

**THE ALTERNATIVE TERTIARY EDUCATION SECTOR:
MORE THAN NON-UNIVERSITY EDUCATION**

by
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Acronyms

AAAC	Association of Accrediting Agencies of Canada
ACCC	Association of Community Colleges of Canada
AERES	Agence pour l'évaluation de recherches et d'éducation supérieure, France,
ALI	Adult Learning Inspectorate, England
ANUT	National Association of Universities of Technology, Mexico
AQF	Australian Qualification Framework
ASTE	alternative sector of tertiary education
BTS	Brevet de technicien supérieur, France
CAATs	Colleges of Applied Arts and Technology, Canada,
CCSSE	Community College Survey of Student Engagement, United States
CEGEP	Collèges d'enseignement général et professionnel, Québec, Canada
CENEVAL	National Center for the Evaluation of Higher Education, Mexico
CNE	Comité national d'évaluation, France
CPC	Commission professionnelle consultative, France
CSU	California State University
DEUST	Diplôme d'études universitaires scientifiques et techniques, France
DFAIT	Department of Foreign Affairs and International Trade, Canada
DNTS	Diplôme national de technologie spécialisé, France
DUT	Diplôme universitaire de technologie, France
EURASHE	European Association for the Study of Higher Education
FE	further education
FHS	University of Applied Science, Germany
FONABEC	National Education Grant Fund, Mexico
FTE	full-time equivalent
GDP	gross domestic product
HNC	Higher National Certificate, England
HND	Higher National Diploma, England
HRSD	Department of Human Resources and Skills Development, Canada
ICT	information and communication technology
ISCED-97	International Standard Classification of Education, UNESCO
IT	information technology
ITAL	Institute of Technology and Advanced Learning, Canada
IUFM	Instituts universitaires de formation des maîtres, France
IUT	Institut universitaire de technologie, France
KCCE	Korean Council for College Education
LMD	license-master-doctorat (a system for sequencing tertiary academic awards in France proposed by the Bologna process)
LSDA	Learning and Skills Development Agency, England
LSC	Learning and Skills Council
NQF	National Qualification Framework
OECD	Organization for Economic Cooperation and Development, Paris
OFFA	(proposed) Office for Fair Access, England
OFSTED	Office for Standards in Education, England
PPP	purchasing power parity
R&D	research and development

RNCP	Répertoire national des certifications professionnelles, France
RTO	Registered Training Organization, Australia
SEP	Secretaría de Educación Pública (Ministry of Public Education), Mexico
STPS	Secretaria del Trabajo y Provision Social, Mexico
STS	Sections de techniciens supérieur, France
TSC	Tertiary short-cycle institution
TSU	Técnico superior universitario (higher university technician), Mexico
UC	University of California
UCs	University Colleges, Canada
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USTE	university sector of tertiary education
UT	Universidad tecnológica (University of Technology), Mexico
VET	vocational education and training
YOK	Turkish Council of Higher Education

I. Introduction

An Overview of Tertiary Education

A strong correlation exists between participation in tertiary education and the level of economic development of nations. World Bank studies show that gross enrolment ratios in tertiary education average over 50 percent for countries belonging to the Organization for Economic Development and Cooperation (OECD), compared to 21 percent in middle-income countries, and 6 percent in low-income countries (World Bank, Edstats data¹). Tertiary education has become an important priority in the public policy agenda and is seen as an agent of social change, an engine of economic growth, and an instrument for the realization of the collective aspirations of society.

Over the past two decades, many low- and middle-income countries have embarked on ambitious plans to increase participation rates in tertiary education to support economic development goals. Invariably, they have considered the development of the alternative sector of tertiary education (ASTE) in OECD countries since the mid-1960s a cost-effective strategy for managing growth. However, the landscape of that sector can be confusing due to a myriad of institutional types, institutional cultures, academic awards, modes of articulation with the university sector, degree of autonomy, and governance. This comparative study of ASTE in selected OECD countries proposes a framework to facilitate analysis of this sector, distill lessons learned, and identify best practices to guide the development of ASTE in developing and transition countries.

Tertiary education today includes most forms and levels of post-secondary education and is provided by both the conventional university sector and non-university institutions, which constitute an alternative sector. In addition to a variety of institutional models, the alternative sector involves work-based cooperative programs and online distance learning schemes. In most countries, both sectors of tertiary education are facing a number of common challenges, including rising participation rates, changing labor market requirements, and competition for public and private funds. All tertiary institutions are thus having to adapt to the increasing and conflicting demands of multiple stakeholders. Students are demanding quality education;

¹ See the Education Statistics Database of the World Bank at www.worldbank.org/edstats (accessed June 2006).

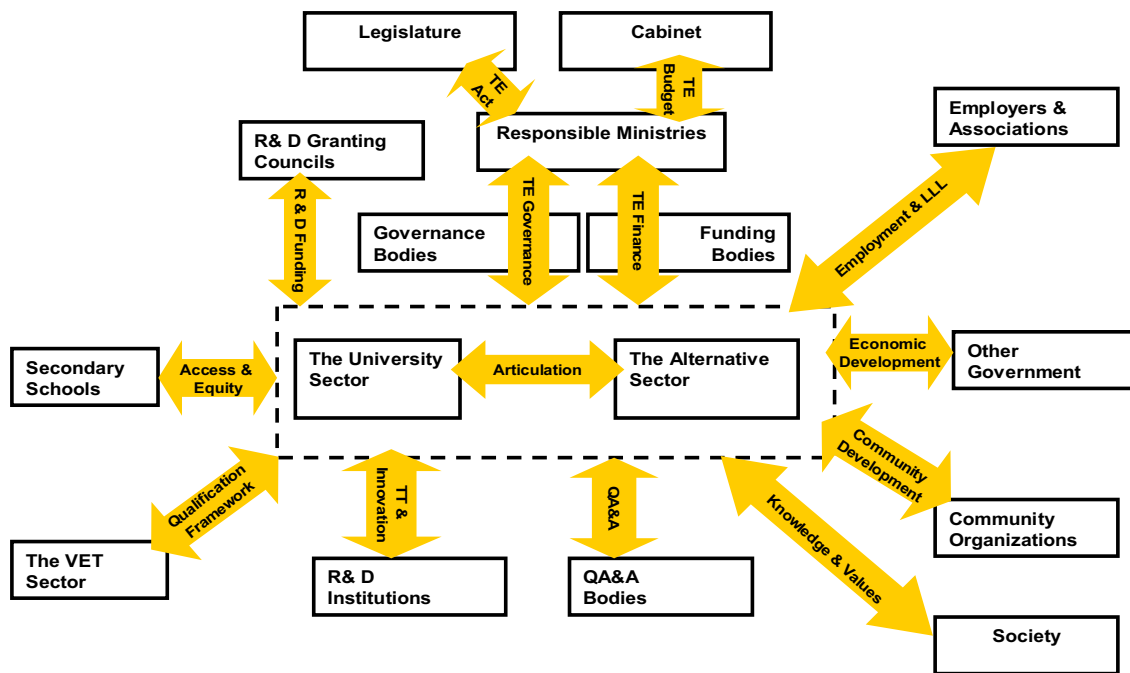
employers, education relevant to their needs; and governments, accountability for public resources allocated to educational institutions.

Other relevant trends in tertiary education include the growth of deregulated, market-driven institutions and vocationally relevant programs, together with the development of “seamless” systems of secondary and tertiary education, vocational training, and lifelong learning. Educational policy makers and planners are also concerned about issues of access and equity, the preservation of perceived distinctions between the purpose and nature of various institutions, the importance of lifelong learning, and the impact of communications and knowledge-intensive information technologies. The issues faced by most developed and emerging economies are similar in this sphere. However, individual countries have handled them in distinctive ways that have been shaped by historical developments, government structures, the nature and performance of education markets, youth demographics, and social attitudes towards access and equity.

The purpose of this paper is to examine the relevant attributes and characteristics of the alterative sector of tertiary education (ASTE), develop a framework for comparative analysis of the sector, and identify the key success factors and best practices of selected OECD countries that have distinctive ASTE models and experience.

