of the UT of Tula has organised "personality workshops" for UT students and graduates as extra-curriculum activities in order to enhance personal prospects. Universities can equip students with practical or relevant abilities for working ("know-how"), but they cannot easily sort out the structural difficulties that commonly link the low socioeconomic background of Tula's young people, and thus remedial strategies need to be implemented.

The other part of the UT scheme, "know" can be understood differently from practical skills ("know-how"). "Knowing" may refer to deeper knowledge, reasoning capacity and analytical abilities; but before analysing this issue, I turn to the discussion of interesting "complaints" expressed by employers regarding graduates attitudes.

C. An opposite vision of the aims of education

It was found that, paradoxically, some employers considered as "weaknesses" of UT graduates their aspirations toward having better job positions. One of these employers was the human resources manager of the manufacture of coal who said that:

The main weakness that I have seen from the UT graduates - which have been mentioned to UT authorities -, is that they believe that as they were working in the private sector and they received a wage; they would easily enter the labour market; they do not want to begin working from the bottom; they want to have "status" immediately and this is very difficult...

A similar perception was expressed by the employer of a company of road haulage services⁶⁰.

⁶⁰ A UT graduate highlighted the unfair process of selection of this company which, he says, was managed by "close groups" of relatives who usually occupied the white collar positions.

The main weakness that I have noticed from the UT graduates is that they believe that they can get a very good job immediately. Perhaps the responsibility for this belief lies with the UT itself; they [authorities] encourage graduates to rely on their knowledge and they tell them that employers are anxious to employ them, but many times it is not like that. Sometimes it is necessary to begin from the bottom to attain a good job position...

(Researcher) Are they very demanding?

(Employer) Yes; they are, from the beginning [of their labour career] they want to reach the top (*llegar muy alto*)...

It can be argued that there is nothing wrong in encouraging graduates to rely on their knowledge acquired in the UT since self-reliance has been, most of the time, positively valued by the representatives of the productive sector.

On the other hand, if UT graduates were very "demanding" in terms of getting the job that they wanted, then it seems that the "personality workshops" organised by the UT of Tula might have had a positive effect on graduates' confidence. This is remarkable since Tula is a disadvantaged region from which the UT graduates are trying to escape due to the low-paid jobs offered by regional companies and due to the lack of social opportunities. This shows that they are not conforming with their existing conditions which is very important for "recognising people as responsible persons" who refuse to act, or choose to act one way rather than another. Sen calls this capacity : *agency aspect* which has a "substantial intersection" with the well-being aspect (1999:190).

To sum up, if the education provided by the UT helps graduates to become responsible individuals with the capacity to envisage and to claim better job opportunities whereas employers consider these capacities as "weaknesses", then big difficulties may be caused by promoting, through education, "the process of enlarging the real freedoms that people enjoy". In this way, to assert that education brings development automatically is a misleading idea.

D. "To be or not to be (a technician). That is the question". Second episode.

According to the Secretariat of Public Education, UT graduates will hold a university qualification (*universitario*) and this qualification will differ from that of bachelor for three reasons: (a) the time-span of studying, (b) the intensive nature of the technical courses (*intensivo*), and (c) the tasks that technicians will perform. However these studies, as SEP pointed out, will have the same "quality" and "profundity" as those offered in the higher education system (SEP, 1991:19). As we can see, the definition of the University Technician level (TSU) seems very elusive. The depth of knowledge (*profundidad*) seems incompatible with the "intensive nature of education" since the courses given in the UT last approximately 3,000 hours (two years), while four or five year programmes generally cover 4,500 hours.

This lack of acknowledgement may be partially explained by vague definitions of the qualification of TSU. But, what is behind the fact that a big proportion of TSUs want to hold a bachelor's degree when educational planners say that Mexico's economy needs University Technicians? Some civil servants have addressed this question by saying that the desires of young people to study for a first degree (instead of a technical qualification) is a sign of the "conservative" nature of Mexican society. However, I question this simplistic vision by saying that choosing a higher education institution in Mexico is a more rational process than civil servants believe. UT graduates enjoy more opportunities in the labour market if they study a first degree than they do if they study a technical one.

This part supports this argument by presenting the opinions of employers. It have suggested that there exists a clear line between the qualification of bachelor and that of technician, which is still playing a key role within the labour market.

When the Administrative Manager of the Automobiles Agency was asked about the

differences between Bachelor and UT technicians in terms of knowledge, he replied as follows:

the bachelors have deeper knowledge. Bachelors in Accounting have more and know more about taxation than technicians. The former understand laws faster than the latter and they have more capacity for decision-making (*capacidad de decisión*) than technicians. This is the big difference.

(Researcher) How can you describe this decision making capacity?

(Employer) I have noticed that technicians are not educated to decide...

(Researcher) What else have you noticed?

(Employer) They are very well equipped with computing skills, for example, they work well in the positions assigned; but one has to push them, otherwise they limit their activities; they [commonly] think: "I have not done this or that, because you have not told me anything".

Two remarkable shortcomings in the academic development of technicians can be identified in this passage. The first is the lack of "faster" understanding of a tax law and, the second is the lack of capacity for making decisions. This poses questions for the way in which analytical abilities are developed through the vocational-oriented model of education and prompt us to consider the following hypothesis: If the lack of reasoning skills are missed in careers such as accounting, then one might infer that the difference of qualifications in technological careers may be bigger. This assumption was addressed by a UT graduate from this career who recognised the gaps between his technical formation and that of bachelors.

my goal is studying an engineering career in order to have better chances in the productive sector...I have noticed that I require deeper knowledge and let me give you an example; I am taking a thermodynamics course in which there are some engineers and the difference between these professionals and technicians is clear. What I studied in the UT were the bases of specific knowledge with the purpose to apply it in productive areas; differences between both [technicians and bachelors] are marked..(B1)

Arguably, the UT courses are helpful "bases" for a larger learning process which may provide "better chances in the labour market" for TSUs. In order to explore the links between the level of education, job occupation and level of wages, I asked a human resources manager if UT graduates could get "white collar positions". His answer was as

follows:

No; [there are no UT graduates occupying white collar positions, because] they have entered the company in recent months, so time has been short to corroborate this fact, but in the long term it could happen, though they need to be more prepared.

(Researcher) Could you tell me in which areas they need to be more prepared?

(Employer)...despite the fact of being formed in practice, they require more preparation in the use and interpretation of statistics which are common tasks assigned to managers

(Researcher) Which level of education do managers have?

(Employer) They studied a first degree.

It is fair to recognise that, although in economies such as Mexico's are experiencing terrible labour constraints and thus, the possible existence of the phenomenon of diploma disease could exist; employers are still detecting differences between the academic qualifications of a bachelor and that of a technician. The employer quoted above is connecting the job promotion of technicians with the acquisition of analytical skills which apparently a bachelor should possess. This is consistent with what Brand predicts within the labour market. He argues that:

News jobs, technology, and reorganised workplaces are requiring multi-skilled workers with strong language, mathematics, reasoning, problems-solving and analytical skills (cited in Tabbron and Yang, 1997: 327).

In order to explore how levels of education were related to economic benefits, a question was put to employers: "Could a technician earn more than a bachelor?". In Tula, only two (food and coal industries) answered positively, whereas the rest (7) answered negatively.

The aspirations of UT graduates to go further in their studies are supported by the realities of the labour market and are not explained by the "ancient culture" of becoming in *licenciado* only for "gaining status" as Mexican authorities believe. In fact, another employer said that "it would be excellent if the UT provides first degrees, especially in Engineering". But, in practical terms, this seems not so easy. How could the Mexican UTs provide analytical skills without compromising their practical skills orientation? Should the

UTs extend their time of studying? An integral framework of public policies should be developed for solving such complexities.

VIII. The complexities of promoting development through education in Tula: Towards a conclusion.

In its "prospective vision" of the UT model, the Secretariat of Public Education states that:

The enormous tradition of the classical first degree careers will push the UT to become like traditional universities...The original model should be maintained for the time required in order to get its consolidations and to show its value (SEP, 1991:74).

The SEP adds that the normal time of consolidation of higher education institutions is ten years, but given the characteristics of the UT model, this process is expected to be reduced significantly. According to the proposition shown above, it seems that the SEP adopted a rigid perspective and gave a normative indication about the future of the UT system. It neglected the possibility of proving the "value" of the UT system through an educational research or assessment exercise.

It was 1996 when the SEP asked for an external evaluation conducted by international experts⁶¹ which recommended "to organise the transition from the University Technician level to that of Bachelor" (CGUT, 2000a:16). But, as was said, the Upgrading Process (*Segundo Ciclo*) within the UTs was stopped for unexplained reasons.

In 1999, the UT system was again the subject of analysis by the same experts and it was interesting to notice that one of the main recommendations was "to maintain the technological "spirit" [sic] in the opening of new careers" (CGUTa, 2000:16). So, it seems that the Secretariat of Public Education and its educational planners have followed the

⁶¹ These international experts were Claude Pair and John Mallea who formed part of the group of the OECD examiners and were co-authors of the *Reviews of National Policies for Education in Mexico* where it was recommended that "technological universities should be developed as priority" (1997:214).

recommendations of external evaluators and are trying to keep the UT model as it was originally conceived when most graduates are wanted to read for a first degree as a response to their personal aspirations. "The enormous tradition" of studying a first degree has been interpreted by UT rectors and educational authorities as a whim of a highly credential conscious society. However, as was argued, UT graduates have good reasons for becoming bachelors as they understand how the labour market really works. This calls to question the functionalist idea of matching human resources with the labour market demands in order to grow economically.

The lack of analytical skills, deeper knowledge on specific areas and personal attitudes are missed in the technical education provided by the UT and these are trying to be restored through a higher education degree. In addition, University Technicians assume that they could improve their wage rate and thus gain personal and professional benefits as their level of knowledge increases. The lesson drawn from this point is that development-oriented models of education do not necessarily respond to what a manpower planning system demands, but can encourage a longer learning process. However, politicians, UT rectors and international organisations such as the OECD seem to be misunderstanding and underestimating people's aspirations. They are only concerned with the structure and do not put direct enough attention toward human agency.

Remarkably, the UT of Tula has been an instrument that has allowed graduates to become educated individuals and to acquire relevant practical skills for attaining a job quickly and thus to earn money, which may be used as means of attaining further achievements. This is plausible, since UT students come from less favoured sectors of society and higher education supply within this region was scarce.

However, the "real opportunities" that UT graduates can have locally for the expansion of functionings are minimal. Social and economic inequalities such as low-paid jobs, the

lack of free higher education options that offer the bachelor's degree, the lack of institutions to certify knowledge at work place, long working shifts and gender bias within the labour market constitute the main barriers that need to be overcome in order to enlarge human capabilities and thus promote development.

The agency aspect has led UT graduates to migrate from Tula for better opportunities. While this searching for well being should be regarded as positive for individuals, the inequality between those who can afford the cost of travelling for studying and those who cannot is increasing. This shows that, for Tula's young people, higher education cannot be "equally accessible to all". Furthermore, the Hidalgo state, through migration, is still losing its educated people as it was almost forty years ago (see Myers, 1965).

The capacity of graduates to choose the job desired was not regarded as a result of have studied in the UT. Special attention needs to be placed upon societal arrangements for improving the quality of life of UT graduates. It was found that the remarkable institutional relations of the UT (specifically the Alumni Department of the UT), job experience and social networks are factors that need to be considered in order to understand more coherently how education interacts with the development process. In short: "education cannot do it alone".

While local economic and social misfortunes have affected the attitudes of the UT graduates, employers pay low wage rates which are accepted by the UT graduates due to the necessity of having an income. Paradoxically, when graduates claim better job conditions, some representatives of the productive sector viewed these demands as "weaknesses". This fact creates problems for the promotion through education, of "the process of enlarging the real freedoms that people enjoy", since employers and graduates seem to have different ideas about the aims of education.

Having shown that educational planners, UT graduates and employers pursue different objectives and possess diverse notions of what education is for, it is now necessary to raise two key questions: Is the idea of development as freedom attainable through education? How can educational and social policy reconcile policy makers' beliefs, employers' interests and students' aspirations? A clever solution needs to be found by Mexican policy makers if we share Sen's idea that "development consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency" (1999:xii).

On one hand, people need to find mechanisms for upgrading their expertise and thus becoming bachelors, but without losing their jobs and without being charged tuition fees. The UT could go backwards and offer the first degree through its infrastructure. This will lead to equal educational opportunities to all graduates within the region irrespective of their socioeconomic background and will bridge the gap between those who can migrate and those who cannot.

On the other hand, co-operation agreements have to be signed with the employers. The aims of these institutional arrangements may be (a) to allow employed graduates to take first degree courses either at a workplace or through continuing education courses outside of the school walls; (b) to establish links with the Mexican boards of knowledge certification for upgrading the level of technician to one of bachelor taking into account the practical skills acquired at the work place. All these proposals, as Brown says, involves an "institutionalised relation of trust" (1999:237).

To conclude, although Amartya Sen "raised on a campus and spent his life in academia"⁶², his vision of reality is neither restricted nor narrow. I am pretty sure that the Cambridge professor has never been to Tula. However, thanks to his analytical rigour,

⁶² This quote is taken from the Steel's report on Amartya Sen which was published by the British newspaper *The Guardian* on the 31st March, 2001.

his intellectual insights can shed light on development problems everywhere. He has set up a sound basis for re-thinking how education works within the development process by developing a human capabilities approach. In this case, it can be argued that the “process of expanding the real freedoms that people enjoy” through the UT of Tula is far from being achieved and thus a removal of unfreedoms is required in order to ensure that education and economic growth are combined in favour of human beings.

CHAPTER 10

**How a modern university
functions within an
industrialised context. The
case of the UT of
Aguascalientes**

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Introduction

According to the Secretariat of Public Education, the Mexican Technological Universities aim "to encourage juveniles to remain in their place of origin and subsequently take up work there, thus contributing to the development of that region" (SEP, 2000:81). With this assumption in mind two key issues emerge: (1) the way in which a vocationally-oriented model could fit into a region given the cultural, social and economic disparities in Mexico's zones, and (2) the presumption that "juveniles" will easily find jobs in their "place of origin" meaning that regional development will occur automatically. This chapter sheds light on these two issues, and it also argues that in Aguascalientes, the Technological University (henceforth referred as UTA) has been, as in the two previous cases, a place where young people have gained valuable personal and professional achievements. However, as a result of the relative economic wealth of this region and the less deprived situation of the locals, these achievements are made rapidly, paving the way to the emergence of higher "functionings". This fact inexorably implies the creation of wider opportunities in order to expand people's freedoms. It is precisely at this stage where this "prosperous" region of Mexico is failing.

Following the same structure as the two previous chapters, I will begin by presenting the characteristics of the graduates interviewed, so that the cultural and economic differences between the Aguascalientes young people and their counterparts in Tula and in Neza can clearly be seen. The second part discusses the way in which a modern educational model works within a relatively wealthy region. In accordance with Sen's

ideas it is argued here that economic prosperity provides a basis and is a means for enhancing people's capabilities. Given that economic approaches usually prove the relationship between education and development by correlating economic and educational variables, the third part shows an alternative way of assessing the impact of studying by evaluating seven functionings in personal and professional terms. It is argued here that despite their less deprived situation in comparison with the students of Tula and Neza, the UTA graduates also recognise the role played by this academic institution in their lives.

The aspirations of the UTA graduates serve in the fourth part to illustrate the opportunities that are available in this region. For this, this part is sub-divided into two sections. One describes the "advanced" expectations and the other shows the attainable aspirations of Aguascalientes' young people. In the fifth part, quality of life is explained by the UTA graduates themselves and is complemented with other locals' opinions who let us know to what extent a relatively "rich" region can enhance the capabilities of individuals.

Finally, the opinions of the employers interviewed are presented in the sixth part. The representatives of the productive sector made two claims. The first was that the TSUs are professionals who tend to adapt relatively easy to production activities. The second was that they stressed the differences between the qualifications of TSUs and those of bachelor's degrees.

1. A profile of the graduates interviewed

As in the previous chapters, this part presents the main characteristics of the graduates interviewed (see Table 10.1). Twenty four "University Technicians"⁶³ (henceforth TSUs)

⁶³ Although "technician" is not the most suitable term in English to refer a technically trained person, it is used here to name the *Técnicos Superiores Universitarios* (TSUs). Indeed some of Mexico's government documents call the TSUs "Higher University Technicians".

answered my questions during interviews which took place in their workplaces and in the Technological University (UTA) itself.

Nineteen of 24 graduates were employed in Aguascalientes, while five did not have a permanent job position at the time of interview. These jobless graduates have decided to leave their jobs due to three main reasons: (1) low wages (D1, D2, D5), (2) long working hours (D4) and (3) to study for a first degree (D3). These facts suggest a society which faces different problems to those experienced by the graduates of the UT of Tula and the UT of Neza. We should remember that Aguascalientes is the least deprived region in economic and educational terms of our three case-studies (see chapter 5).

Table 10.1. Selected characteristics of graduates interviewed in Aguascalientes

High wage level							
<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>	<i>Current position at time of interview</i>	<i>Job satisfaction</i>	<i>Main expectation*</i>
A1	28	M	1994	Information systems	Director	Fair	To run a business
A2	27	F	1996	Manufacturing	Administrative assistant	Very high	To run a business
A3	24	F	1997	Management systems	Director	Very high	NA
A4	26	M	1998	Manufacturing	Head of area	Fair	To run a business
A5	25	M	1996	Marketing	Administrative assistant	Very low	Don't know
A6	32	M	1995	Management	Administrative assistant	Very high	To run a business
A7	28	M	1995	Manufacturing	Superintendent	Fair	To teach
A8	25	M	1998	Manufacturing	Qualified technician	Fair	To be promoted
Middle wage level							
B1	27	M	1998	Information systems	Qualified technicians	Very high	To run a business
B2	25	M	1997	Manufacturing	Qualified technician	Very low	To study
B3	21	F	1999	Management Systems	Administrative assistant	Fair	To run a business
B4	33	M	1998	Industrial maintenance	Qualified technician	Very high	To be promoted

continues...

<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>	<i>Current position at time of interview</i>	<i>Job satisfaction</i>	<i>Main expectation*</i>
B5	25	M	1995	Management	Foreman	Fair	To run a business
B6	29	F	1996	Marketing	Head of area	Very high	NA
B7	22	M	1997	Industrial maintenance	Qualified technician	Very low	To run a business
Low wage level							
C1	24	M	1997	Industrial maintenance	Foreman	Very low	Don't know
C2	21	F	1998	Management	Administrative assistant	Fair	To teach
C3	24	F	1998	Management systems	Owner of her own business	Fair	To consolidate her business
C4	24	F	1996	Industrial maintenance	Administrative assistant	Very low	To run a business
Unemployed							
<i>Code</i>	<i>Age</i>	<i>Sex</i>	<i>Year of graduation</i>	<i>Career</i>			<i>Main expectation*</i>
D1	22	F	1999	Marketing			To work
D2	25	F	1995	Management			NA
D3	21	F	1999	Manufacturing			To study
D4	22	F	1999	Marketing			To run a business
D5	25	F	1997	Marketing			NA

* This excluded the option "studying for a first degree" which was already included in the questionnaire.

NA= No Answer

Unlike the case of Neza, Aguascalientes' economy seems to reward those professionals who hold a career in Manufacturing with high wages rather than those who studied IT specializations or administrative disciplines. This fact is supported by the quantitative analysis which revealed that Management and Marketing account for the bulk of unemployed graduates (35% and 29%, respectively) while Manufacturing and Industrial Maintenance each registered 14% of the total of respondents. The head of the State Employment Service (*Servicio Estatal de Empleo*), Jorge Castorena, supported this observation during an interview. He argued that, in Aguascalientes, graduates from engineering in manufacturing, electricity and electronics are highly accepted in the labour market. Contrary to this, professionals from economic, administrative and humanistic

disciplines are not easily “absorbed” by the world of work.

Curiously, a UTA graduates follow-up study reported that Management had the highest percentage (21%) of the total of graduates followed by that of Marketing and Industrial Maintenance and Manufacturing Processes (21% and 18%, respectively) (UTA, 2001).

Despite the problems that administrative disciplines face in facilitating the transition from school to work, the UTA created a course of Marketing in 1994 and, more suspiciously, in 1997 another administrative career was opened: “Corporate Accounting”. If the UT model assumes that courses should be created in accordance with the needs of a productive sector, it is fair to ask: What kind of planning process for offering academic programmes is being followed in the case of the UTA? Although I recognise that universities should not be regarded merely as a place for preparing people for work, this case needs further explanation regarding the relevance of education.

While the representatives of the productive sector could demand one thing from the UT, politicians and educational authorities could pursue other interests by creating specific types of courses that were able to attract a considerable number of young people. However, students may not be thinking of “the needs of the economy” nor of politicians’ beliefs when they choose a vocational course.

II. The UTA and its region: “Like a hot knife through butter”

One of the general objectives of this research is to explain the relationship between higher education and development by using three technological universities in different zones of the Mexican Republic. This cross-regional approach allows us to assess how an academic institution could change or adapt its activities in accordance with its contextual factors. In this case, Aguascalientes is a small state whose population, aged 15 and over, has a higher schooling average than the national average; the bulk of its population (29.6%) holds an educational level of upper secondary school and higher

education. The largest proportion of Aguascalientes' employed population (33.5%) receives between two and five times the minimum wage and it has been a state which has attracted more people than it has lost through migration.

Due to all of these factors, it is expected that the function of this UT may differ from that of Tula and Neza. In this vein, and according to the Rector of the UTA, Mr. Héctor Tiscareño, the UT model of education fits well into zones that are characterised by an entrepreneurial surrounding such as Aguascalientes. He said that "within a prosperous and productive context, the UT is like a hot knife through butter." However, it is necessary to emphasise that the match between an educational institution and its context should not be reduced to the simple supply of a suitable workforce for the needs of the employers: it is necessary to analyse how the contextual conditions work for "enriching human beings' lives" (to use Sen's phrase). "Human beings are not merely means of production, but also the end of this exercise", as Amartya Sen pointed out. Sen also argues that:

The acknowledgment of the role of human qualities in promoting and sustaining economic growth - momentous as it is - tell us nothing about *how* economic growth is sought in the first place (Sen, 1999:295 author's italics).

How can economic growth in certain regions improve the living conditions of their inhabitants? Placing humanity at the centre of attention, Amartya Sen gives us some clues. He suggests a focus on the expansion of human freedom to live the kind of lives that people have reason to value, then

the role of economic growth in expanding these opportunities has to be integrated into that more foundational understanding of the process of development as the expansion of human capability to lead more worthwhile and more free lives (Sen, 1999:295).

So “while economic prosperity helps people to gain wider options and to lead more fulfilling lives, so do[es] more education” (Sen, 1999:295). Thus, it can be argued that if a trained or educated person lives in a prosperous environment where a wide range of opportunities are available, they may be more likely to expand their freedoms than those who live in a context with limited opportunities. This point reinforces the idea that in order to achieve development through education, complementary conditions should be in place. In doing so economic growth, as a means, can help significantly.

Having discussed the basic pillars of Sen’s human capabilities approach, it is necessary to illustrate theoretical propositions with empirical evidence drawn from a “prosperous” region: Aguascalientes.

According to the quantitative analysis in Aguascalientes, the majority of graduates surveyed (65%) chose this educational option due to the convenience of its short academic courses. One might infer that this proportion is explained by the economic restrictions experienced by locals, just as in the case of Tula. However, while in Tula 51% of respondents lived in households with an income of between one and five times the minimum wage per month, in Aguascalientes 48% of graduates surveyed belonged to households with a monthly income of between seven and more than nine times the minimum wage. Thus there may be other factors that explain why young people from richer income brackets selected a technological university.

During the in-depth interviews with UTA graduates, it was found that young people from Aguascalientes perceived education in a pragmatic way, which suited their needs. When I asked an unemployed graduate why she had chosen the UT, she replied as follows:

Because the educational model convinced me. The fact of doing things suits me rather than being a “human encyclopedia” (D4).

But the preference for the instrumental aims of higher education was not the exclusive reason for jobless graduates selecting the UT. A middle-paid graduate said that:

I chose this university for its short courses. To be honest for laziness: I did not want to study five years in a university and, moreover, to find a job was not difficult (B5).

At first glance, UTA graduates seem to be more free to choose the school they want to attend and their decisions are not purely based on the desire to find a solution to their economic problems. This line of reasoning implies that the Technological University is a *real option* for studying rather than being “the only possibility” as in the case of Tula, or being an “escape valve” for rejected students as in Neza.

Another finding that helps us to understand how this technological university is meeting locals’ aspirations is that, although the proportion of the UTA graduates who wish to study for a first degree is still high (82%), this percentage is not above those of Tula and Neza (96% and 90% respectively). This shows us that in less privileged regions, people may have a greater tendency to value education as being a passport to achieving better social and economic conditions. In contrast, in regions like Aguascalientes this perception seems to diminish.

Furthermore, and diametrically opposite from our previous cases, some young people in Aguascalientes have studied in public universities that offer bachelor’s degrees, such as the *Universidad Autónoma of Aguascalientes*. However, they changed their minds and entered the UT. A well-paid graduate who was working in a family business said that:

I was studying Management in the Autónoma [UAA], but I got bored and thus I dropped out. I wanted to finish something quickly (A4).

Perhaps as a consequence of her duties in being responsible for her business this graduate needed to study "something quickly", so she was not so keen to acquire non-practical knowledge. Another graduate who also studied in the UAA and, eventually, took classes in the UT and explained his reasons for changing schools:

The UT has a supportive system for its students contrary to the *Autónoma* [UAA]. I did not like the *Autónoma* since I noticed a sort of preference of some teachers for graduates from specific upper secondary schools (A8).

It is not my concern to investigate whether or not some teachers from the *Autónoma* preferred students from different schools, but rather, to stress the freedom that the UTA graduates have to change their place of study. What factors have provoked that freedom? It seems that young people from this region have a greater capacity to do what they desire once those economic and social opportunities exist. A graduate who occupied a position as "superintendent" in a transnational company said that:

I had the opportunity to study in the *Tec de Monterrey*, but unfortunately I did not take it. I have noted that Tec's graduates are very well-accepted in the labour market and thus they earn high wage rates; I have confirmed this fact in this company (A7).

The Tec de Monterrey is one of the most expensive private technological institutes in Mexico and is commonly selected by young people from the upper class. If this graduate had the chance to study there, it means that his decision to go to the UT was not a response to the necessity to study a short course in order to attain a job quickly and maintain or support his family - as in the case of Tula's young people. It seems that short and technical courses may not only be suitable for less economically disadvantaged persons. Cultural factors are also involved in the process of choosing a university. For example, when I asked another graduate which university he would select if he had another chance, he said that he "would re-enter the UT" since its educational model was

“quicker than the traditional system” (B4).

In sum, given both regional opportunities such as a favourable economic situation and, a pragmatic view of education, the Aguascalientes’ young people have selected the UT educational model in accordance with their own needs rather than external factors derived from a deprived situation. This also shows that vocational models of higher education can fit well within an industrialised context such as Aguascalientes where people have a choice of educational options in accordance with their personal needs.

Having examined some opportunities that Aguascalientes offers, it is necessary to examine the other side of the coin of the human capabilities approach: functionings.

III. Evaluating the functionings of the UTA graduates

The concept of “functionings”, as Sen argues, has “distinctly” Aristotelian roots and it reflects the various things a person may value doing or being. “While the combination of a person’s functionings reflects her actual achievements, the capability set represents the freedom to achieve” (Sen, 1999: 75). With respect to functionings, Sen points out that:

The valued functionings may vary from elementary ones, such as being adequately nourished and being free from avoidable disease, to very complex activities or personal state, such as being able to take part in the life of the community and having self-respect (Sen, 1999:75).