The analysis presented in the paper addresses systemic aspects of tertiary education, including its structure and organization, as well as various sectoral and institutional typologies. The study also addresses relevant ASTE-specific issues, such as the autonomy and accountability of institutions, their articulation with universities, quality assurance and accreditation, access and equity, the composition and characteristics of student populations, the quality and relevance of academic programs, the effectiveness of teaching and learning, links between ASTE and the labor market, and the role of ASTE in economic development. To facilitate analysis, the paper proposes a systemic approach to the study of tertiary education, as outlined in figure 1, which defines institutions and supporting frameworks of the sector.

Figure 1. A “System” Diagram of Tertiary Education



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Typologies of Tertiary Education

ASTE institutions are relatively new compared to their more traditional counterparts in the university sector; a systematic analysis of these institutions requires a classification system to describe and categorize them. A number of typologies and classification schemes will be examined here, including the Carnegie Classification Scheme used in the United States, the tripartite institutional typology, and the program-based International Standard Classification of Education (ISCED-97) of the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

The Carnegie Classification

In 1970, the Carnegie Commission on Higher Education developed a classification of colleges and universities to support its program of research and policy analysis in the United States. Derived from empirical data on colleges and universities, the “Carnegie Classification” was

published for use by other researchers in 1973, and subsequently updated in 1976, 1987, 1994, 2000, and 2005. For over three decades, the Carnegie Classification has been the leading framework for describing institutional diversity in U.S. higher education. In the 2005 revision, the single classification system was replaced by a set of multiple, parallel classifications. The new classifications provide different lenses through which to view U.S. colleges and universities, offering researchers greater flexibility in meeting their analytic needs. These classifications are organized around three fundamental questions:

- what is taught (undergraduate and graduate instructional program classifications);
- who the students are (enrolment profile and undergraduate profile); and
- what the setting is (i.e., size and setting).

The original Carnegie Classification framework—now called the Basic Classification—has also been substantially revised. Another change has been the introduction of an “elective” classification. Unlike classifications based on secondary analysis of existing national data, elective classifications rely on voluntary participation by institutions, permitting analysis of attributes that are not available in national data. The first elective classification, released in December 2006, focuses on community engagement.

The current Carnegie Classification divides institutions into six main categories: doctoral and/or research institutions, master's colleges and universities, baccalaureate colleges, associate's colleges, specialized institutions, and tribal colleges. Most categories also specify subcategories. Doctoral/research institutions can, for example, be either extensive or intensive and offer a wide range of undergraduate degrees, as well as master's and doctoral-level graduate degrees. Extensive doctoral/research institutions award more doctorates in a wider range of fields than do intensive institutions. Master's colleges and universities fall into one of two categories (master's I or II) and typically offer a wide range of undergraduate, as well as graduate (through the master's degree), programs. Category I master's institutions award more master's degrees in a wider range of disciplines than do their category II peers. Baccalaureate colleges primarily focus on undergraduate education and are divided into three categories: baccalaureate colleges (liberal arts and baccalaureate colleges), general, and baccalaureate and/or associate's colleges.

Liberal arts colleges award at least half of their degrees in liberal arts fields, whereas general colleges award less than half in such fields. Baccalaureate and/or associate's colleges award both

associate and baccalaureate degrees. Colleges and universities identified as specialized institutions in the Carnegie Classification may award degrees ranging from a bachelor's to the doctorate, but the majority are awarded in a single field. There are several subcategories of specialized institutions, including theological seminaries and other specialized faith-related institutions, medical schools and centers, other health profession schools, schools of engineering and technology, schools of business and management, fine arts schools, schools of law, teachers colleges, military institutes, and other types of specialized education institutions. Tribal colleges are generally controlled by a Native American tribe and located on reservations.

While the Carnegie classification system is often used to make qualitative distinctions among institutions, the commission denies that this is the purpose of the system. In his foreword to the 1987 edition of the classification, Ernest Boyer emphasized that the system "is *not* intended to establish a hierarchy among learning institutions. Rather, the aim is to group institutions according to their shared characteristics, and we oppose the use of the classification as a way of making qualitative distinctions among the separate sectors" (Boyer 1987, page 87). Nevertheless, the process of "institutional drift," in which colleges strive to climb the hierarchy, is well documented in the educational literature. For example, junior colleges become baccalaureate-granting institutions by grafting another two years onto their programs, while doctoral/research-intensive universities increase funded research activities as they aspire to gain doctoral/research-extensive status. The Carnegie Foundation is in the process of reassessing its classification system and the way in which it characterizes similarities and differences among institutions; the new system will allow multiple classifications of institutions.

Institution-based typology

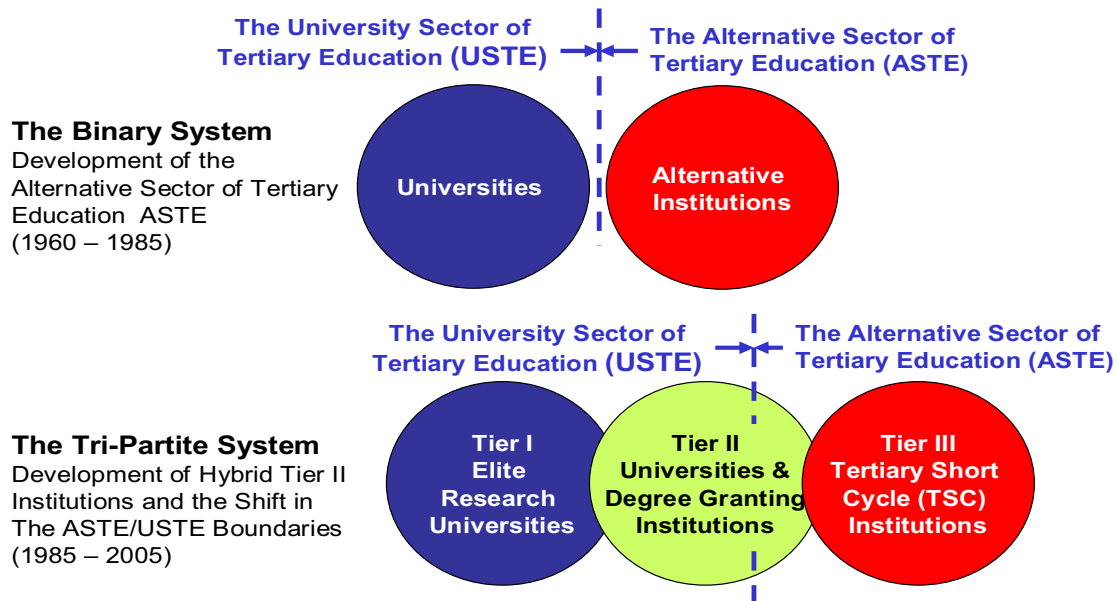
The diversity and complexity of the U.S. tertiary education system is reflected in the complexity of the Carnegie Classification. A more simplified, institution-based typology is needed to facilitate comparative analysis of less diverse systems of tertiary education. However, the landscape of tertiary education has changed dramatically in most developed and emerging economies over the past four decades. Many countries have established or substantially expanded institutions that are clear alternatives to traditional universities. The new institutions are more diverse in their mission, governance, and programs. It is often a challenge to define the alternative sector to which they belong because no single characterizing feature can be identified

that is universally true for all countries. Collectively, alternative institutions represent distinctive developments in tertiary education and offer some remarkable benefits—as compared to universities—including: (i) easier and more equitable access for large segments of the student population, (ii) greater flexibility and responsiveness to the needs of identified employers, and (iii) a different occupational orientation and approach to public service.

These alternative institutions face two significant challenges. First, there is the challenge of defining their identity, role, and appropriate place in tertiary education systems dominated by universities. Second, they face the dilemma of branding or labeling institutions that do not clearly belong to the traditional sector. The early work of the OECD, as well as the European Association for the Study of Higher Education (EURASHE) called such alternative establishments tertiary short-cycle (TSC) institutions. However, some of these institutions provide degrees that require three to four years of study and thus cannot be considered short-cycle institutions. In 1991, an OECD report called them alternatives to universities; other authors claimed that these institutions belonged to the non-university sector (NUS) of tertiary education. Yet all of these labels are inadequate.

A better approach to categorization is one that defines the tertiary education system as a tripartite system composed of three tiers of institutions (Grubb 2003): Tier I, which consists of elite research and comprehensive universities; Tier II, lower-status universities and degree-granting tertiary colleges and institutes; and Tier III, institutions that offer mostly short-cycle, subdegree programs (1–3 years). Figure 2 outlines the evolution of tertiary education over the period 1960–2005. The hierarchy of institutions in Tiers I and II is established by the type of degrees offered, the selectivity of admission criteria, and the resources allocated per student (the latter are almost universally greater in first- than in second- or third-tier institutions).