As in the two previous cases, seven functionings are presented here for assessing the impact of this UT on the lives of its graduates (see Table 10.2). Four of them are concerned with personal improvements and three with the professional achievements that young people may have made as a consequence of studying in the UT.

Table 10.2. Functionings to be evaluated by category

<i>Personal Improvements</i>	<i>Professional Achievements</i>
1. Being able to feel confident and self-reliant.	5. Being able to acquire the knowledge required in a job position.
2. Being able to visualize life plans.	6. Being able to look for and to ask for better job opportunities
3. Being able to transform commodities into functionings	7. Being able to choose jobs desired.
4. Being able to develop further abilities.	

According to the quantitative analysis, 37% of the graduates surveyed thought that the UT contributed to helping them to acquire relevant knowledge for their jobs, while 28% of respondents said that the UTA had helped them to find a job quickly. It is worth saying that none of the 89 respondents answered that studying in the UT was not "useful at all". So, despite selecting the UT under a pragmatic view of education and a relatively better economic situation, the young people of this region have attributed an important role played by the UT in this "prosperous" region.

A. Enhancing graduates' "beings" in an industrialised region

Using a metaphor, one graduate pointed out that the UT had given him "the wings to fly" (B4). When I asked what he meant, he explained that he had the opportunity of studying in this "modern model education" and thus he had the chance "to acquire knowledge quickly" though he also recognised that "flying" was part his own responsibility. Translating this into Sen's words, it can be said that the "wings" can be interpreted as the instrumental freedoms that this person could gain, while "flying" depended on his own endeavour. Arguably, in the process of development, "there is a deep complementarity between individual agency and social arrangements" (Sen, 1999:xii).

On the other hand, despite a successful performance in the labour market, a graduate from Manufacturing did not underestimate what the UT did for him. He pointed out that thanks to the UT he:

knows how to recognise your means, your *capacidades* (capabilities) in order to use them (*explotarlas*). Seven years ago I did not imagine occupying this position, I never ever had envisaged this. Now I am more conscious that I can achieve higher goals (*llegar más lejos*) (A7).

When a person is more "conscious" that she or he can "achieve higher goals" this implies that she or he will require larger opportunities. The set of alternatives from which a person can choose is a part which has been omitted from the literature on the economics of education, principally, those approaches based on manpower planning techniques, which are aimed at matching "stocks" of workforce with the requirements of the labour market. Apart from philosophical criticisms regarding the violation of human freedom, these deterministic approaches assume that workers will remain "static" once they are trained or educated to work in a particular occupation. But the intrinsic complexity of individuals is rarely captured by these techniques. Education works in a different way to that assumed by some narrow-minded educational planners. Let us look at an example. According to a poorly-paid graduate:

The UT was a turning point in my life. Not only in technical terms but in human terms as well. I became a more secure person, my convictions were stronger. I had left some ideals and when I finished [my studies in] the UT I recovered them (C4).

It is worth saying that this graduate in Industrial Maintenance was studying her first degree in the Technological Institute of Aguascalientes (ITA) and she envisaged running a business. To run a business was a common aspiration expressed in the interviews with UT graduates. Ten of 24 interviewees had the main expectation of establishing their own source of employment (see Table 10.1).

Another relevant finding was that, irrespective of their wage level or their job situation, UTA graduates recognised the positive impact of this learning space on their lives. For instance, a graduate who was also studying an engineer course in the ITA, and thus was unemployed, said that thanks to the UT he was able to “speak about any theme or issue”. Moreover, he was looking for “higher positions” rather than for “operative jobs” (D3).

To develop further abilities was another functioning positively evaluated in this case. A jobless and female graduate noted that she experienced personal changes before and after studying in the UT. She said that:

I lost weight...I felt a much more secure person to choose any thing, to decide about something. I think I have more ability to act within any atmosphere, to deal with different issues and to treat people from all [social and cultural] levels (D4).

Making personal achievements is a benefit that cannot be underestimated, especially when people have lost their jobs. The same graduate added that to study in the UT was important not only,

to match the labour market requirements but also in personal terms, at least in my case, I gained security and my perspective is broader (D4).

In addition to the last passages, some graduates of this technological university said they were “more mature individuals (A2, A4, B7); and they could “express themselves more easily” (A5), even though in the past they were not very “communicative persons at all” (C2).

On the other hand, it is not illogical to think of the UT as an academic space that may foster a more extensive process of learning. In fact, a jobless graduate said that the UT provided the “basis for continuing” her development (D5). The knowledge acquired in the UT is, as a well paid graduate said, a part of enhancing professional performance, the

other “tool” is job experience (A1).

Considering that it is possible to be a more self-confident person, to be able to visualise better living conditions and to develop further abilities through this educational model of higher education, it can be argued that studying in the UT can be considered a step toward the improvement of some graduates’ “states of existence” (borrowing from Sen). Irrespective of their labour situation, of their wage level, and of their needs based on a pragmatic view of education, graduates recognised what the UT did for them in personal terms. Now, let us move on to analyse what can the UT do in professional terms.

B. Attaining professional achievements. An interlinked perspective

As was argued in the literature survey (see Chapter 1) the usual way of assessing the impact of education on development has been based on human capital theory which uses, as its main basis, the link between levels of schooling and levels of employment with the aim of explaining economic growth. However, these approaches tend to overlook several aspects such as the segmentation and fragmentation of the labour markets, and the qualitative benefits (externalities) of the educational process; even more questionably they use the idea that human beings are regarded as “factors of production”. Therefore, this thesis seeks to fill this theoretical gap by using Sen’s human capabilities approach.

If we follow Sen’s theoretical proposition regarding seeing human beings from a broader standpoint, we cannot separate their personal improvements from their professional achievements gained through education. In this respect, Sen suggests that: “In looking for a fuller understanding of the role of human capabilities, we have to take note of:

- 1) their *direct* relevance to the well-being and freedom of people;
- 2) their indirect role through influencing social change; and

3) their indirect role through influencing economic production" (Sen, 1999:296 author's italics). Sen proceeds by arguing that:

The relevance of the capability perspective incorporates each of these contributions. In contrast, in the standard literature human capital is seen primarily in terms of the third of the three roles. There is a clear overlap of coverage, and it is indeed an important overlap (Sen, 1999:297).

Congruently with his holistic way of thinking, Sen puts humanity at the centre of attention though without neglecting the indirect role of human capabilities in social change and economic production. For this reason, this "overlapping" perspective may be regarded as another, though more coherent, approach the investigation of an old theme among educators: What is education for?

This part presents the professional achievements that graduates made once they finished their studies in the UT. These functionings are basically concerned with job issues, that is, practical applications of the knowledge acquired in the UT. These achievements, besides the personal improvements which have been evaluated above, form a part of the humanistic perspective suggested by Amartya Sen.

As in the case of Tula and Neza, the quantitative analysis showed that the majority of the graduates of the UT of Aguascalientes (84%) were working at the time of interview. Moreover, in this case, we see the highest proportion of TSUs who found a job in a very short time. Of 75 graduates, 38 (51%) were employed in less than a month and, if we add the 19% of graduates who were working before finishing their studies in the UTA, it can be seen that a considerable number of young people were participating in the production activities of this state. This fact cannot be overlooked since it represents a basis for more valuable achievements, and thus the process of expanding people's freedoms can be precipitated more easily. In Sen's words:

If a person can become more productive in making commodities through better education, better health and so on, it is not unnatural to expect that she can, through these means, also directly achieve more - and have the freedom to achieve more- in leading her life (Sen, 1999:294).

On this line of reasoning, the relationship between the content of some higher education programmes and the labour market seems virtuous since this link may work in favour of human beings. This means that a remunerative occupation can be the point of departure for expanding people's freedoms. However this relationship should not be considered as the most relevant indicator for gauging the effects of education. This will lead us again to a "fragmented" perspective on human beings. In this vein, the Mexican expert in education Pablo Latapí (1997) reflects that employment is the "natural goal" for education, however Latapí himself recognised that public academic institutions, specifically universities, should educate young people for working life but also root (*arraigar*) students in their full human reality (Latapí, 2001:Web-Site). So, education brings wider benefits than only to obtain a job position.

The UT of Aguascalientes has taught "practical things" that help graduates to "know how the companies really work" (B3). According to another graduate, the benefits of having studied in the UT lie in the fact that "you could have a job without a problem and earn a fair wage" (A8). At first glance, the vocational orientation of the UT programmes appears to suit what some companies are demanding. To support this point, a graduate in Industrial Maintenance underlined the acquisition of "technical and practical knowledge" in the UT which is "very important to get into the labour market" (B4). This graduate added that he has received job offers from three companies and he considered this point as crucial since we are living "times of fierce competitiveness" (B4).

A case that deserves special attention is that of the graduate who had her own business. She was running a business based on creating a web-site for the state of Aguascalientes

since she studied *Ofimática* (Management Systems). Unfortunately, she did not succeed as a result of the lack of interest of her partners - other classmates - who wanted to earn money instantly. Despite this fact, she accepted that her course was well-known and thus she "could work in any company" (C3). This clearly shows that studying in the UT allows individuals to build up their own entitlements thanks to the knowledge acquired.

As in the case of Tula, the disciplinary effects of studying also were mentioned by the UTA graduates. After having recognised that he could finish his studies "quickly", a graduate from Management pointed out that, in this institution, "you are formed under a tough educational model, so you are more able to adapt to a working system" (B5). This supports Bowles' arguments in the sense that "discipline, respect for property, competition, and punctuality are an implicit part of the curriculum of virtually all schools" (Bowles, 1977:174). But, with the difference that in this case, I am analysing a university instead of a "school". Whether or not a higher education institution should promote these values directly or indirectly raises sensitive issues for discussion - especially from those authors who come from a structural tradition. Since I am concerned here with the assessment of the professional achievements of the UT graduates, I will not stop to discuss the most suitable normative ways of teaching in the UT. Rather, I would suggest that research regarding promoting working habits in schools will be very illuminating in the current climate where the intrinsic and instrumental aims of education are being transformed rapidly within the global context.

But following the evaluation of professional functionings, I would say that we cannot separate graduates' personal improvements from their professional achievements. Perhaps an example would illustrate this claim more clearly. When I asked a well-paid graduate what were the main changes before and after studying in the UT, he highlighted the relationship between both types of functionings as follows,

Now I can buy more things than in the past. Moreover, as you acquire knowledge, job experience and [you hold] a diploma, you become a more secure person. [With this] economic situation seems not so complicated, you can buy a car and to have more things that you never had imagined besides you are more competent to do whatever activity (A6).

So this graduate established a relationship between his professional achievements (“acquire knowledge, job experience”) and his personal improvements (“to be a more secure person”). Having found a well-paid job, he was able to buy things that he “never had imagined” and perhaps because of this, his economic situation did not seem “so complicated” to him. Amartya Sen gives some theoretical clues that may to explain this finding:

[...]since enhanced capabilities in leading a life would tend, typically, to expand a person’s ability to be more productive and earn a higher income, we would also expect a connection going from capability improvement to greater earning power and not only the other way around (Sen, 1990:90).

Arguably, practical abilities gained through the short academic courses in the UT have facilitated the transition for graduates from school to work, and this cannot be underestimated since they represent a basis for the larger expansion of capabilities. A coupling of personal and professional functionings captures more coherently what education can do for individuals.

IV. What the aspirations reveal

A. “Advanced” aspirations

As was argued above, the process of choosing a university in Aguascalientes seems to have a different rationale to that in Tula or in Neza. At Tula, prior to the creation of the UT, there was no public higher education institution; at Neza the most of students had not been accepted in the major public universities of Mexico City. Furthermore, it was also

noted that despite the high number of graduates desiring to study for a first degree in Aguascalientes, this proportion was the lowest of the three case-studies analysed. Therefore, it is worth examining why the UTA graduates wanted to go further in their studies.

During the interviews I asked a graduate why she wrote in her questionnaire that she wanted to study for a first degree. She replied as follows:

When I finished my studies in the [technological] university, I was not interested in studying anymore. But, as I was involved in my work, I realised that there is a fierce competitiveness, so I would like to study not only a first degree but a master course or a PhD (B3).

Apart from regarding education as a means for defending herself in the competitive world of work, this graduate mentioned the possibility of studying beyond a bachelor's degree. This is consistent with the argument developed in the previous chapters: the technical courses taken in the UT can be the first step in encouraging individuals to embark on a continuous process of learning. Similarly, a graduate who occupied the position of a director in a public institution said that:

I would study a first degree only for the diploma, not because I need it. Once finished this, I will "jump up" to study a master course or a PhD. In fact, I am studying some *diplomados* [continuing education courses] (A3).

The same graduate aspired to become the Rector of the UTA. It is worth remembering that this aspiration was not mentioned by any of the graduates interviewed in Tula or Neza. This marks a contrast in terms of the job aspirations expressed by Aguascalientes graduates with their counterparts in the states of Hidalgo and Mexico. Following this graduate, it was also interesting that she said that she did not need the bachelor's diploma for the job she wanted. Whether or not the bachelor's diploma is required in other jobs will be discussed below (see section B), but it is worth noting here that the academic

aspirations of these graduates are beyond this level of education. In this respect, it was found that some graduates have not only wondered about studying for a first degree but also about taking a postgraduate course in a foreign country. For instance, an unemployed graduate wished to study abroad, but the problem was that she did not have a *licenciatura* (the first degree) (D4). Bearing similar plans in mind, another graduate said that:

I am planning to go to Spain in order to study a *especialización* (specialization course)⁶⁴. I do not know what problems could I face since I do not have the bachelor's degree (A2).

Besides the direct cost of studying in a foreign country such as tuition fees, accommodation and travel expenses, etc., accomplishing this aspiration also requires the ability to speak a foreign language. Moreover, this desire also has an indirect cost which is generally known as the opportunity cost. If one of these graduates leaves the country for the purpose of studying, their households will not receive their income as workers anymore. As we can see, pursuing a postgraduate course in a foreign country is a finding that contrasts with those found in Tula and Neza where graduates are experiencing economic and social problems in studying a first degree near their homes.