Figure 2. Institution-based typology of the evolution of tertiary education system, 1960–2007



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In the United Kingdom, for example, Tier I includes Oxford, Cambridge, and the rest of the so-called “Russell Group” of high-status universities; Tier II consists of universities of lower status, research orientation, and selectivity, including the former polytechnics, and Tier III consists of the Further Education (FE) colleges. In the United States Tier I is composed of the Ivy League and other high-status research universities; Tier II consists of less-selective universities (often state universities) that have larger numbers of occupational programs; and Tier III consists of community colleges and technical institutes. France also has a tripartite system, with the *Grandes Écoles* constituting the first tier due to their selective admissions and high spending per student, even though they are not research-oriented institutions; the universities form the second tier; and the *Instituts Universitaires de Technologie* (IUTs) constitute the third.

The boundaries between the three tiers are fuzzy and would be hotly disputed by many institutions in the lower tiers. In the United Kingdom there are hybrid institutions that provide

degrees as well as adult education programs. In Canada, university colleges in British Columbia cooperate with local universities to offer bachelor's degrees. Australia has dual-tier institutions that include colocated universities and technical and further education (TAFE) colleges that share infrastructure. Certain U.S. universities are allowed to award two-year associate degrees commonly offered by community colleges. But these complications and fuzzy boundaries should not obscure the fact that the tripartite model by and large reflects the reality of tertiary education in most OECD countries today. Using this tripartite typology, the alternative sector of tertiary education (ASTE) can be defined as including all Tier III institutions and certain Tier II institutions that are not considered, in a national context, as part of the university sector of tertiary education (USTE).

ASTE is a complex, amorphous sector conceived differently in different countries, which causes a number of difficulties. First, some countries have programs and institutions that straddle the divide between secondary education and tertiary education, such as the *Collèges d'Enseignement Général et Professionnel (CEGEP)* in Québec and the Technical Colleges in Japan. Second, in some countries, compulsory school age and the delivery of secondary school-leaving certificates occurs at different ages, ranging from 15 to 18 years. These differences complicate the comparative analysis of admission requirements to ASTE institutions. Finally, in some countries, tertiary short-cycle education represents the first stage of degree programs, but no separate data are available for these programs. Examples of institutions belonging to the tripartite classification system of tertiary education in selected OECD countries are shown in table 1.

Table 1. Tripartite system of tertiary education in selected OECD countries

<i>Country</i>	<i>Tier I</i>	<i>Tier II</i>	<i>Tier III</i>
Australia	8 research universities	32 new universities and some TAFE colleges	68 TAFE ^a colleges
Canada	30 research and comprehensive universities	56 new universities, university colleges, polytechnic ITALs ^b	145 community colleges and technical institutes
Finland	20 universities	31 polytechnics	Short-cycle programs in polytechnical education
France	37 Grande Écoles ^c	86 universities	123 instituts universitaires de technologie (IUTs) 280 sections de brevet de technicien supérieur (BTS)
Germany	78 technical and comprehensive universities	182 Fachhochschulen FHS ^d 43 Berufsakademien ^e	Dual training institutes ^f
Ireland	8 universities	13 technical institutes	Training centers
Korea	10 public universities 7 private universities	24 public universities 150 private universities	14 public junior colleges 144 private junior colleges
Mexico	10 federal and state universities 8 private universities	54 state and polytechnic universities 184 private teacher training (TT) colleges 249 public TT colleges	60 technical universities 211 technical institutes 995 private career colleges
Norway	4 universities	26 state colleges	Adult education institutes
Spain	Superior technical schools (Escuelas técnicas superiores)	University schools (Escuelas universitarias)	Higher professional training schools (Formación profesional de grado superior, FPGS)
United Kingdom	20 Oxbridge and “Russel” universities	53 newer and polytechnic universities	340 further education (FE) colleges
United States	690 Ivy League, public, and private research universities	1,760 polytechnic, colleges, and smaller state universities	1075 community colleges and institutes of technology

Source: Mikhail (2006). Reprinted with permission.

Notes: ^a Technical and Further Education Colleges.

^b Institutes of Technology and Applied Learning, Ontario.

^c The Grandes Écoles are professional schools, but most are not research-oriented institutions, however, they are the most selective and prestigious institutions in France.

^d Fachhochschulen FHS are Universities of Applied Science.

^e Berufsakademien are similar to the FHS, but with a strong emphasis on cooperative education

^f “Dual training institutes” offer cooperative programs with employers.

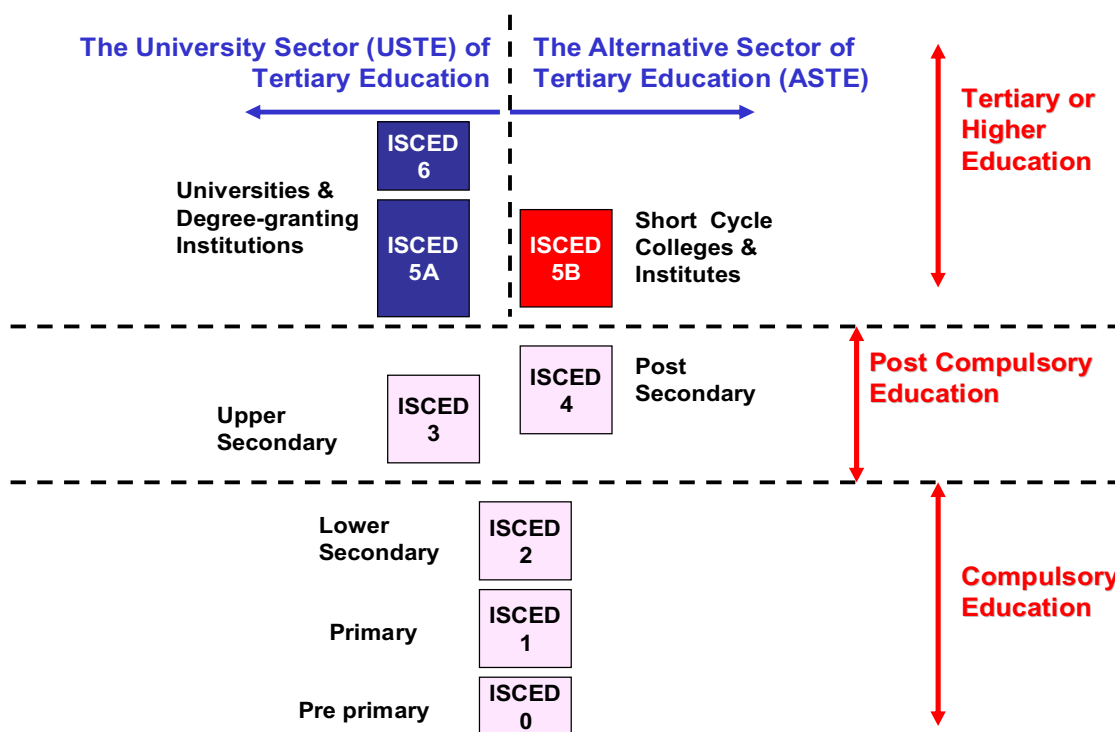
Program-based typology

The structure of educational systems varies widely among countries, making a framework to collect and report data on educational programs with a similar level of educational content a clear prerequisite for internationally comparable education statistics and indicators. In 1997, a revised International Standard Classification of Education (ISCED-97) was adopted by the UNESCO General Conference (OECD 1999), as shown in figure 3. This multidimensional framework has the potential to greatly improve the comparability of education statistics.

ISCED 1. Primary education usually begins at age 5, 6, or 7, and generally lasts for four to six years, with six the norm in OECD countries. Programs at the primary level generally require no previous formal education, although it is becoming increasingly common for children to have attended a pre-primary program (ISCED 0) before entering primary school. ISCED 1 programs are normally designed to give students a sound basic education in reading, writing, and mathematics, along with an elementary understanding of other subjects, such as history, geography, natural science, social science, art, and music.