Given the level of opportunities in Aguascalientes and having met basic aspirations in economic, academic and labour terms, it is not illogical to expect that "more advanced aspirations" could emerge in the minds of UTA graduates. This phenomenon has been explained by the American psychologist Abraham Maslow (1908-1970) as the "hierarchy of needs". That is, as people meet their basic needs, they continue to pursue higher needs until they reach the need for "self-actualization", which is the desire to become everything that one can become (Dictionary of Sociology, 1998).

⁶⁴ In Mexico, "*especializaciones*" are part of postgraduate courses which can be studied after the first degree but without reaching master's level. Their equivalent in the UK may be the diploma.

As education causes movement upwards in Maslow's hierarchy, the set of real opportunities for meeting people's aspirations needs to be expanded. This fact inevitably raises challenges in terms of public policy, and force us to re-think how the state, the private, and the voluntary sectors can contribute to the expansion of capabilities of individuals when they start a learning process.

B. Real aspirations and real opportunities

Realistically speaking, one of the graduates quoted above said that as she got involved in the labour market, she noticed that "there was a fierce competitiveness" and thus she wanted to go further in her studies (B3). However, another well-paid graduate, also cited above, underlined the uselessness of the diploma in her working activities (A3). These contrasting answers require further explanations because we may be approaching a case of "diploma disease" in Aguascalientes, even though in Tula and in Neza this has not been the case. In these regions, both graduates and employers have remarked upon clear differences between the qualifications of a bachelor and those of a technician.

If we consider Aguascalientes as a modern and "prosperous" region, we would expect that regional employers value the knowledge of people over any other factor. A sign that points in this direction is that only one out of 89 respondents wanted to continue their studies because the company was asking them for a first degree (see Chapter 7). So it is difficult to assert that companies were directly urging students to go further in their studies. However, a contradictory point is that the bulk of graduates surveyed (41%) wished to become bachelors with the aim of attaining a better job position. If the employers are not directly pressing people to study but graduates desire to read for a first degree in order to get a better job, where does the explanation for this "paradoxical" relationship come from? I would argue that as graduates get involved in productive activities, they begin to understand how the labour market really works and what the tacit rules are that shape a professional career . Therefore, it is not surprising that most

graduates want to study for a *licenciatura* (first degree) in order to have, as an immediate goal, a better job.

This aspiration leads us to stress the importance of recognising the capacity of individuals to act or refuse to act, to choose to act one way rather than another (Sen, 1999).

Despite the fact that human beings act rationally to identify the strategies for "cracking" the tacit rules and improving their job conditions, this does not say anything about whether there is a "ritualist process or accumulating qualifications" (borrowing from the Dictionary of Sociology). Whether or not Aguascalientes is experiencing a phenomenon of diploma disease is an issue that will be discussed through employers' and graduates' opinions. In this part, TSUs' accounts are presented.

When I asked one of the UT graduates why he had studied for a first degree, he answered that:

Unfortunately, as a TSU I did not see good professional opportunities in the short time [meanwhile] as engineer I had the opportunities in less than a month.

(Researcher) Do you think that this tendency has changed recently?

(A7) It is difficult to say, but with respect to this company⁶⁵ and to others such as Japanese companies the TSUs are rejected (*tiene un rechazo*). If you do not hold a bachelor's degree is very difficult to grow up professionally.

(Researcher) Why is that?

(A7) Perhaps because the diploma is highly valued, though there are exceptional cases. For example, the director of this plant started working as workman, but eventually he needed to study the course of industrial engineering.

As we can see, this graduate had the chance to study for an engineering career and thus his job conditions improved. He also stressed the restrictions that certain companies, especially international firms, have imposed on the TSUs. In the next part I will present some employers' opinions about the access of UTA graduates to the labour market.

⁶⁵ The real name of this enterprise was changed by using the term "this company".

However, I would briefly say that I had the chance to interview the human resources manager of the transnational where the graduate quoted above was working, and she raised two important issues. The first was that the TSUs occupy positions that are “between engineers and supervisors, but above operators”, and secondly, it was confirmed that a technician starts earning a lower wage than an engineer, but more than an operator. When I asked this employer what the necessary elements are for the promotion of technician to a higher position, she replied that: “they need to study an engineer course”.

But, before going into detail, it must be said that knowledge acquired in a school should, in theory, be certified by a diploma. This *papelito* (diploma) thus guarantees the successful completion of any academic programme.

Having said this, we will proceed to discuss whether knowledge plays a key role in facilitating occupation of higher job position in Aguascalientes. In doing so, an opinion of a graduate of Marketing is given. This graduate told me, during the interview, that she was thinking of studying for a first degree in International Trade, but then she stopped and said: “this is because of the diploma, not for the lack of knowledge” (B6). She also explained that:

When you work as TSU you occupy low-ranked positions (*de chalán*). As technicians you occupy middle positions in the organizational structure, but once working you could see that you know the same as a bachelor or an engineer, although you may be earning less than them just for the diploma (B6).

According to this graduate, there is no clear distinction between a technical level and that of bachelor. However, in discussing whether or not a technical degree can be objectively comparable with that of bachelor, it is important to bear in mind the type of course. In this case, the graduate quoted above studied an administrative discipline (*Comercialización*) whose academic contents can be transmitted more easily than those careers which

require practices with machinery, for example. This point was supported by another graduate from *Comercialización* (Marketing) who underlined the low level of specialization of this course in relation to his job position as a salesman. He said that what counts in Marketing are the "technical abilities rather than scientific applications" and he thought that "*Comercialización* is not such a specialised course, not as much as any course in engineering", he said (A5).

A graduate of Manufacturing whose job position was "head of area" (*jefe de área*), said that:

As a TSU you are prepared, but employers do not recognise this level. A textile company told me that, although I had the knowledge, my level was one of a technician (A4).

A jobless graduate supported this point by saying that, "I realised that the first degree is more valued in the companies than that of technician" (D3). Furthermore, when I asked a graduate from Industrial Maintenance which university he would choose in the situation of having another chance to do it, he indirectly remarked upon the lack of recognition of the UT's degrees. He pointed out that:

I did not waste the time here in the UT, but I would choose the ITA [Technological Institute of *Aguascalientes*] since the technical degree is not recognised. I would have liked to study an engineering course from the beginning (B7).

It is worth saying that this graduate was studying Mechanical Engineering in the ITA since the technical degree is seen only as "*mano de obra calificada* (qualified workforce) rather than a "*carrera superior*" (a higher education course) by the industrial sector (B7). In the same vein, another graduate whose wage was ranked at the middle level said that:

I did like the model [of education] of the UT, but I would like also to study in the *tecnológico* [ITA] because you can get an engineer's diploma even though the level of knowledge is similar, the diploma is the difference (B2).

It is noteworthy that graduates recognised the academic quality of the UT as a public higher education institution. Equally interesting was that those graduates who were studying for a first degree in the ITA compared both academic institutions. A well-paid graduate who was studying in the public technological institute said that:

I am studying in the ITA [Technological Institute of Aguascalientes] and I do not like it. It is not very updated compared to the UT. Some books are dated in the 1980s and the labs are in the same conditions (A2).

Although another well-paid graduate was not studying in the ITA, she supported the opinion of the graduate cited by saying that the ITA is an ill-equipped institute and thus the labs were "obsolete" (A3). But not only the graduates earning high wages expressed their opinions about the *tecnológico* (ITA). A low-paid and female graduate remarked on the differences between both public institutions by using an illustrative country comparison.

(Researcher) Given the fact that you are studying in the ITA, could you tell me some differences between the Institute and the UTA?

(C4) There is a "*abisma*" (huge) difference. It is like if you were living in Canada and then you have moved to El Salvador. Canada is the UT [while] the ITA is El Salvador because of its academic staff, its infrastructure. There is a huge difference.

This graduate also mentioned the unfair way in which some ITA's teachers treat some UTA graduates. She said that a professor told them: "When your finish you studies here, you will gain something that the UT could not provide: that is *materia gris* (intelligence)". For these reasons, she noted a "tension between the ITA and the UT" (C4). This claim is very relevant because the lack of recognition of the UT could be a much more complex

phenomenon than was expected. We should not overlook the fact that the UTs were not allowed to provide first degree courses (*Segundo Ciclo*), presumably due to political conflicts between the offices (*subsecretarías*) that controlled the technological institutes and those that coordinated the UT model.

Aside from exploring political conflicts, it can be argued that, like their counterparts in Tula and Neza, most of the UTA graduates desire to study for a first degree in order to improve their job conditions. But contrary to these previous cases, the graduates from Aguascalientes did not note a deep shortage of knowledge in performing their assigned tasks. However, the TSU is still limited in occupying higher job positions and this is explained by the graduates as a consequence of the lack of recognition of their diploma by employers. But some rules regarding the operation of the labour market are tacit rather explicit and thus as the graduates work, they identify the tools necessary for climbing the job ladder. One of these tools is the completion of a bachelor's degree.

In contrast with the cases of Tula and Neza, in Aguascalientes the process of upgrading technical expertise to that of a bachelor is not so complicated. Irrespective of their current level of wage and career, some UTA graduates were studying for their first degree in a public technological institute. The Technological Institute of Aguascalientes is allowing UTA graduates to become engineers or bachelors despite its problems in terms of infrastructure and healthy relations with the UTA graduates.

Aguascalientes has provided the institutional arrangements for meeting the valuable aspirations of its young people and it has also taken a step towards improving their capabilities.

V. Knowing Aguascalientes through its locals' voices

A. The quality of life in a prosperous region.

Following Sen's theoretical propositions, this chapter has argued that by studying for a technical career, young people from Aguascalientes can achieve some valuable personal and professional improvements. One of these achievements is to take job in order to lead the life that they value as worthy. But this is not enough. Sen argues that the quality of life of a person is not merely a matter of what he or she achieves but also of what options the person has had the opportunity to choose from. He proceeds by arguing: the "good life" is partly a life a genuine choice, and not one in which the person is forced into a particular life (1985a: 70).

If Aguascalientes is relatively the least disadvantaged region in economic and social terms of our three cases studied, and thus there are apparently more chances to study and to work, it is fair to explore the ways in which the UTA graduates could enhance their lives since higher functionings, inexorably, means wider opportunities.

In order to examine how the UTA graduates could have a "good life", I asked them "what would you do to gain a better standard of living". Studying appeared as a means of improving the quality of life of graduates. For instance, a graduate in Management was interested in "learning from people who possess experience" (B3) while a poorly-paid graduate wanted "to study forever since changes take place constantly" (C3). In this sense, an unemployed graduate reflected that "there are many factors implied" in achieving a better standard of living such as "to be a prepared person, to continue studying and to sell myself to a company in order to get for a good wage" (D4). Regarding the relation between income and quality of life, Sen has made outstanding contributions in combining both dimensions in favour of human beings. In this sense, the Nobel Prize winner in Economics argues that:

If we have reasons to want more wealth, we have to ask: What precisely are these reasons, how do they work, on what are they contingent and what are the things we can "do" with more wealth? In fact, we generally have excellent reasons for wanting more income or wealth. This is not because income and wealth are desirable for their own sake, but because, typically, they are admirable general-purpose means for having more freedoms to lead the kind of lives we have reason to value (Sen, 1999:14).

Illustrating Sen's theoretical propositions a jobless graduate said that to have a better standard of living she needed "to have stability in economic and family terms". I went further asking her what means she would use to achieve this and then she replied that:

The first is to be a realised person and to achieve this I need working in a company that recognises my studies, my capacity, my contributions and which pays me a fair wage (D3).

"To be a realised person" this graduate needed to be employed in a company where her "studies", "capacity" and "contributions" could be recognised as well as being paid fairly. All this, in order to have "economic and family stability". It is clear that this passage fits well with the theoretical assumption of Amartya Sen given above. This graduate, apart from desiring to earn money to achieve higher functionings (to be a realised person and having stability), also stressed the "valuable" and "valued" opportunity of having a fulfilling occupation (using Sen's terms). On this, Sen said that:

the freedom-centered perspective has a generic similarity to the common concern with "quality of life", which too concentrate on the way human life goes (perhaps even the choices one has) and not just on the resources or income that a person commands (Sen, 1999: 24).

A broader overview of the relationship between income and quality of life is achieved by contrasting jobless graduates' accounts with those of well-paid graduates.

Having studied engineering, a graduate who occupied an important position in a transnational company said that in order to live better, he would "limit" his working time to

spend more time with his family (A7). So, as people meet their valuable needs, other aspirations may appear, which are not necessarily of an economic nature. Although Maslow has explained these facts on the basis of his "hierarchy of needs", he says little about the real opportunities that people have. Amartya Sen has bridged this gap by distinguishing between achievements, the means of achievement, and freedom to achieve, as Callinicos (2000) observed.

In accordance with Sen's ideas regarding the quality of life, this part gave some empirical evidence that a "good life" depends partly on the choices that people have, rather than just on their achievement or on the income "that a person commands". The regional opportunities of Aguascalientes have permitted the UTA graduates to pursue higher aspirations which, will inevitably require greater opportunities in order to improve their standards of living.

Despite its regional opportunities, it would be misleading to argue that Aguascalientes is free of problems. Thus, the next part is concerned with the "unfreedoms" found through the interviews with graduates.

B. To what extent is Aguascalientes a region of opportunities?

In *Development as Freedom*, Amartya Sen argues that:

Seeing development in terms of the substantive freedoms of people has far-reaching implications for our understanding of the process of development and also for the ways and means of promoting it (Sen, 1999:33).

Looking at development from this perspective, education in general, and higher education in particular, has come to play a key role as a factor in "substantive freedom" and in "ways and means" for promoting development. This claim raises epistemological and methodological problems for the assessment of the impact of education on the process

of "development as freedom". This work seeks to provide empirical support for Sen's theoretical approach by demonstrating how the knowledge acquired in a technological university can expand people's freedoms. In doing so, I have examined personal and professional achievements, which have been evaluated through questionnaires and semi-structured interviews, and I have also focussed on regional contexts with their respective opportunities. Furthermore, Sen's ideas require us to consider the types of impediments that could exist to block people's freedoms. In Sen's words, these impediments will be the "unfreedoms" that leave people with little choice and little opportunity of exercising their reasoned agency" (Sen 1999: xii). In the analysis of education and development, this point contrasts clearly with mainstream economic approaches which aim to prove that there is a relationship between education and economic growth. For all these reasons Sen has provided a sound basis for deeper understanding of the ways in which knowledge acquired within the school's walls may contribute to the process of development.