ISCED 2. The lower-secondary level of education generally continues the basic programs of the primary level, although teaching is typically more subject focused and often employs more specialized teachers, who conduct classes in their field of specialization. Lower-secondary education may either be “terminal” (i.e., prepares students for direct entry into working life) and/or “preparatory” (i.e., prepares students for upper-secondary education). This level can range from two to six years of schooling, with three the norm in OECD countries.

Figure 3. ISCED program-based typology of tertiary education



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ISCED 3. This level corresponds to the final stage of secondary education in most OECD countries. Instruction is typically more organized by subject matter than at the ISCED 2 level, and teachers typically need to have a higher level, or more subject-specific, qualifications than at the preceding level. The entrance age to this level is typically 15 or 16 years. The duration of ISCED 3 programs differs substantially both across and among countries, typically ranging from two to five years of schooling. In addition, this level may either be “terminal” and/or “preparatory.” ISCED Level 3 programs are subclassified according to the destination for which a program is designed: (i) ISCED 3A indicates programs designed to provide direct access to ISCED 5A programs, (ii) ISCED 3B, direct access to ISCED 5B education, and (iii) ISCED 3C, direct entry into the labor market, although this designation also holds for programs that provide access to ISCED 4 programs or other ISCED 3 programs. Upper-secondary apprenticeship programs also fall into this category unless the program is primarily designed to prepare students to enter ISCED 5 education.

ISCED 4. Level 4 was introduced by the ISCED-97 classification scheme to cover programs that straddle the boundary between upper-secondary and post-secondary education. Level 4 programs cannot, considering their content, be regarded as tertiary programs. Although they are often not *significantly* more advanced than ISCED 3 programs, they serve to broaden the knowledge of participants who have already completed a program at Level 3. Students are typically older than those in ISCED 3 programs. Again, Level 4 programs are subclassified according to the destination for which a program is designed: (i) ISCED 4A programs provide direct access to ISCED 5A education, (ii) ISCED 4B, direct access to ISCED 5B education, and (iii) ISCED 4C, direct entry into the labor market.

ISCED 5A. The curriculum of programs at this level has a strong theoretical foundation and either emphasizes the liberal arts and sciences or prepares students for professions with high skills requirements. As the organizational structure of programs in tertiary education varies greatly across countries, no single criterion can be used to define boundaries between ISCED 5A and ISCED 5B education. The following criteria are the minimum requirements for classifying a program as ISCED 5A:

- It must have a minimum cumulative theoretical duration (at the tertiary level) of the full-time equivalent of three years, although the length of such programs is typically four or more years. If a program has a full-time equivalent duration of three years, it is usually preceded by at least 13 years of previous schooling at the primary and secondary levels. For systems in which degrees are awarded by credit accumulation, a comparable amount of time and intensity are required.
- It provides the level of education required for entry either into a profession with high skills requirements or an advanced research program.
- The program is taught by faculty who have advanced research credentials. This criterion is not meant to draw an institutional boundary, that is, 5A programs do not have to take place in the same institutions in which advanced research degrees are awarded.

ISCED 5B. These programs are generally more practical and occupationally specific than ISCED 5A programs. Qualifications in category 5B are typically shorter than those in 5A and focus on occupation-specific skills. The programs are generally geared for direct entry into the labor market, although some programs may cover certain theoretical foundations. A 5B program typically meets the following criteria:

- It is more practically oriented and occupation-specific than programs at the ISCED 5A level and does not prepare students for direct access to advanced research programs.
- It has a minimum duration of the full-time equivalent of two years. For systems in which qualifications are awarded by credit accumulation, a comparable amount of time and intensity are required.
- Program content is typically designed to prepare students to enter a particular occupation.

ISCED 6. This level is reserved for tertiary programs that lead directly to the award of an advanced research qualification. They are devoted to advanced study and original research. The theoretical duration of these programs is three years full time in most countries, with a cumulative total of at least seven years of full-time equivalent (FTE) study at the tertiary level, although actual enrolment time is typically longer. For a program to be classified as ISCED 6, it must meet the following criteria:

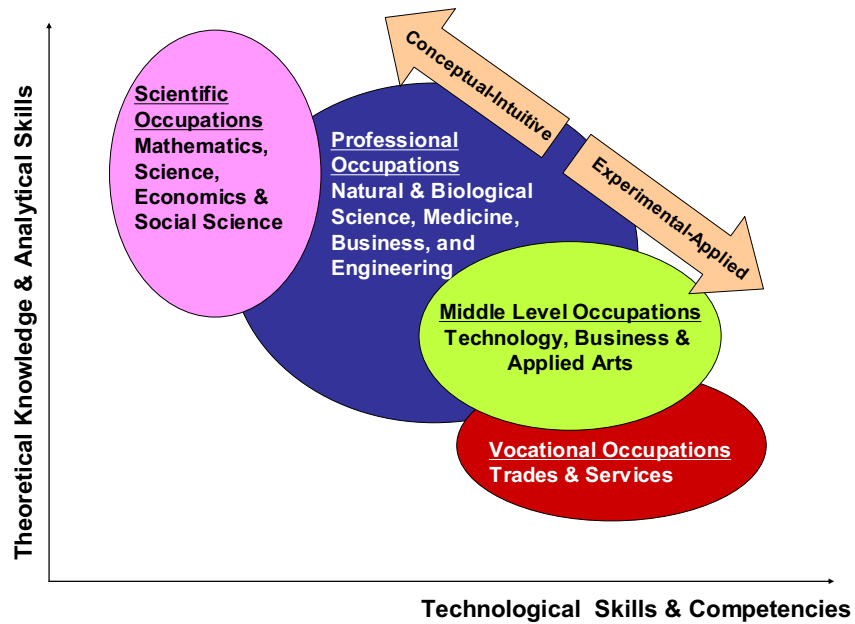
- Successful completion requires the submission of a thesis or dissertation of publishable quality that is the product of original research and represents a significant contribution to knowledge.
- The program is not solely based on coursework.
- It prepares recipients for faculty posts at institutions that offer ISCED 5A programs, as well as research posts in government and industry.

Topology of Technological Occupations in the Knowledge Economy

Understanding the relationship among technological occupations in the knowledge economy sheds light on the role of ASTE and its institutions in the economic development of countries and regions. As shown in figure 4, a simple but effective typology of occupations charts professions along two important education-related dimensions: theoretical knowledge and analytical skills (y axis) and technological skills and competencies (x axis). The typology proposes four categories of occupations, including: (i) scientific occupations, (ii) professional occupations, (iii) mid-level occupations (paraprofessional), and (iv) vocational occupations. In the health care field, for example, a molecular geneticist and a medical specialist would represent scientific occupations; practicing physicians and nurse practitioners, professional occupations; nurses, physiotherapists, and nutritionists, mid-level, or paraprofessional, occupations; and paramedics and nursing assistants, vocational occupations. In the emerging field of biorobotics, a biomedical research

scientist would represent a scientific occupation; electromechanical robotics design engineers, a professional occupation; manufacturing engineering technologists, a paraprofessional occupation; and electromechanical test technicians, a vocational occupation.

Figure 4. Typology of technological occupations in the knowledge economy



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Table 2 shows additional examples of the four categories of knowledge economy professions in key economic sectors.

Table 2. Examples of technological education in the knowledge economy

<i>Sector</i>	<i>Scientific occupations</i>	<i>Professional occupations</i>	<i>Para-professional Occupations</i>	<i>Vocational occupations</i>
Construction	Structural Engineers/Scientists	Civil and construction engineers	Site engineers and surveyors	Construction trades and/or technicians
Manufacturing	Design engineers and scientists	Manufacturing engineers	Plant engineers	Manufacturing technicians
Environmental/energy technology	Environmental/energy scientists	Chemical, mechanical, or environmental engineers	Applied chemical, mechanical, or environmental engineers	Chemical, mechanical, or environmental technicians
Manufacturing	Design engineers or scientists	Electromechanical engineers	Plant and quality engineers	Electromechanical technicians
Petrochemical	Process design engineers and scientists	Chemical process and mechanical engineers	Plant engineers	Process technicians
Pharmaceuticals	Scientists and bioinformatics specialists	Bio-engineers and information technology specialists	Process engineers and applications programmers	Pharmaceutical technicians
Health care	Molecular geneticists or medical specialists	Family practitioners or nurse practitioners	Nurses, physiotherapists, and nutritionists	Paramedics and nursing assistants
Accounting	Forensic accountants	Chartered accountants	General accountants	Accounting clerks

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II. Key Themes and Issues in the Study of the Alternative Sector of Tertiary Education

A number of themes and issues have dominated the study of ASTE in OECD countries over the past four decades. Comparative analysis of these issues in selected countries can provide valuable lessons for lower- and middle-income countries that are embarking on the reform and expansion of their tertiary education systems. This section will assess the following key themes: (i) relative size and organization of the ASTE sector, (ii) the purpose and identity of ASTE institutions, (iii) sector governance and institutions, (iv) sector financing and funding methods, (v) academic programs and awards, (vi) student body characteristics, (vii) teaching and learning, (viii) sector articulation with the university sector, and (ix) quality assurance and accreditation.

Size, Organization, and Purpose of ASTE Institutions

Size of ASTE

The size of the ASTE varies considerably among OECD countries. The differentiation of tertiary education into the tripartite sectors outlined earlier has not been formally adopted by the OECD. Differentiated data on the three sectors is thus difficult to obtain. However, table 3 presents useful comparative information about the participation and graduation rates in two sectors of tertiary education in selected jurisdictions. The data in this table leads to a number of conclusions.

- The definition of ASTE proposed in this paper includes all Tier III institutions that offer predominantly short-cycle programs (1–3 years in duration), as well as some institutions in Tier II that offer a hybrid of short-cycle and degree-level programs. However, OECD statistics provide data only on short-cycle (ISCED 5B) programs and thus exclude, for example, state colleges in Norway and the polytechnic institutes in Finland. This data exclusion explains why table 3 shows these two countries to have the lowest participation and graduation rates of all countries shown.
- Although in most countries, the percentage of students in the ASTE is lower than in the traditional university sector (i.e., USTE), the total number of students in ASTE is still considerable.
- There is a better correlation between the attainment and participation rates for the USTE than the ASTE sector; a finding that can be attributed to a number of factors, including differences in the maturity of the two sectors, student demographics, and in the close links that ASTE has established with the labor market, which often allow students to obtain employment without graduating.

- Countries that have a sizeable ASTE, such as the United Kingdom, the United States, and Canada started the development of the sector earlier than others such as Finland or Norway. Among the larger European nations, Germany appears to have a small ASTE because of the migration of the *Fachhochschulen* (or FHS) to Tier II of USTE in the last decade. Unlike the situation in the United Kingdom, where FE Colleges subsumed the role of the polytechnic institutes as ASTE institutions, the same transformation did not occur in Germany.

Table 3. ASTE participation and attainment rates in selected countries, 2004

Country	Population (Millions)	Participation rates		Attainment rates	
		USTE	ASTE	USTE	ASTE
Australia	20.4	27.8	18.6	49.0	NDA
Canada	32.5	29.8	19.4	35.0	12.0
Finland	5.3	53.4	10.2	48.7	1.6
France	60.5	28.8	11.2	26.7	18.6
Germany	82.2	34.8	5.2	19.5	10.0
Ireland	3.9	26.2	15.7	36.8	19.3
Korea	48.2	48	46	30.8	31.2
Mexico	103.3	29	2	17.9	1.12
Norway	4.7	31.8	8.9	39.8	4.5
Spain	40.2	17.7	13.4	32.1	15.7
United Kingdom	60.0	32.1	24.7	38.2	13.8
United States	303	32.4	18.2	32.9	8.8

Source: OECD (2004).

Notes: 1. ASTE is defined as consisting of Tier III institutions that offer mostly short-cycle programs, with a few exceptions where institutions also offer applied degrees.

2. ASTE does not include the following institutions: the German *Fachhochschulen*, the Norwegian state colleges, or the Finnish polytechnic institutes.

3. Participation rates are net rates that compare the ratio of the population aged 18–24 years who are participating in tertiary education to the total population of the same age group.

4. Attainment rates represent graduates as a percentage of total population of the same age.

ASTE-related legislation

In almost all OECD countries that offer ASTE programs, specific legislation governs education in the sector and this legislation is very recent. In most countries, legislation is a national responsibility, but in certain countries, such as Germany, it is a shared responsibility between federal and regional authorities, whereas in others, including the United States and Canada, it is primarily a regional responsibility. In Canada, education (including tertiary education) is the sole jurisdiction of the provinces and territories. In some countries, moreover, short-cycle ASTE

institutions are organized by the government (national, regional, or local), sometimes in collaboration with professional organizations.

ASTE programs can also be provided by private education and training providers, as in the United States and Canada, where private sector technical and occupational colleges offer a wide range of short-cycle occupational program in business studies, information technology (IT), health care, and services. In the State of Wisconsin, for example, there are 28 public community colleges and over 40 private occupational colleges, whereas in the Province of Ontario, there are 25 community colleges and 36 occupational colleges.

The U.K. Further and Higher Education Act of 1992 changed the status of polytechnic institutes, bestowing on them the defining characteristics of universities and the power to award their own teaching and research degrees. Overall responsibility for all aspects of education in the United Kingdom lies with relevant regional departments, such as the Department for Education and Skills in England, the Welsh Office, the Scottish Executive, and the Department for Employment and Learning in Northern Ireland. The fact that the educational systems in these jurisdictions are subject to independent legislation results in variations in the organization, administration, and control of ASTE, as well as in educational terminology and the designation of ASTE educational institutions.

Purposes and scope of ASTE institutions

ASTE institutions have a greater number of purposes and functions than do USTE institutions, despite the fact that universities are usually described as institutions with diverse purposes in teaching, research, and public service. Historically, ASTE institutions were established by consolidating many smaller, specialized vocational institutions and therefore not surprisingly, their focus remains occupational preparation for the workplace. A useful classification framework for ASTE institutions places institutions on a grid using two key indicators: the purpose of the institution and the scope of their academic or occupational programs. Institutions are further divided into three categories with respect to purpose: single-purpose institutions, which provide a range of occupational programs and very little else; dual-purpose institutions, which provide occupational as well as academic programs corresponding to the first phase of degree-level studies in universities; and multipurpose institutions, which provide the same

educational programs as do dual institutions, in addition to offering continuing education and community service programs.

ASTE institutions are divided yet again into three categories with respect to the scope of program offerings: (i) specialized institutions that offer programs in a single occupational category or body of knowledge, such as technology or hospitality and tourism, (ii) semi-comprehensive institutions that offer programs in two or three related occupations categories or bodies of knowledge, such as technology, business studies, health science, social services, or art and design, and (iii) comprehensive institutions that offer a wide range of occupational and academic programs. Figure 5 shows the typology of ASTE institutions at Tier II and Tier III levels, using the purpose-scope classification grid.

Figure 5. Scope-purpose typology of ASTE institutions

Scope of Academic Programs	B3. Comprehensive		American & Canadian Colleges	American & Canadian Colleges
	B2. Semi Comprehensive	German FHS & Norwegian State Colleges (Tier II)	French IUTs Mexican UTs	UK FE Colleges
	B1. Specialized	Finnish Polytechnics (Tier II)	Australian TAFEs	
		A1. Single Purpose	A2. Dual Purpose	A3. Multi Purpose
		Purpose of the Institution		

Source: Mikhail (2007). Reprinted with permission.

State colleges in Norway and the Finnish polytechnic institutes are good examples of single-purpose tertiary institutes. The same is true of the FHS in Germany, the students of which mostly seek employment upon graduation. Many community colleges in the United States and Canada are multipurpose comprehensive institutions, which stress several purposes: student transfer to

universities, preparation for the labor market through occupational diplomas and associate degrees, and adult education and community service. The FE colleges in the United Kingdom can also be considered multipurpose institutions, as they offer courses that prepare students for many different occupational qualifications at different levels, provide academic programs (including courses that qualify students to take GCSE and A-level exams), and serve the function of transferring students to the university via articulation agreements with universities, particularly former polytechnic institutes.

The French IUTs are dual-purpose institutions. While the educational programs of these institutions were initially envisioned as leading to employment, as many as 60 percent of graduates now gain entry to university after completing two years of study at higher-quality IUTs. So what was intended to be an institution with a unitary purpose has become, through student mobility, one with dual (or binary) purposes, serving the goals of both preparation for the labor market and entry into university academic programs.