This part explores the unfreedoms that are affecting the life of graduates of the UT of Aguascalientes. As was said earlier on, this region has been classified, in relative terms, as a "prosperous" region and thus the "unfreedoms" that will be analysed may differ from those observed in Tula and in Neza.

In analysing the ways that people may be left with little choice and little opportunity for exercising their reasoned agency", it is necessary to remember here that one of the main intentions of the UT graduates was to run a business. However, it seems that there are problems in creating sources of wealth in this region since the quantitative analysis showed that only two of 89 respondents occupied a position as owners of their own businesses. On the other hand, the qualitative analysis reported that ten of 24 interviewees expressed the intention of becoming entrepreneurs, but just one interviewee had her own business. So what are the problems that affect running an enterprise in Aguascalientes? A reliable answer came from a graduate who was working in the family

company and, whose sister had opened a clothes shop recently. The UTA graduate noted the existence of "too many legal procedures" (*trámites legales*) (A2) in opening a business. This point was supported by another well-paid graduate who thought that the main restriction to opening a business was "the initial investment and the legal procedures" (A6). It seems the investment climate and regulatory support need to be improved in Aguascalientes since another graduate underlined the same problems, though he was more explicit and explained the restrictions that a young entrepreneur may face. He listed these problems as follows:

The first is the tax burden (*carga fiscal*), but in this sense you can sort it out. On the other hand, there is no information about the economic supports for running a business, at least I do not know any. Bureaucracy is another problem, especially for the kind of business that I want to open - a car washing. Lastly, there is a shortage of workforce in the operative levels (B5).

So the intention of running a business in Aguascalientes becomes a more complex aspiration than might be thought. Too many legal procedures (bureaucracy), tax burdens, lack of information about economic schemes - such as micro finance, for example - and the shortage of operative workers are part of this "unfreedom" in terms of economic facilities which, according to Sen, refer to

the opportunities that individuals respectively enjoy to utilize resources for the purpose of consumption, or production, or exchange (Sen, 1999:39).

In this sense, the Indian expert in poverty adds that:

The availability and access to finance can be a crucial influence on the economic entitlements that economic agents are practically able to secure. This applies all the way from large enterprises (in which hundreds of thousands of people may work) to tiny establishments that are run on micro credit. A credit crunch, for example, can severely affect the economic entitlements that rely on such credit (Sen, 1999:39).

If there is failure in providing economic facilities in the region of Aguascalientes, it would not be illogical to think this restriction on the creation of economic wealth is also limiting a larger expansion of human freedom.

Another "unfreedom" found during the interviews with the UT graduates pointed to their existing working conditions. This fact was discussed in considerable depth in the cases of Tula and Neza, thus it needs a proper analysis here too. As in the two previous cases, long and "flexible" working times were regarded by the UTA graduates as limitations on having a better life, though it is fair to say that this was reported to a lesser degree than it was by their counterparts at Tula and Neza.

A well-paid graduate said that in order to have a better standard of living he would "limit" his working time in order to have more opportunities to be with his family (A7). Another graduate pointed out that despite her "fixed" working time she never finished within her legal working hours, she needed to work longer to make matters and, worse, her extra time was not paid (B3). A graduate who occupied a position of "qualified technician" stressed the low wage rates in his job and his "flexible" working time, which meant that he used to work for six months in the mornings (from 6:00 am to 14:30 pm) and six months in the evenings (from 10:30 pm to 6:00 am). Although these working hours do not exceed legal time, they do inhibit the intention of studying for a first degree, since according to another graduate, open university courses are not available in this region for certain careers such as engineering in electronics (C3). This graduate also pointed out that it is very difficult to study and to work at the same time, thus one might infer that this TSU had to work in order to support or maintain her household -just as in the case of Tula or Neza, but that this was not her main reason for not studying. She accepted that she could get a part-time job and study simultaneously, but

a part-time job is normally not related to your area of study. The cost [of studying] does not mean a big restriction since I can get a scholarship besides my family can support me (C3).

So this graduate had the option to study thanks to institutional support (scholarships) and support from her family, despite her low-ranked wage. Another interesting reason drawn from this account was that this graduate did not want to work in an area unrelated to her area of study. This meant that she did have the chance to lead her life as she wished, thus the argument that Aguascalientes provides more opportunities to expand people's freedoms is reinforced.

Regarding wage rates, a graduate highlighted the "large supply of jobs for operative workers", but not for the TSUs. He believed that among the *maquiladoras* (assembly plants) of Aguascalientes there was a *contubernio* (one-sided agreement) to freeze the wage rates (B5). Although the jobs offered by the assembly plants seem more suitable for operative workers, it is fair to say that one of the main criticisms of the UT model is that these academic institutions are presumably educating people to work exclusively in the *maquiladoras*. In this sense a former Rector of a state university in Mexico and currently legislator of a centre-left party in Mexico pointed out that:

I understand the vision of the government with respect to the technical education which is based in a third world perspective that lies in attracting foreign investment by opening *maquiladoras* which do not have any compromise in labour terms with their workers since this relation is made through [external recruitment] agencies (Raúl Padilla en *La Jornada*, February 29th 2000).

To clarify this issue the next section provides a brief discussion of the assembly plants available in Aguascalientes and their links with the UT. This may have important implications for the proper understanding of economic growth in this region.

C. Maquiladoras, levels of skills, and freedom

Emulating foreign models of technical education in developed nations and based on the academy-industry relation, the UTs were created with the aim of providing relevant short courses in distant regions of the Mexican Republic. However, little was explicitly known about the responses of the productive sector in this sense and how the UT model would be inserted into the new stage of Mexico's economy. Perhaps from the lack of public information on this subject a criticism of the UT model rapidly emerged.

It was believed that the higher education institutions should respond to the needs of the productive sector to make education relevant. This implied a "new configuration of the relations" between government, academia and enterprises in Mexico (see Casas and Luna, 1997). In Aguascalientes, this policy of "relevance" of higher education seems to have been followed since the Head of the State Employment Service (*Servicio Estatal de Empleo, SEE*) pointed out that:

In the past there was no a clear employment policy in the state that integrated the employment, the industrial policy and the educational policy in order to meet the demand of the productive sector with the university graduates (Jorge Castorena).

Additionally, Mr. Castorena underlined the restrictions in the job supply that Aguascalientes experienced a time ago and he explained what actions were undertaken.

In the past, there was a big problem of unemployment, so it was thought that opening *maquiladoras* would solve this problem, even though they paid poor wages, [it was assumed] "let us solve the unemployment problem immediately". That was the solution. This industrial policy served as a cushion for the effects of the economic crisis in 1995 and others that came before. So, this employment policy allowed us to meet the demand for jobs and this is reflected in the low unemployment rates (Jorge Castorena).

National statistics support the claims of Mr. Castorena with respect to the low unemployment rates. According to the Secretariat of Labour (STPS, 2000b), this state registered an urban unemployment rate of 2.1%. As a complement to these statistics, it is worth noting that quantitative analysis showed that the largest proportion of unemployed graduates (36%) did not find a job due to the "lack of job opportunities in the labour market".

Meanwhile, during the interviews with the jobless graduates it was found that most had left their occupations for two reasons. The first was the low wage rates and the second, the long working time. With respect to the low wage rates the Rector of the UTA, Mr. Héctor Tiscareño, was asked about the low-ranked earnings perceived by graduates. He replied as follows:

In this sense, I am very worried. Any time that I can, I work for raising the wages paid by employers but eventually it is the market which sets the rules. If employers recognise the graduates' capacities they retain him or her by paying good wages. [On the other hand] if the UT graduates change their job positions is surely because they did not find good conditions.

But a questionable issue emerged from the Rector's quotation. In terms of the labour market it is clear that a public intervention would be desirable since the subjects within that "market" are humans beings rather than goods. This claim is congruent with Sen's ideas:

It is hard to think that any process of substantial development can do without very expensive use of markets, but that does not preclude the role of social support, public regulation, or statecraft when they can enrich - rather than impoverish - human lives (Sen, 1999:7).

Following Sen's arguments I would say that just as a job can expand peoples' achievements and capabilities, working conditions can also constrain people's freedoms and it is in the latter where "public regulation" is desirable. These simple claims - not novel

at all - should be taken into account in future studies on education and development since job-oriented approaches could fail by seeing human beings only as workers.

Having argued that employment policy in Aguascalientes was based on the creation of *maquiladoras* and thus the job supply has increased, a question remains: How do the *Técnicos Superiores Universitarios* (University Technicians) fit within this policy?

In order to address this question, I asked an employer of an auto-parts plant which kind of occupations were created more rapidly. He answered that "as production rises, we require more technicians and many more operative workers", although he did not explain the level of these technicians which could be either upper secondary or higher education level. This doubt was reinforced when he continued, saying that "job mobility" (*rotación de personal*) is rising since the people who are commonly "unstable" in labour terms belong to the operative levels. He remarked that mobility in the labour market is seriously affecting the industrial sector of this region. On the other hand, the Head of the State Employment Service, Mr. Jorge Castorena, was also asked the same question and he pointed out that:

In Aguascalientes there is something very peculiar. The unemployment rate is very low for people who have studied primary, secondary and upper secondary school. I would say that there are five vacancies for two job-seekers. But from university levels of technicians upwards this varies a bit.

He then recognised that the supply and demand for TSUs is almost even, which meant that the number of job-seekers at this level corresponds to the number of vacancies available. The uneven relation was found in higher degrees of education, but only in specific areas such as economic, administrative and humanistic disciplines. In this vein, the same graduate who highlighted the "large supply of jobs for operative workers" (B5) also commented on the hiring policies of some companies which did not hire personnel for strategic positions from Aguascalientes. White collar positions, he said, seem to be

occupied prior to some companies' arrival in the region, and thus locals were employed in "second class" positions (B5).

If Aguascalientes has adopted a model of economic growth based on the *maquiladoras* which usually employ low-skilled workers, what is the professional future of the TSUs? Challenging the modern idea of the relevance of education, a graduate of *Comercialización* (Marketing) argued that his career was not "well-accepted" since "regional businessmen are trying to sell their products in the same way as fifteen years ago" (A5). Then he made a striking comment:

This career would be more suitable for a commercial city, say, Guadalajara, León which, despite the fact of being smaller cities than Aguascalientes, they are more commercial. This state is more industrial (A5).

It is worth saying that the city of León, in the near state of Guanajuato, was also mentioned by another graduate as a place where "engineers are needed" (C4). Notwithstanding his highly-ranked wage, the graduate quoted above (A5) confessed to be unsatisfied with his low-specialised activities as a salesman. He noticed that "high qualifications in this positions are not required". He then criticised the UT for creating false expectations with respect to the availability of some skilled jobs. He said that:

the UT sold us the idea that our diploma reflected a university level (*universitario*) and this implied, presumably, occupying a position as an advertiser (*publicista*) or marketer (*mercadólogo*). That means a high hierarchy not a technical position. Obviously, when we entered the labour market [the UT's assumption] did not match reality (A5).

This frustration is another effect of trying to match academic courses with labour demands. So, this is the controversial result of a rigid perspective on education which leads to a loss of functionings when expectations are not met.

To be a realised person through the knowledge acquired and through the attainment of a fulfilling occupation can be seen as an alternative interpretation of the "relevance of education" which contrasts with the view of simply matching the needs of the labour market with graduates.

As we can see, despite a high supply of jobs in this region, Aguascalientes also has problems in the labour market. It can be seen that, in recent times, technically trained professionals have had problems to find a job. This claim is supported by a graduate in Industrial Maintenance who said that:

In the beginning I did not have problem finding a job, but for two years, it has been difficult. It seems that the labour market is constraining.

(Researcher) What actions would you take to overcome this situation?

(C4) It is difficult to say. Employers want to reduce costs and the diploma of the TSU suits their needs because if you say that you are a technician they will pay you less or you will be under-employed...

This graduate also remarked that to find a job has been difficult but:

where is it easy? Here employers need a cheap labour force and the state is producing those kind of professionals, so there is a wastage in the investment on education because, at the end, there are no more options than to be either technician or operator. There is no room to think, to improve the production process, to standardise the processes, to have innovative ideas (C4).

It can be argued that finding a job and to earning a certain amount of money are misleading indicators in assessing the prosperity of a region. It is important also, as Sen suggests, to focus on the liberties that people can achieve and how and why they pursue freedom once they have acquired knowledge.

To sum up, despite its regional opportunities Aguascalientes also has problems in the labour market that "leave people with little choice and little opportunity of exercising their reasoned agency" (Sen, 1999:xii). These people are particularly the technically trained

professionals who possess higher qualifications than those who only have a basic level of education. These professionals have faced difficulties in the labour market under the excuse that “you have studied a lot for the positions required”, as a graduate said. Therefore, it is not unusual for UT graduates to start thinking “it is incredible that now the problem is that I have studied!” (D2).

VI. What employers say on TSUs. A complementary vision.

This part presents the opinions of four representatives of the productive sector of Aguascalientes on two issues: (a) the academic qualification of the UT graduates and (b) the difference in qualifications between a TSU and a bachelor. As we can see in the Table 10.3, these employers belong to the manufacturing industry.

Table 10.3. Enterprises visited by sector, number of workers and TSUs employed

Sub-sector	Number of total workers	Number of TSUs employed
Maquiladora of clothes	140	3
Auto-parts plant	843	12
American transnational in electronic equipment	2,600	30-35
Textiles manufacturing	140-150	1-2

The person who was interviewed was responsible for human resources. As in the previous cases, employers answered all my questions kindly and they gave their objective opinions on the strengths and weaknesses of the TSUs. It is worth saying that, to some extent, they contrast with those of the graduates themselves, specifically in the difference of qualifications between a TSU and a bachelor’s degree. But let us examine firstly which skills in graduates are valued by employers.

A. Valuing the academic formation of the UT graduates

If we have shown that the UT graduates have found jobs relatively quickly, we can infer that employers value the technical qualifications of these professionals. In fact, none of the representatives of the productive sector questioned the academic quality of the UT model. According to the manager of human resources of an American transnational, they have employed TSUs,

especially for their knowledge; it seems that they have more practical skills than theoretical. They are more prepared thanks to the curriculum.

In recognising the practical skills of the TSUs, this employer also underlined the difference from the bachelor's degree: the theoretical knowledge. But before discussing this issue, it is crucial to know what the employer at the clothes assembly plant said, with respect to the qualifications of the TSUs.

First of all, he admitted that these graduates occupied middle positions and they earned between Mx\$130 to Mx\$180 per day. This employer also commented on the practical orientation of the UT graduates, that is, they are ready to apply their qualification in their work. So "they do not possess too much theoretical background" and this company, he said, "is more concerned with a practical orientation". This assumption is consistent with the fact that maquiladoras require few "highly-skilled" workers, that is, professionals who possess more than practical abilities such as analytical reasoning, critical thinking and so on.

Although the employer in the textiles company considered the practical skills of the TSUs, as valuable she also highlighted weakness. She said that some of the UT graduates "look like not very mature persons". On this sense, the average age of respondents was 24 years old and, curiously, was the highest average of the three cases studied. This

observation was not put forward by the rest of the employers, who rather coincided in the identification of another "weakness" in terms of the qualification of the UT graduates. The employer of the auto-parts plant argued that when TSUs finish their studies they seem very excited, thus they come to his company to look for a job and ask for a "manager position or nothing else". This fact was supported by the human resources manager of the *maquiladora* who said that the UT graduates "had a problem in terms of attitudes" and he proceeded by saying:

Sometimes they do not want to begin to work as an *auxiliar* (assistant) or in a middle position. I do not know which vision is transmitted in the UT. They come to this company with a vision of *jefe* (chief) which is ok, but they are starting, so they have to change this attitude in order to join us. Some of them are very arrogant contrary to others who show the interest for learning. In this sense, we are more prone to give the opportunity to the latter group.

As in Tula, employers perceived the fact of claiming a high job position as a "weakness" but in Aguascalientes the difference is that the UTA graduates have not taken any personality workshop to empower them as in Hidalgo state. In this "prosperous" region the UT graduates seem not to be eligible for that self-help scheme and this fact leads us to confirm that, in general terms, the socioeconomic background is related to an open and uninhibited character among graduates. As graduates in Aguascalientes are more empowered they do not want to accept positions as "*asistentes*" (assistants). In this respect there is a marked contrast with the case of Tula, where young people have to accept any position due to their socioeconomic disadvantages. This clearly shows a varying degree of freedom between two individuals with the same level of schooling, but whose contextual condition differ significantly.

On the other hand, it is necessary to analyse in further research, how the directive, academic and administrative staff of the UT are promoting careers in the labour market. If the UT is communicating unrealistic ideas about either what a technician can do or what position they can occupy it may create false expectations among individuals which could

cause "real frustrations". To be a frustrated graduate comprises a negative functioning.

For these reasons it is fair to investigate whether or not there are differences in the qualifications of a technician and those of a bachelor.

B. Searching for a suitable place for the TSU

In Tula and Neza, nine and seven employers were asked , respectively, about the differences in the formation of the TSU with respect to that of bachelors. All agreed that there are differences regarding the analytical capacities, deeper knowledge and a better understanding of work problems, among others. In this case, the employers of Aguascalientes were not the exception. They noticed "discernable differences" between a TSU and a bachelor. The manager of human resources in the assembly plant highlighted the fact that the bachelors have *un conocimiento más a fondo* (deeper knowledge) and he explained that: "For instance, in international trade bachelors know the law of international trade better and that of labour". This fact was also congruent with the account given by the employer in the auto-parts plant. He has noted that the "TSUs' knowledge is narrow (*"cerrado"*) while engineers have a "broader vision".

Given the differences in knowledge, I asked the employers about the possibility of a technician earning more than a bachelor and, surprisingly, they replied that:

Yes, the possibility is open. When you enter this company, a bachelor occupies a higher hierarchy than a *técnico superior universitario* [TSU] but in accordance with their performance the TSU have chances to be promoted (The employer in the *maquiladora*)

The same employer left little room for thinking that a rigid labour law could exacerbate the phenomenon of the diploma disease. He goes on to say that:

Although a person holds a bachelor's degree if she or he does not show *funcionalidad* (functionality) another person can take their position irrespective of his or her educational level. In another words, within the labour market it does not matter if somebody is *técnico superior universitario* [TSU] or *licenciado* [bachelor] what is important are the results.

The auto-parts plant seemingly followed the same criteria to reward their personnel. The employer of this company mentioned the performance ("*desenvolvimiento*") of the workers as a basis for improving earnings. He was asked about how the structure of wage rates (*tabuladores*) were designed and he clearly said that "the tabulador is not based on schooling levels -except for operative levels - but in accordance with the performance of the worker in his or her area".

To conclude, it can be said that although the employers interviewed recognised and valued the practical skills of the UT graduates, they underlined differences between the qualifications of TSUs and those of bachelors. This fact itself explains why a bachelor can earn more money than a technician and thus the aspiration of the majority of graduates of pursuing a first degree is reasonable and justified. Furthermore, the employers interviewed did not deny the possibility of being promoted in accordance with the graduates' performance in the workplace instead of using, as primary reference, the level of diploma conferred. Therefore, a clear definition of what a *Técnico Superior Universitario* is, as well as realistic information on the type of occupations that a TSU can take, is desirable in order to avoid the emergence of false expectations that pave the way for real frustrations.

Conclusions

How can a vocationally-oriented model of higher education promote social and economic advancements, given the deep regional disparities in Mexico? When higher education is seen merely as a factor of production a positivistic vision is embedded in this assumption. But cultural, social and economic realities challenge the assumptions of educational

planners, especially those who are keen on the idea that “the level of and structure of educational expansion ought, to a significant extent, to be explicitly geared to the prospective demand for labour” (in Hinchliffe, 1987). The inherent character of individuals besides their aspirations and feelings cannot accurately be captured by manpower planning techniques. It is necessary, as Amartya Sen argues, to see human beings in a broader way and not only as a “means of production,” but also as the “end” of development. Within this line of reasoning, it can be seen that given the existing economic and social facilities in place in Aguascalientes, the UT graduates are more likely than their counterparts in Tula and Neza to lead their lives in a way that they have reason to value. By using the seven functionings described as a basis for this work, it can be said that graduates have achieved personal and professional achievements once they have studied at the technological university. However, this is not enough to assert that a higher education institution is alone fostering regional development (SEP 2000).

Arguably the economic prosperity of this region has worked to improve the standards of living of its people significantly. However, the central argument here is that as individuals gain certain levels of functionings, they will tend to seek higher achievements and this inexorably implies setting a wider range of opportunities. It is here that Aguascalientes is failing, specifically, for example, when undergraduates are keen to build up their entitlements by running a business and there are no “economic facilities” to do it. Furthermore, the jobs created during recent years are generally more suitable for workers who possess lower qualifications. So highly-skilled professionals begin to have problems to find suitable jobs for getting valuable and higher functionings.

Now Aguascalientes should pass from the stage of intending to provide full employment for its population towards a stage in which the economic prosperity, the productive sector and the educational policy work together to create greater opportunities in order to expand the freedom of its inhabitants.

Conclusions

Conclusions

Inequality and poverty cannot be reduced automatically through the formation of human capital. Although governments invest massive resources in the educational sector, put their hopes in educational attainment; unemployment rates among the educated increase, real wage fall and, then education is thought to have been ineffective in fighting against economic disparities. These paradoxes demand a broader analysis of the relationship between education and development.

Therefore, this thesis seeks to broaden the reductionism derived from economic approaches and to analyse the relationship between education and development. In doing so it uses Amartya Sen's concept of development and the human capabilities approach. These theoretical propositions are illuminating since: (1) they consider monetary benefits as a means of development and not as an end in itself allowing us to have a deeper understanding of the effects of education; and (2) they highlight the complementarity between the nature of individual agency and social arrangements as means of attaining development.

This research sought to analyse the relationship between education and development by using three technological universities of Mexico as case-studies. It has also shown the relevance of Sen's theoretical propositions.

It is clear that higher education has enabled students to meet their academic and personal goals. Nevertheless, this has not prevented them from experiencing different kind of unfreedoms.

I. Could UT model meet their original objectives?

In analysing the effects of education through a graduates' follow up study, this work

assessed the two main objectives with which Mexican technological universities were created: (1) Equity - by opening higher education institutions in distant regions, and (2) the pursuit of development.

Data collected through questionnaires and interviews clearly showed that the three UTs have satisfactorily achieved their first objective. The UT of Tula, for example, is enrolling locals who were excluded from higher education options before its creation. Moreover, since local's economic necessities have to be met in the short term, UT's careers are equipping young people with relevant and practical skills, which allow them to obtain jobs soon after graduation.

The UT of Neza, which is situated in another disadvantaged region, is a key part of the social opportunities as accepts young people who do not academically qualify to enter the major public universities of Mexico City. This technological university therefore gives people the chance to resume their professional studies. Apart from this, the UTN like its counterpart in Tula, is also a suitable option for locals who require a short academic career because of their economic demands.

Meanwhile, the UT of Aguascalientes is a highly valued institution by those locals who want to acquire knowledge in order to be employed. However curiously, this motivation was not due to economic deprivations but based upon a pragmatic view of education. So, I argue that, vocationally-oriented careers also suit the interest of less deprived people.

The second objective evaluated here unveiled interesting qualitative issues. The Mexican government expected to achieve regional progress by matching technically trained people with the demands of the labour market. However, this approach shows the failures of this functionalist idea. Although UT graduates have no difficulty in entering the labour market shortly, accessing intermediate positions and receiving a wage, two outcomes of education appeared. The first is that educated people tend to migrate from

regions when their professional or personal aspirations are not met locally, and secondly, technically trained people want to upgrade their knowledge to the level of a bachelor in order to obtain more challenging occupations. Therefore, it is difficult to conceive people as an aggregate of human capital that merely serves to boost economic progress.

As UT graduates enter the labour market and gain knowledge on its operation, they are highly motivated to search for better opportunities. This searching is not merely an economic move but is also a pursuit for improving their human capabilities.

This is not to say that technological universities have little direct impact on graduates' lives. Rather, I suggest that it is necessary to understand the relationship between education and development more coherently. In doing so, I primarily focus on exploring what a person can do or be after having studied for a technical career.

II. Functionality: A primary basis for analysing the impacts of education

This thesis shows that independently of the degree of regional advancement, wage level, labour situation, gender or type of career, the graduates of Neza, Tula and Aguascalientes agreed that studying in the technological university represented personal and professional improvements.

By using functionality to evaluate these effects, it can be said that once graduates have finished their studies, they feel more confident and self-reliant. This finding is more relevant in Tula than in Neza or Aguascalientes as the former region possesses more acute disadvantages. In this region of the state of Hidalgo a link between relatively poor socioeconomic backgrounds and naive attitudes was discernable. In order to overcome this disadvantage, the UTT has empowered people through: (1) its ordinary academic life - which cannot be reduced to a simple attendance at school, and (2) its extracurricular activities such as personality workshops. The last strategy showed how institutional support overcome people's handicaps. Personality workshops do not exist in either Neza

or Aguascalientes.

Another functionality evaluated satisfactorily was the capacity of graduates to organise their lives as they wished. The UT worked to broaden people's perspectives. But acquiring knowledge is not a simple and linear process. Further abilities were developed within particular learning space irrespective of the type of curriculum. Apart from practical skills, the UT graduates of the three regions, pointed out that they gained personal and disciplinary attitudes during their studies. As a part of these attitudes, young people intended to read for a bachelor's degree. This fact cannot be underestimated since in the most deprived (Neza and Tula) there is a higher proportion of students wanting to study for a first degree than in the affluent region of Aguascalientes. Arguably, the UT has represented not only a first step - but also a "giant leap" - for encouraging lifelong learning processes.

This study also shows that as a consequence of their practical qualifications, the UT graduates are accepted in the labour market of the three areas selected. Therefore, it can be said that knowledge acquired in the UT and in the labour market form part of a sound basis for enlarging people's capabilities. As a complement of this broad picture, income levels also have to be considered as a means of development.

It was found that in the first job destination, few graduates received high salaries. However, as they accumulated job experience, developed their networking, tackled the difficulties of the world of work, improved their abilities, upgraded their skills and so on; most graduates improved their wage rate over time. Although this observation can be generalised to the three case-studies, a relevant fact was found in Neza: There are more graduates concentrated in the richest income group than those of the most affluent region (Aguascalientes). This can be explained due to the geographical position of Neza. This municipality is situated next door to Mexico City where graduates can find highly-paid jobs relatively easy. Curiously, in the past Neza's youngsters went to Mexico City

seeking educational opportunities in the public universities, when they were rejected, the UT of Neza was chosen as an alternative. Now, UT graduates are returning to the largest city of the world with the aim of being employed in the modern sector of the economy. This "ping pong" effect is inconsistent with the assumption that the UTs encourage people both to remain in their place of origin and to subsequently take up work there, thus contributing to the development of that region (SEP 2000:81). Thus, I argue that the relationship between education and development is far more complex.

Under the functional idea that schooling and the needs of the productive sector have to be strongly connected in order to achieve economic progress, education becomes regarded as a factor capable of overcoming the existing socioeconomic problems. This limited vision suggests that higher education in general and universities in particular can be held directly responsible for the mismatch between educational supply and labour market demands. I call in to question this rationale by showing that the main reason for unemployment in Tula and in Aguascalientes was explained by the dearth of regional opportunities. In Neza, the UT graduates thought that joblessness was caused, primarily, by a lack of job experience, and secondly as a consequence of the lack of remunerative occupations. Therefore, it is difficult to assert that unemployment is closely related to academic failure. Adjustments also need to be made from the demand side and not only from educational supply. This will allow us to see education more realistically as a contributor rather than as being a magical solution within the development processes.