Identity challenge for ASTE institutions

When the OECD examined ASTE institutions three decades ago, it was unclear whether or not these institutions had yet developed a clear identity within the sphere of tertiary education. Three decades later, following substantial growth and the development of new institutions in several countries, their identity remains an open question. As indicated by this study, ASTE institutions of all kinds have been established that serve substantial numbers of students in their respective jurisdictions. Even in countries like Finland and Norway, where ASTE institutions were established less than a decade ago, these educational institutions seem to play a firm role in tertiary education and there is little chance that they will disappear.

Sheer size or numbers, however, do not resolve the problem of identity—the question is whether these institutions have developed a clear, distinct, and positive identity, as opposed to being simply understood as non-university institutions within tertiary education. Obviously there are enormous variations in the image of ASTE institutions among countries, so that blanket generalizations are difficult to make. However, the following several identity-related issues are very relevant in the debate over identity:

- ***Institutional image.*** Institutional image involves whether or not ASTE institutions are *educational institutions* or *trade schools*. Educational institutions are not simply places where students earn a qualification for the labor market, although there is little doubt that

such places enhance the future employment potential of their students. They are also places where students make the transition from adolescence to adulthood and undergo the intellectual and emotional development needed to make the transition successfully. Trade schools, on the other hand, simply provide programs and courses necessary to earn particular qualifications. Such schools are not seen as places to provide other forms of development and student services are limited or non-existent.

- One example of a trade school is the typical TAFE college in Australia, which emphasizes programs and courses rather than institutional services. On the other end of the spectrum are the state colleges of Norway and many community colleges in the United States and Canada—institutions with a rich student life where students spend considerable amounts of time and which typically have attractive campuses and provide a wide range of student services. In the middle of the spectrum are various “hybrid” ASTE institutions, such as certain colleges in the United States and Canada and FE Colleges in the United Kingdom, which have characteristics of both educational institutions and trade schools.
- ***Role in research.*** Many ASTE institutions have been given or have taken on responsibilities for local and regional research. For example, the Finnish polytechnic institutes carry out applied research and development (R&D) that supports the local community and region. The French IUTs have the right to carry out scientific and technological research, the most common of which seems to be providing technical assistance to enterprises. The legal act that established the state colleges in Norway specifically provides that they should engage in research connected either to the practice of specific occupational fields or the problems of local industry. The new Ministry of Research and Innovation in Ontario, Canada, earmarks funds for applied research and the commercialization of technology, activities in which the Ontario colleges are encouraged to play an active role.
- ***Lifelong learning and community service.*** Many community colleges in the United States and Canada carry out a variety of activities intended to serve the lifelong learning needs of the local community—activities that are deemed to be in the realm of community economic development. These activities usually include providing advice to local small and medium enterprises on technology development and practices, small business incubation services, and support for creating and attracting new employers by providing education and training targeted to employment needs. Other activities of these institutions include community development, participation in local task forces on community issues, providing a bridging mechanism to institutions of secondary education, and leadership on issues of disadvantaged students.

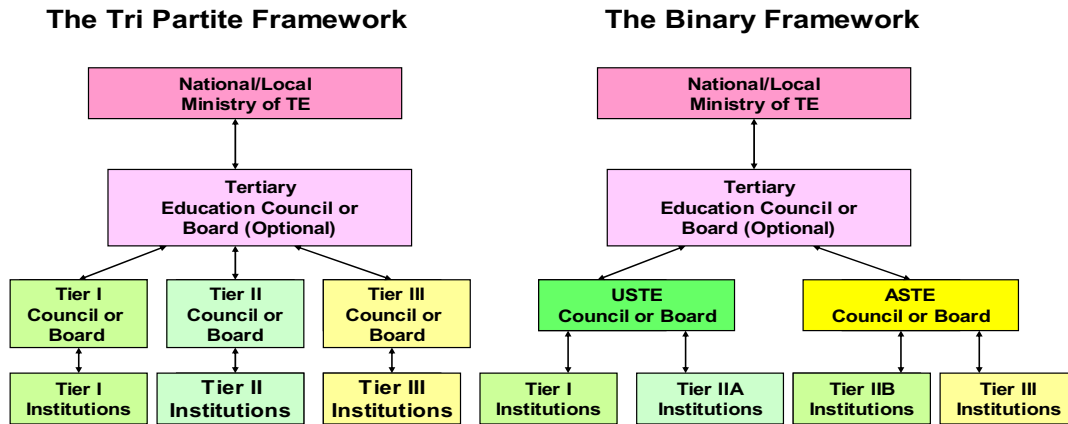
Governance and Funding of ASTE Institutions

Governance of ASTE institutions

Governance of institutions that provide tertiary or higher education varies considerably among jurisdictions. Three models are investigated here because, with certain variations, these models represent the majority of governance systems used in many OECD jurisdictions. The models are

tripartite governance, binary governance, and the direct steering model. Schematic diagrams of the first two models are shown in figure 6 below.

Figure 6. ASTE governance framework



Sources: Adapted from California Post Secondary Education Commission (2004), and the Ministry Training, Colleges and Universities MTCU, Ontario, Canada (2006)

Tripartite model

This model is used in jurisdictions where the three tiers of tertiary education are clearly demarcated and identified. The institutions in each tier are governed by a council or board specific to that tier. The work of the three boards is often coordinated by a jurisdictional (national or regional) Board of Regents or Board of Governors for the entire system. An example of the tripartite model is the tertiary education governance system in the State of California (see Box 1).

Box 1. Governance of Tertiary Education in California

The master plan for higher (tertiary) education in California created separate statewide governing boards for California Community Colleges (Tier III), California State University or CSU (Tier II), and the University of California or UC (Tier I). The plan also led to the creation of a statewide higher education coordinating commission, now known as the California Post-secondary Education Commission (CPSEC). The master plan differentiated educational functions among the three segments of higher education, including the pool of students from which each segment was to draw. The UC draws from the top one-eighth of high school graduating classes; CSU, from the top one-third; and community colleges are instructed to accept every Californian with a high school diploma or aged 18 or above.

The Board of Governors (BoG) of California Community College. Community college districts in California are administered by their own locally elected boards of trustees, as well as a statewide Board of Governors (BoG). The community college BoG is composed of 16 members who are appointed by the Governor of California and provides policy guidance to the system. The board adopts regulations for all community colleges, allocates state and federal funds to districts, and reviews academic programs and the construction of facilities. The board also appoints a chancellor who serves as the chief administrative officer of the system.

The Board of Trustees (BoT) of California State University. The individual California state colleges were brought together as a system in 1960 and in 1972, became the California State University (CSU), with 20 university campuses. Responsibility for CSU is vested in a Board of Trustees (BoT). The board consists of 18 members appointed by the Governor of California (for eight-year terms) and five ex-officio members: the governor, lieutenant governor, Speaker of the Assembly, superintendent of public instruction, and the CSU Chancellor. The BoT appoints the chancellor, who is the chief executive officer of the system, together with the presidents of individual universities, who are the chief executive officers of their respective campuses.

The Board of Regents (BoR) of the University of California. The University of California has eight general campuses, as well as one health sciences campus in San Francisco, together with numerous research facilities. The UC constitution grants authority to a 25-member Board of Regents (BoR). Seven members of the board are ex-officio: the governor, lieutenant governor, Speaker of the Assembly, superintendent of public instruction, president and vice president of the alumni association, and president of the university. Eighteen additional members are appointed to 12-year terms by the Governor of California, appointments that are approved by the state Senate. A university student selected by the Regents from a pool of candidates nominated by the Student Association is appointed to a one-year term by the Board. In addition, two faculty representatives (the Chair and Vice Chair of the Academic Council) serve as nonvoting members of the Board.

Source: League of Women Voters of California, "California State Guide to Government," Web site, www.smartvoter.org/gtg/ca/state/overview (accessed June 2007).

Binary model

The binary model is similar in spirit to the tripartite model, except that it pertains to tertiary education systems that are not as clearly divided into three distinct tiers as the California system. This model applies to jurisdictions where tertiary education is divided into a university sector (USTE) and an alternative sector (ASTE), with the latter composed mostly of short-cycle institutions. The governance arrangements for ASTE institutions are somewhat similar to that of

community colleges in the California model, whereas the governance framework for USTE institutions is a hybrid of the frameworks for the higher two tiers of the California system.