In order to reach this integral perspective, it is also crucial to recognise human beings as responsible actors rather than static vessels. It is argued here that once UT graduates have found jobs, they start looking and asking for better opportunities. They do not rest on their laurels at all. This work showed a higher propensity for emigrating in the most disadvantaged region (Tula and Neza) compared to the relatively prosperous Aguascalientes. Though the migration of skilled people may be considered as a

regressive phenomenon in regional and national terms, these movements also reflect the capacity of people to search for better living conditions. Derived from this point, a hypothesis arises: if Tula and Neza had enough opportunities, possibly the educated population would not leave their localities. This fact points to the emergence of important challenges in social policy.

With respect to the capacity of UT graduates for demanding for better job conditions, it was found that, paradoxically, some employers of Tula considered this functionality as a graduates' "weakness". While some employers offered poorly-paid jobs, skilled people were able to determine their own labour conditions. When these conditions were not met by local employers, then graduates acted by changing their jobs, or perhaps by migrating. This shows that each segment of society expects different results from education. So, on one side graduates wanted to expand their freedoms and on the other employers attempted to pursue bigger profits by offering lower salaries. For this reason, I remain sceptical that development will come as the UT meets the labour demands of local companies. Divergent interests in the relationship between education and development is another missed point in economic approaches.

It can therefore be said that modern ideas about education cannot be easily put into practice since, aside from graduates and employers, other stakeholders also have their own interests concerning the outcomes of education. This makes the relationship between education and development an even more complex but no less fascinating field of study.

In relation to different interests concerning education, this research also puts under scrutiny one of the main attributes of the UT model: Its relevance. According to the SEP, the technological universities should design their careers in accordance with the needs of the regional productive sector. But, an inconsistency of this rationale is presented here. In the UTs of Neza and Aguascalientes the most demanded career (Management)

registered the highest number of unemployed graduates. Why is that? Why have educational planners failed to do anything in this respect? Because administrative careers are highly helpful to ensure a considerable level of students. But, is this fact congruent with the modern idea of the relevance of education? Absolutely not, but politicians and educational planners know well that having a considerable number of students helps in legitimating politically the UT model, in receiving public funding, and in significantly reducing operational costs.

My particular point of view is then that in understanding, the relevance of education, it is important to look at the capacity of human beings to apply their innovative knowledge everywhere rather than thinking in terms of meeting labour market needs by designing relevant careers. This view is consistent with Sen's idea of putting people's freedom at centre stage.

Regarding freedom, this research also found that having the liberty to choose a job is not regarded as an important contribution of any UT. So, one might infer that other factors should be considered in arguing that education brings development. For this reason, I looked at two "instrumental freedoms" (economic facilities and social opportunities) to explain this connection.

Finally, in order to see human beings from a broader perspective, I would emphasise the interlinkages between personal achievement and professional functionality. Both, "beings" and "doings" cannot be divorced as they overlap, thereby enlarging human capabilities.

III. Broadening the perspective of education and development

As was argued, the UTs have provided a means for obtaining personal and professional functionality. But, in order to assess whether higher education can bring development, it is necessary to look at the instrumental freedoms that people have in terms of living as

they wish (Sen 1999). This integral approach makes possible a deeper analysis of the relationship between education and development.

Therefore, I focussed on two types of instrumental freedoms: economic facilities and social opportunities. For this study, economic facilities were divided into two sub-categories: (1) job conditions (including wage rates, working time, incentives and so on), and (2) financial support (access to finance, credit crunch, micro credits, etc.). Meanwhile, social opportunities are concerned with further educational chances. It was found that these means of development vary regionally and, even more revealing was that the existence or the lack of such opportunities significantly impacted upon graduates' functionality.

Analysing the case of Neza, it was found that in this municipality, remunerative jobs for UT graduates were scarce. The exchange of labour power is done principally in Mexico City. There, people can find well-paid positions, though this entails high costs. Long working shifts emerge as a requirement for technical occupations in the best-paid careers (Informatics or Telecommunications). It can be seen, then that whilst people may be highly paid there is a trade-off in terms of the time they have left to do other worthwhile activities.

In the case of Tula, there is also a shortage of fair payments and adequate working hours. However, in this region, structural disadvantages unveiled a bigger problem. The UT graduates accepted being paid poorly as a response to their economic deprivations. Contrary to their counterparts in Neza, Tula's graduates do not have a close urban city that offers what they cannot find locally: highly paid jobs. In Tula there are two choices: either being paid poorly or being unemployed. Logically, UT graduates have chosen the first option. This unfreedom raises the inadequacy of some national employment statistics to measure the effects of education.

With respect to Aguascalientes, poorly paid jobs were not a recurrent problem found by UT graduates. In fact, some unemployed interviewees had denied poorly bad jobs. Contrary to Tula, this shows a larger freedom to lead the lives of their choice. Equally remarkable than these differences were the similarities between Tula and Neza, and Aguascalientes. In this prosperous region, UT graduates also occupy very demanding jobs. This, as was said, inexorably limits people's liberties to do other worthwhile activities.

Despite the fact these job conditions on several occasion violated Mexican labour laws, none of the graduate from Neza, Tula and Aguascalientes mentioned seeking protection from trade unions. This fact raises the lack of another instrumental freedom: protective security. The existence of perverse employment conditions reinforces my claim that to assess the impacts of education on development by using merely labour market outcomes (employment rates, earnings, etc.) is misleading as this provides no indication of how certain occupations might work to undermine people's freedom.

As a consequence of these disadvantages, a question emerges: why have the UT graduates not created their own employment sources despite having expressed this intention. By addressing this question, this work shows that in Neza the main reason for still being a job seeker instead of job maker is the lack of availability and easy access to finance. Meanwhile, in Aguascalientes the main limitation of running a business is bureaucracy, followed by an adverse regulatory and investment climate. Arguably, the shortage of economic facilities in Neza and in Aguascalientes have limited graduates' aspirations.

Apart from external factors and, despite having an special area of liasion with industry and branches of the National Bank of Foreign Trade (Bancomext) in their campuses, the UTs have not encouraged the creation of new businesses. This development-oriented model of education has failed in the direct job creation. The links between academia and

industry still operating traditionally. This point was supported by most employers who agreed that, besides organising placements and visits to companies, the UT is quite naive in establishing strategies for industrial and commercial growth.

With respect to social opportunities, the UTs of Neza and Tula have fulfilled the objective of enrolling young people who did not have previous access to higher education. However this attempt of social inclusion could have been more effective if the UT had provided, as was planned originally, the chance to study a first degree.

As was argued earlier on, the majority of University Technicians (TSUs) in Neza, Tula and Aguascalientes wanted to upgrade their expertise to the level of a bachelor's degree. Though this aspiration can be interpreted as a symptom of a diploma disease, this thesis showed that the intention of reading for a first degree is justified. Through the interviews conducted with regional employers, it was found that technically trained people of the UTs lacked abstract and reasoning skills independently of their career studied. Thus it would be difficult for them to occupy white collar positions. This fact was supported by the quantitative analyses which reported that a minimal proportion of the UT graduates in the three regions hold a position of manager or director. So the reasons for UT graduates wanting to become holders of bachelors degree (*licenciados o ingenieros*) is understandable.

More interesting is that irrespective of their employment situation, wage rate, gender, or career; the majority of respondents in Neza, Tula and Aguascalientes wanted to study for a first degree. By going further in their studies, graduates try to enhance their professional and personal situation. Notwithstanding, their aspirations were suddenly restricted as the UTs stopped of providing for undergraduates courses. If the UTs were created to benefit locals, it is difficult to understand the limitation of educational provision to technical degrees when people have valid reasons to pursue more advanced studies. This unexpected action - presumably based on political conflicts - has had major

consequences in the most deprived regions (Tula and Neza) in comparison to more affluent areas (Aguascalientes).

Since in Tula and Neza there are no public universities that offer the bachelor's degree, the UT graduates have only two choices: Either studying in local but private institution or attending public or private universities outside their localities. To choose any of these alternatives imply regressive implications in economic terms. The upgrading of knowledge in these regions is attainable only for those graduates who can either pay tuition fees or afford the cost of moving to another region for study. This serves to divide a group of individuals who share similar aspirations but whose income levels differ significantly. Consequently there emerges inequality among UT graduates.

In the case of the UT of Aguascalientes, this type of inequity was not discernible as the region possesses a wider set of social opportunities. Public higher education institutions exist and institutional mechanisms to validate and upgrade UT's academic courses are available. Consequently, UT graduates are more prone to achieve higher functionality. This fact inexorably implies the existence of wider opportunities. Regional governments need to be aware of this since development should be encouraged through political and institutional commitments.

Apart from the shortage of economic facilities and social opportunities, sadly, in Tula another unfreedom was found. Female graduates were still being discriminated by some local employers, especially in the textile industries. Some representatives of this sector have told women that they are not apt to occupy physically demanding positions. This finding paves the way for another argument held by this thesis: Just like instrumental freedoms, unfreedoms - that leave people with little choice or little opportunity to exercise their reasoned agency (Sen 1999) - are also linked. For instance, if a female graduate is discriminated in the labour market it seems very difficult that she can legally obtain a wage rate that allows her to continue her studies and thus to get higher functionality. In

this case, her freedom can be significantly restricted. Similarly, if a graduate obtains an extremely demanding job, he or she will not be able to go to school in order to upgrade his technical expertise. Therefore, it is likely difficult for this person to climb the job ladder easily. I would say that coherent social policy frameworks need to be developed in order to identify and then disentangle these linked unfreedoms.

To sum up, by comparing three regions it can be argued that instrumental freedoms significantly influence graduates' functionality. Therefore the effects of education can be maximized if the means of development are simultaneously generated. Contrary to this, a lack of economic facilities and social opportunities will undoubtedly restrain the educational endeavour.

Arguably, the education provided by Mexican technological universities has helped human beings to get valuable personal and professional functionality. However, development is far from being achieved since instrumental freedoms have been missed.

IV. Limitations of the study

Focussing on the effects of education on graduates' functionality leaves little room to discuss the wider roles of higher education institutions. For instance, the impact of research on scientific progress or the importance of this academic space as a promoter of culture. The aim here was only to investigate how education can work to expand the graduates' freedoms since this is consistent with Sen's concept of development.

The functioning of being able to convert goods into more valuable achievements was not successfully evaluated. Graduates showed interest in gaining a larger functionality and, consequently in expanding their well-being, however, a complementary part was missed. Contextual factors needed to be analysed in order to foster the functionality's transformation. Following Sen's ideas, this fact underlined the deep complementarity between individual agency which, in this case, has been modified through education and

“social arrangements” that, in some extent, has remained remarkably unchanged by public policies. In achieving development through education, governments should also create the conditions for maximising the educational endeavour, otherwise well intentioned actions may be futile.

It is evident that no comparison was possible among the three case-studies about the quality of life since questions for assessing these issues were different. Much work thus needed to be done in this regard.

Although I discusses briefly the structure and agency approach and Bourdieu 's theory of reproduction, it emerged that these theoretical propositions should have received a more extensive analysis in order to disentangle controversial issues of the relationship between education and development.

V. Proposals

- ◆ From my particular perspective, Mexican educational planners and politicians need to think more widely in order to benefit people through the educational endeavour. Their well intentioned actions may be curbed by their possession of a limited idea of what education really can do for human beings.
- ◆ If Mexico's government remains politically naive in establishing instrumental freedoms, then the functionality of educated individuals could be severely restrained and development will arrive much later than expected. Arguably, education needs friendly conditions in order to expand human capabilities.
- ◆ In Tula and in Neza, primarily, it is necessary that UT graduates find mechanisms for upgrading their expertise and for becoming bachelors. Upgrading should be possible without resulting in the risks of losing jobs or meeting high tuition fees. In order to achieve this, political action would be required to encourage civil servants to turn back on their decisions to offer first degrees. This will bring equal educational opportunities to all graduates within their localities irrespective of their

socioeconomic background.

- ◆ Co-operation agreements need to be developed between the UTs and the regional employers in order to allow employed graduates to take first degree courses either at their workplace or through continuing education courses.
- ◆ Additionally, it is necessary to establish links with the Mexican boards of knowledge certification for upgrading the level of technician to one of bachelor taking into account the practical skills acquired at the work place. Long stays at school can be regressive for some UT graduates.

VI. Future research avenues

Once having suggested that economic approaches can be integrated within the human capabilities approach, it is necessary to improve methodological techniques as well as to give more attention to the design of personal and professional functionings. In this vein, further analysis has to be developed in order to analyse different educational levels under the human capabilities approach. This part needs to be supported by extensive empirical work.

Since this work found that women from the most deprived regions analysed (*Ciudad Nezahualcóyotl* and *Tula*) are more prone to face inequalities than men, it is necessary to pay special attention to differential impacts of education on gender.

If the human capabilities approach is "naturally" linked with the perspective of positive freedom (Sen 1999) then it would be relevant to integrate Sen's theoretical ideas with those of authors who have spoken about education as a means of emancipation, for example the Brazilian pedagogue Paulo Freire (1972). No doubt, a large field is open for exploration in this regard.

As public funding is being restricted, how could the system of UT be sustainable when it is failing in the creation of local wealth and in the attraction of private funding? Further

studies that reveal what kind of institutional and cooperation agreements can exist between Mexican stakeholders (see Table 6.3) are urgently required. These researches need to bear in mind variables concerning institutional trust, behavioral norms, social networks, and transparency guarantees in order to examine to what extent a trusting environment could influence the relationship between education and development.

To understand the links between education and development in a broader perspective paves the way for the application of different techniques to measure human and social benefits of education. Cost-effectiveness analysis can be a useful method since it may show which type of education can impact more widely on the freedoms of people by investing the same amount of public spending.

Having taken into account the challenges of the current system of production and its relationship with education, it would be interesting to critically examine the aims of education. Since learning is becoming more pragmatic, how can a renovated educational paradigm work to promote abstract and reasoning abilities? In this sense, how far is education of training? Or, what future steps will be taken to reconcile vocational education with the general type of education? Would it be necessary to change whole pedagogical practices or only the extent of the time span of study? Where should the change come from? And finally, how will the Mexican UTs adapt their existing ways of operating to these realities?

It can be seen, then, that there are many issues awaiting to be investigated in order to explain how the existing complexities might be modified in favour human beings. In this, education also shares a part of the responsibility.

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Annexes

ANNEX 1

Pilot questionnaire

Higher education and development

Applied to employed graduates of three technological university

Number _____
Code _____

Note: Could you please answer the following question with only ONE option. In caso of having questions or doubts, do not hesitate to ask the interviewer.

Age: _____ Sex: __F __M
Marital status: Single __ Married __ Other _____
Number of children _____ Ages: _____, _____, _____, _____

1. Why did you study at UT?

- a. Due to the convenience of short academic courses
- b. Due to need to have a job quickly
- c. My parents expected me to
- d. I was not accepted at:
UNAM __ Poli __ UAM __ Other _____
- e. I wanted to acquire more knowledge
- f. Don't know
- g. Other _____

2. In which year did you finish your studies at the UT?

3. Have you got the diploma?

- a. Yes, in which year
- b. No, why not?

4. What is the average of your household income (including you) per month?

- a. Less than \$1,000 (US\$100)
- b. Between 1,000 and 3,000
- c. Between 3,000 and 5,000
- d. Between 5,000 and 7,000
- e. Between 7,000 and 9,000
- f. More than 9,000

5. Were you born in this region?

- a. Yes
- b. No, where were you born? _____

6. Would you like to remain in this region in the future?

- a. Yes, why? _____
- b. No, why? _____
- c. Maybe, because _____

7. For how long did you look for a job after your studies at UT?

- a. Less than a month
- b. Between one and three months
- c. Between three months and six months
- d. Between six months and a year
- e. More than a year
- f. Other _____

8. What kind of job do you have currently?

- a. Formal
- b. Informal
- c. Part-time

9. What kind of job did you attain when you finished your studies?

- a. Qualified Workman
- b. Administrative assistance
- c. Director or manager
- d. Qualified technician
- e. Owner of your business
- f. Other (specify) _____

10. How much did you earn per month in your first job?

- a. Less than \$1000 (US\$100)
- b. Between \$1000 and \$3000
- c. Between \$3000 and \$5000
- d. More than \$5000

11. How did you hear about the job?

- a. Through newspapers
- b. Recommendation of friends
- c. Recommendation of relatives
- d. Through the UT itself
- e. Recommendation of teachers
- f. Other _____

12. How many training courses have you taken since you started to work?

- a. None
- b. Between one and five
- c. Between five and seven
- d. More than seven
- e. Other _____

13. How many times have you changed your job after your first one?

- a. None (go to 15)
- b. One
- c. Two
- d. Three
- e. More than three
- f. How many _____

14. When have you changed your job and to what degree have your job conditions improved since your first job (e.g. labour stability, pension systems, access to health care)

Second Year___	Third Year___	Fourth Year___	Other Year___
a. A lot	a. A lot	a. A lot	a. A lot
b. A little	b. A little	b. A little	b. A little
c. Not at all	c. Not at all	c. Not at all	c. Not at all
d. None	d. None	d. None	d. None
e. Worse	e. Worse	e. Worse	e. Worse
F. Don't know	F. Don't know	F. Don't know	F. Don't know

15. What is your current monthly salary?

- a. Less than \$1000 (US\$100)
- b. Between \$1000 and \$3000
- c. Between \$3000 and \$5000
- d. More than \$5000

16. What is your current position?

- a. Qualified Workman
- b. Administrative assistant
- c. Director or manager
- d. Qualified technician
- e. Owner of your business (go to 16a, b, c)

16a. When did you start your business?

16b. How many jobs have you created since you started your business? _____

16c. In which sector have you established your business _____

17. At what level are you satisfied with your job or your business?

- a. Strongly satisfied
- b. Satisfied
- c. Unsatisfied
- d. Extremely unsatisfied
Why? _____
- e. None
Why? _____
- f. Don't know

18. What are your expectations in the short term (a year)?

- a. To study a first degree
- b. To open a business
What kind of business? _____
- c. To move to a different city
Which one? _____
- d. To emigrate and work in a foreign country
- e. To enters politics
- f. To become a professor at UT
- j. Don't know
- h. Other _____

19. What has been the main contribution of the education provided by the UT?

- a. To find a job quickly
- b. To improve my own income
- c. To acquire new knowledge useful for my job
- d. Personal development
- e. It has been unuseful
- f. Don't know
- g. Other

Many thanks!

Date: _____

Telephone; () _____ Email: _____

ANNEX 2

Dear graduate, could you please answer the following question of this questionnaire which will be used as a part of a PhD research at the University of York, England.

In case of having questions or doubts, do not hesitate to ask the interviewer.

Number _____
Code _____

Age: _____

Sex:

 F

 M

Marital status:

Single

Married

Career: _____ Year of graduation _____

1. Why did you study at UT?

- a. Due to the convenience of short academic courses
- b. Due to need to have a job quickly
- c. I was not accepted at:
UNAM ___ Poli ___ UAM ___ Other _____
- d. I wanted to acquire more knowledge
- e. Don't know
- f. Other (specify) _____

2. What is the average of your household income (including you) per month?

- a. Less than one minimum salary(ms)
- b. Between one to three times the minimum salary
- c. Between three to five times the minimum salary
- d. Between five to seven times the minimum salary
- e. Between seven to nine times the minimum salary
- f. More than nine times the minimum salary

3. Have you got your own:

Yes No

a. House () ()

b. Car () ()

4. Were you born in this state?

- a. Yes
- b. No, where were you born? _____

5. Have you got a formal employment?

- a. Yes (go to question 7)
- b. No (go to question 8)

6. From the following reasons choose the TWO which you feel are the most significant constraint for not having a job and put them in rank order (1=strongest; 2=second strongest 3= third strongest) Go to question 19

- a. Lack of job opportunities in the labour market of the state
- b. Lack of job experience
- c. Lack of specialised knowledge in a particular area
- d. Personal reasons (e.g. disease, disability, etc.)

e. Social problems (e.g. discrimination, family problems, etc.)

f. Other (specify) _____

7. For how long did you look for a job after your studies at UT?

- a. Less than a month
- b. Between one and three months
- c. Between three months and six months
- d. Between six months and a year
- e. More than a year

f. I was working before finishing my studies at UT

8. What kind of job did you attain when you finished your studies?

- a. Qualified Workman
- b. Administrative assistance
- c. Director or manager
- d. Qualified technician
- e. Owner of your business
- f. Foreman

g. Other (specify) _____

9. How much did you earn per month in your first job destination?

- a. Less than one minimum salary
- b. Between one to three times the minimum salary
- c. Between three to five times the minimum salary
- d. Between five to seven times the minimum salary
- e. Between seven to nine times the minimum salary
- f. More than five times the minimum salary

10. Have you changed your job?

- a. Yes (go to 11)
- b. No (go to 12)

11. How many times have you changed your job? (Go to 13)

- a. One
- b. Two
- c. Three
- d. Other

12. From the following factors choose the THREE which you feel are the strongest impediments for not changing your job and put them in rank order (1=strongest, 2=second strongest, 3=third strongest)

- a. I was satisfied with my job
- b. Lack of better opportunities in the labour market
- c. Lack of job experience
- d. Lack of different skills
- e. Personal reasons (e.g. family residence, etc.)
- f. Lack of extracurricular knowledge (English, computing, etc.)

Go to 14

g. Other (specify) _____

13. From the following options choose the THREE which you feel were the strongest reasons to change your jobs and put them in rank order (1=strongest, 2=second strongest, 3=third strongest)

- a. To have better salary
- b. To have better job conditions
- c. To improve job environment
- d. Personal reasons (e.g. change of jobs by partner)
- e. To receive a job offer
- f. To acquire new skills
- g. I don't want to change my job
- h. Other _____

14. What is your current position?

- a. Qualified Workman
- b. Administrative assistant
- c. Director or manager
- d. Qualified technician
- e. Owner of your business
- f. Foreman
- g. Other _____

15. From the following options choose the THREE which you feel were the strongest reasons to have found your job and put them in rank order (1=strongest, 2=second strongest, 3=third strongest).

- a. Employment opportunities in the state.
- b. The TSU diploma.
- c. Previous work experience
- d. Knowledge acquired at the UT
- e. Personal perseverance
- f. Social relationship of my family
- g. The placements of the UT
- h. Other (specify) _____

16. How did you hear about your recent job?

- a. Through newspapers
- b. Informal contacts (e.g. friends, relatives, teachers, etc.)
- c. Through the UT itself, Placement or Career planning
- d. Other (specify) _____

17. What is your current monthly salary?

- a. Less than the minimum salary
- b. Between one to three times the minimum salary
- c. Between three to five times the minimum salary
- d. Between five to seven times the minimum salary
- e. Between seven to nine times the minimum salary
- f. More than five times the minimum salary

18. How much satisfaction you get from your job or your business?

- a. Too little
- b. About right
- c. Too much
- d. Don't know

19. Do you want to study for a B.A?

- a. Yes (Go to 20)
- b. No (Go to 21)

20. From the following reasons choose the THREE which you feel are the strongest to study for a first degree and put them in rank order (1=strongest, 2=second strongest, 3=third strongest).

- a. To acquire more knowledge for my current job
- b. The company is asking me for the first degree
- c. Due to possibility to attain a better job
- d. My parents expected me to
- e. For deeper understanding of my career
- f. The region requires more educated people

21. What are your expectations in the short term (a year)?

- a. To open a business
- b. To move to a different city
- c. To emigrate and work in a foreign country
- d. To enter academia and research
- e. Don't know
- f. Other (specify) _____

22. From the following factors choose the THREE which you feel are the main contribution of the education give at the UT. Put them in rank order (1=strongest, 2=second strongest, 3=third strongest).

- a. To find a job quickly
- b. To improve my own income
- c. To acquire new skills for my job
- d. To choose the job that I wanted
- e. To fill out my personal aspirations (e.g. to be a educated person, to improve my attitudes, etc.)
- f. It has not been useful at all
- g. Don't know
- h. Other _____

Many thanks!

Surname: _____

First name: _____

Telephone: () _____ Date: ___/___/2000

Email: _____@_____

Company _____

ANNEX 3

Informants and questions of interviews

Employers (Responsible of human resources)	Educational authorities (Civil servants and UT's rectors)	Employed graduates	Unemployed graduates
<p style="text-align: center;">General</p> <p>1. How many TSU have you employed in your company during the last year?</p> <p>2. From which careers?</p> <p style="text-align: center;">Academic formation</p> <p>3. Why are the main reasons to hire TSUs?</p> <p>4. Have you noted big differences, in the qualifications of a TSU and that of a Bachelor?</p> <p>5. What can you tell me about the personal attitudes of TSUs?</p> <p>6. Have you noted particular weaknesses in the qualifications of TSUs?</p> <p style="text-align: center;">Earnings</p> <p>7. Could a TSUs earn more than a bachelor?</p> <p style="text-align: center;">The relationship between industry and the UT</p> <p>8. Is you company participating in some projects with the UT? Which ones?</p> <p>9. Is there any legal restriction to employ TSUs in your company?</p>	<p style="text-align: center;">The UT model</p> <p>1. Could you tell me how were Technological Universities (UTs) created?</p> <p>2. Why did authorities create this educational model?</p> <p>3. How is technological education related with the opportunity to provide well-being to human beings?</p> <p>4. What is the future of the UTs in Mexico?</p> <p>5. What are the problems of the UT model?</p> <p>6. What could you tell me about the partnership between the UT and industry?</p> <p style="text-align: center;">Responsible of Ex-Alumni departments</p> <p>7. Why do companies look for TSUs?</p> <p>8. What type of enterprises are more interested in hiring TSUs?</p> <p>9. What are the main restrictions that the companies express for employing TSUs?</p> <p>10. What can you tell me about the qualifications of TSUs?</p>	<p style="text-align: center;">General</p> <p>1. How many hours do you work per day?</p> <p style="text-align: center;">Social opportunities</p> <p>2. If you had another option to choose your higher education institution, what school or university would you select?</p> <p>3. Is your regional context giving you economic facilities to reach your goals as TSU?</p> <p>4. If you earned 50% more money, how would you allocate these extra resources?</p> <p>5. According to your answer in the questionnaire, your expectations are ____, could you tell me what are the impediments to reach these goals?</p> <p style="text-align: center;">Economic facilities</p> <p>5. According to your academic formation and the knowledge acquired in the UT, would you resign to bad-paid job and look for a better one?</p> <p>6. You have expressed in the questionnaire that you'd like to open your own business, what do you think that are the main problems for opening a business?</p> <p>7. Let's presume that you are unemployed; what kind of assistance would you look for to overcome this problem?</p> <p style="text-align: center;">General</p> <p>8. If you wished to have a better standard of living, what would to do?</p> <p>9. What are the personal and professional benefits of have studied in the UT?</p>	<p style="text-align: center;">General</p> <p>1. Could you tell me what do you think that are the main reasons for not finding a job?</p> <p>2. If you had another option to choose your higher education institution, what school or university would you select?</p> <p style="text-align: center;">Social opportunities</p> <p>3. According to your answer in the questionnaire, your expectations are ____, could you tell me what are the impediments to reach these goals?</p> <p>4. How have you thought to overcome the problem of being unemployed?</p> <p>5. Have government institution given you some assistance since you are unemployed?</p> <p style="text-align: center;">Economic facilities</p> <p>6. You have expressed in the questionnaire that you'd like to open your own business, what do you think that are the main problems for opening a business?</p> <p style="text-align: center;">General</p> <p>7. If you wished to have a better standard of living, what would to do?</p> <p>8. What are the personal and professional benefits of have studied in the UT?</p>