Direct steering model

Governance of ASTE institutions in Europe involves direct steering by governments. In France, for example, even though IUTs are affiliated with the universities, these institutions have less autonomy and are more directly steered by the Ministry of Education. Each discipline taught in an IUT is directed by a National Pedagogical Committee (CPN), which defines the educational programs for the discipline and assesses the quality of programs offered by various IUTs, the success rate of graduates, and the need for program renewal. CPNs also deal with major policy issues, including the development of new programs and the expansion of IUTs to respond to identified employment opportunities. CPNs are composed of qualified experts, employers, teachers, and union representatives. A national commission is constituted from the discipline-specific CPNs and works with the national government to develop policies, make recommendations on the direction of the IUTs, and coordinate the work of individual IUT pedagogical committees.

Role of employers and professional associations in ASTE governance

Employers and professional associations play a distinct role in the governance and management of ASTE institutions and have a stronger presence on the governing boards of ASTE than USTE institutions. These actors contribute to the success of these institutions by ensuring that the mission and strategic goals of individual institutions are informed by economic and market signals to ensure their long-term sustainability, avoiding the pitfall of short-term imperatives driving educational programs. The participation of employers and professional associations in the governance of ASTE institutions often translates into commitments to support cooperative forms of program delivery, internships for students, and the donation of equipment and facilities to targeted programs in the institution.

Financing of ASTE institutions and programs

Public funding

Comparative analysis of the funding of ASTE institutions encounters a number of difficulties. First, as noted earlier in this paper, there is a lack of agreement on the definition of the tripartite typology of tertiary education. Second, there is lack of consistent comparative data on the funding of the three tiers and two sectors. Finally, comparative analysis is meaningless unless expenditures are converted into a common value, either by using purchasing power parity (PPP) or percentages of the gross domestic product (GDP) of respective countries. Table 4 provides a comparative overview of expenditures on tertiary education as percentage of GDP for the two sectors, using OECD terminology (Type A for USTE and Type B for ASTE institutions).

Table 4. USTE and ASTE expenditures on tertiary education in selected OECD countries, 2004

<i>Country</i>	<i>Expenditures on education (% of GDP)</i>	<i>Annual per student expenditure in PPP-adjusted US\$ by sector</i>			<i>Relative duration of ASTE programs</i>	<i>Theoretical relative cost of ASTE graduates (%)</i>	<i>Approximate relative cost of ASTE graduates^a (%)</i>
		<i>USTE</i>	<i>ASTE</i>	<i>ASTE relative to USTE (%)</i>			
Australia	5.97	13,410	7,544	56%	50%	28%	40–50%
Canada	6.14	18,200	10,740	59%	75%	44%	60–72%
Finland	5.84	11,883	3,185	27%	50%	13%	20–26%
France	5.98	9,132	9,801	107%	50%	54%	60–68%
Germany	5.26	11,860	5,739	48%	50%	24%	36–44%
Ireland	4.49	9,809	6,278	64%	75%	48%	60–72%
Korea	7.5	9,138	4,021	44%	50%	22%	36–42%
Norway	6.37	13,927	4,317	31%	50%	16%	24–30%
Spain	4.89	8,074	7,718	95%	50%	48%	60–70%
United Kingdom	5.48	12,305	8,120	66%	50%	33%	40–50%
United States	7.34	22,234	9,338	42%	50%	21%	40–48%

Source: OECD (2004, 2006a).

Note: ^a Estimated relative cost based on average expenditures and completion rates in both sectors. The calculation takes into consideration the fact that a large percentage of ASTE students complete their studies on a part-time basis while holding steady jobs.

The data indicate that with few exceptions, expenditures per student in ASTE institutions in OECD countries are lower than in USTE institutions. France is the exception, where the IUTs are better funded than universities. The level of funding is, of course, reflected in the overall quality of education delivered in the IUTs, as well as the greater demand for access to these institutions on the part of students. The very low levels reported for Finland and Norway can be attributed to the fact that Tier II institutions—polytechnic institutes in Finland and state colleges in Norway—are reported as Type A (USTE) institutions in the OECD database. Spain is an example of how higher levels of expenditures on ASTE were used as a catalyst to expand tertiary education.

Table 4 also provides comparative information on the theoretical cost of ASTE graduates compared to USTE graduates. This relative cost depends, *inter alia*, on the duration of ASTE programs compared to their USTE counterparts, as well as graduation rates in the two sectors. (ASTE institutions are characterized by low graduation rates because a large percentage of ASTE students have to work during their studies in order to support themselves and, often, their families.)

From a policy perspective, the differential between spending in ASTE institutions and universities means that expanding post-secondary education through ASTE institutions would be cheaper and more cost-effective than an expansion of universities. However, from the perspective of students, lower levels of funding mean institutions that have fewer student services, lower-caliber faculty, and less adequate physical facilities. Grubb argues that “the interests of policy makers and the interests of students are at odds concerning the expansion of tertiary education” (Grubb 2003). If ASTE institutions are established or expanded because they are cheaper than universities, then policy makers will surely resist efforts to increase expenditures to improve the quality of education in these institutions.

A criterion for neutrality of funding is needed to support the growth of ASTE institutions. Such a criterion requires setting tuition, grant, and/or loan levels so that students from all income levels are equally encouraged to attend tertiary education, regardless of the sector (i.e., tuition causes no preference between sectors). Achieving neutrality between ASTE and USTE institutions would certainly require income-contingent tuition and income-adjusted grants and loans, together with differentials in tuition that favor ASTE institutions.

Other Sources of Funding

Revenues from students are, of course, only one of many potential sources of funding for ASTE institutions. Others include funding from different levels of government, employers, and, potentially, research grants. In some countries, such as France, ASTE institutions are under the jurisdiction of the national government and funded by national revenues. In other countries, such as the United States, Canada, Germany, and Australia, these institutions are the creation of states or provinces. In these cases, state or provincial funding substantially exceeds national funding, which leads to differences among provinces according to income and/or taxation levels. Such a problem may not be serious in a relatively homogeneous country, such as Germany, but is associated with serious differences in the quality of ASTE institutions in the United States and Canada,

The financing and management of contemporary tertiary education, including ASTE institutions, is undergoing major reforms in OECD countries. These reforms are driven by: (i) expansion and diversification of enrolments, participation rates, and the number and type of institutions; (ii) the fiscal pressure of declining per-student public expenditures; (iii) the ascendance of market orientations and solutions, together with the concomitant search for nongovernmental revenue; (iv) the demand by governments and taxpayers for greater accountability on the part of institutions; and (v) the demand for greater quality and efficiency, that is, for more rigor, more relevance, and better learning opportunities in tertiary education. With respect to ASTE institutions, these reforms include considerations of a number of important alternative funding sources:

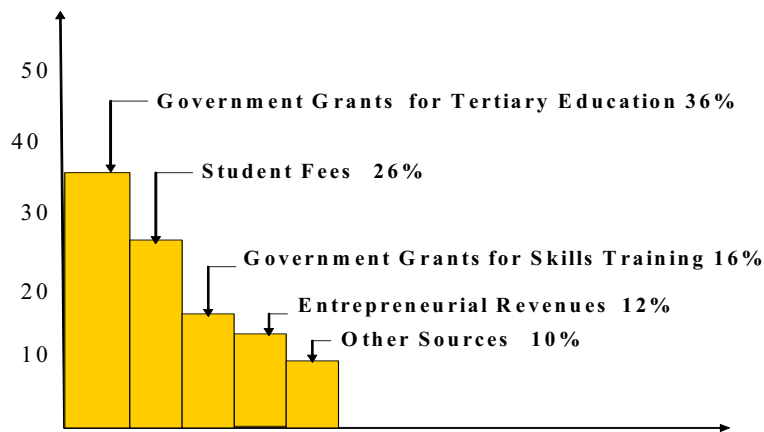
- **Tuition and fees.** Most OECD countries have been shifting the cost of tertiary education from the taxpayer to parents and students in the form of tuition and fees. Although tuition and fees have been long established in the United States in both the public and private sectors, they have been generally absent from European tertiary education. However, many European countries are now introducing means-tested, program-differentiated fees to diversify the sources of funding for ASTE programs.
- **Grants and loans.** These funding sources are seen as a means to preserve accessibility and equity in tertiary education. An alternative to recovering expenses from parents, even with means testing, is to recover them from the student through some form of *loans* or *graduate taxes*, to be repaid as the student becomes employable and productive. Although student loans are found in increasing numbers of countries, they are not all equally effective in shifting costs from the government (or taxpayers) to the student. The effectiveness of loan mechanisms can be improved by some of the following measures: (i) charging nearly market rates of interest; (ii) improving collections by holding the

originator, the university, and the servicing agency each partially responsible for repayment; (iii) arranging collections through a government tax withholding system; and (iv) switching the concept of cost recovery from individual loan repayment to a graduate tax.

- **Entrepreneurial activities.** In many OECD countries, ASTE institutions are building strong partnerships with potential employers, leading to revenue-generating initiatives that include technology transfer, corporate training, and government-funded apprenticeship programs. Since the early 1990s, well-managed American and Canadian colleges have realized that regular operating subsidies from the government will not grow and have accordingly adopted more entrepreneurial strategies, earning extra income and involving faculty and students in the effort. Some popular programs have even managed to generate income on their own through the sale of services and specialized courses.
- **Philanthropy.** Philanthropic giving to tertiary education is another form of funding that supplements public, or governmental, revenue. Successful philanthropy generally requires a tradition of philanthropy, along with favorable tax treatment of charitable contributions. The latter, however, shifts some of the effective burden of philanthropy onto the government in the form of lost tax revenues. A tradition of philanthropy does not, moreover, come easily or quickly, and is especially problematic for ASTE institutions because of their relative newness, lack of fundraising experience and lack of wealthy alumni.

Figure 7 shows how community colleges in Ontario are funded.

Figure 7. Composition of funding for community colleges in Ontario, Canada



Source: ACAATO (2006).

ASTE Academic Programs

Academic focus of programs

The curriculum of ASTE programs in almost all OECD countries is either a combination of theory and practice or a combination of theory, practice, and work placement. In countries where ASTE is well embedded in the system of tertiary education, such as France, Ireland, Spain, and the United Kingdom, and where a significant number of students are enrolled in the sector, virtually all occupational fields are covered by ASTE programs. Analysis of program offerings of a number of ASTE institutions in the various countries indicate that the largest enrolments are in popular fields, such as business studies, information technology, health studies, and social work. Other popular areas of study include information systems and library studies, hospitality and tourism, biotechnology, architecture, correctional services, security and police studies. In certain cases, specific fields, such as marine studies and aquaculture (Norway) and forestry (Finland), indicate that academic programming is informed by local economic development goals.

While it would be difficult to list all programs offered by ASTE institutions, it is nevertheless important to list the well-established generic areas of study found in most institutions:

- **business studies:** business management, office and organizational management, retail operations, accounting, marketing, human resources, e-business, supply chain operations, banking and financial services, transportation operations, and hospitality and tourism studies;
- **information and communication technology (ICT):** computer systems software systems, computer networks, computer games, animation, multimedia design, Web site design, and Internet services;
- **applied science:** biotechnology, pharmaceutical studies, environmental studies, nutrition studies, veterinary science, natural resources, industrial chemistry, and laboratory studies;
- **technology:** mechanical systems, manufacturing technology, automation, transportation and heavy machinery, electrical distribution, electronics, energy systems, computers and ICT, telecommunications, construction and building technology, architecture, and surveying;
- **agriculture and natural resources:** field crops and processing, agribusiness, agriculture technology, dairy animals, milk production, horticulture, forestry, and forest management;
- **trades:** construction trades, automotive and transportation trades, heavy machinery, and industrial trades;

- **applied arts and design:** interior design, graphic design, fashion design, multimedia, journalism, and theatre design;
- **health studies:** nursing, paramedic programs, spa therapy, medical laboratory studies, dental hygiene, optometry, biomedical technology, assistive devices technology, medical rehabilitation studies, and geriatric care studies; and
- **social services:** social work, juvenile studies, early childhood education, disability studies, correctional services, and addiction studies.

New programs are also being developed in such fields as financial services, small business enterprises, marketing, disability studies, and rehabilitation, to name a few. Other new initiatives include early childhood education, avionics, digital media, leisure studies, animal husbandry, and optometry. The focus of many of these programs is to prepare graduates for the emerging knowledge economy. Many of these initiatives include innovative, degree-level programs, including “Foundation Degrees” in the United Kingdom, engineering technology degrees in the United States, and applied degrees in Canada.

A survey of ASTE education in the OECD indicates that the sector is growing and adapting swiftly to the needs of rapidly evolving social and labor market conditions. However, certain peculiar phenomena should be noted. In the Netherlands, for example, there is a ban on new short-cycle programs and all subdegree courses must be discontinued by 2007. Institutions offering such courses are required to upgrade them to the bachelor’s level and meet accreditation standards for degree programs. New short programs within degree programs will, however, be permitted. In legislation that is currently being prepared, the Dutch government provides opportunities for students to leave a degree program early to join the labor force. These graduates will not, however, receive an official qualification, only a qualification recognized by the labor market

Entrance requirements and duration of studies

Entrance requirements for ASTE programs in most OECD countries is a secondary school-leaving certificate. However, accreditation of prior experiential learning is sometimes accepted in France, Ireland, Norway, Spain, England, and Wales. With the exceptions of the United Kingdom and Ireland, all ASTE Tier III program courses last more than one year. In Ireland the first formal qualification received is the National Certificate, which takes two years to acquire. Most subdegree programs take two years, but some require three years of full-time study. In

Ontario, Canada, however, certain ASTE Tier III programs at the applied degree level require four years to complete.

Academic awards

A diploma is the most common academic award for two-year programs. However, as can be seen in table 5, academic awards have a wide range of titles. A certificate, for example, may be awarded after one, two, or three years of study, meaning there is a lack of consistency and comparability among these awards, especially in European tertiary education. In the United Kingdom, the foundation degree has found its place in the national qualification framework, which uses descriptors to define each level. The degree is, in fact, an intermediate tertiary qualification and sits at level four in the framework.

The Scottish Credit and Qualification Framework (SCQF) is at the forefront of educational developments worldwide because it has integrated qualifications across academic and vocational sectors into a single, credit-based framework. The aims of the SCQF are to: (i) enable employers, learners, and the general public to understand the full range of Scottish qualifications, how they relate to each other, and how different types of qualifications contribute to improving workforce skills; (ii) help people of all ages and circumstances access appropriate education and training over their lifetimes in order to fulfill their personal, social, and economic potential; (iii) make the relationships between qualifications clearer, as well as to clarify entry and exit points and routes of progression within and across education and training sectors; and (iv) maximize opportunities for credit transfer and assist learners to plan learning throughout their lives.

Table 5. ASTE academic awards

<i>Country and institution</i>	<i>One-year award</i>	<i>Two-year award</i>	<i>Three-year award</i>	<i>Four-year awards</i>
Australia: TAFE Colleges				
Canada: Community Colleges	Certificate	Diploma	Advanced Diploma	Applied Bachelor Degree
Finland: Polytechnic Institutes	NA	NA	NA	AMK/YH Degrees
France: IUTs	NA	Brevet de Technicien Supérieur (BTS), Diplôme universitaire de technologie (DUT)	Diplôme d'état spécialisé	NA
Germany: Fachhochschulen				Diplom
Ireland: Technical Institutes	One-year certificate	National certificate	National diploma	
Korea: Junior Colleges	NA	Associate degree	Associate degree (Junior College)	NA
Mexico: University of Technology or CONALEP	Certificado	Titulo de técnico superior (Universidad tecnológica)	Titulo de técnico profesional (CONALEP)	
Norway: State Colleges		DiplomaHøgskolekandidat		
Spain	Título de técnico	Título de técnico superior	NA	NA
United Kingdom: Further Education Colleges	Certificate in HE, Higher National Certificate (HNC)	Diploma in HE, Higher National Diploma, Foundation degree		
United States: Community Colleges	Certificate	Associate Degree		

Source: Mikhail (2006). Reprinted with permission.

ASTE Students

Gender

In the United States, Canada, and most countries in Europe save German-speaking countries, the majority of students in ASTE Tier III institutions are female, whereas in Australia, male students have slightly higher participation rates. The majority of students in ASTE Tier III programs in Europe are in the United Kingdom, where the number of women in sub-degree programs greatly

exceeds that of men, meaning there is an overall majority of females (± 55 percent female versus ± 45 percent male) in ASTE programs in Europe. In most countries, there is a traditional gender division based on specializations, with more women in programs such as social services, nursing, and education, and more men in programs such as engineering technology, business, and applied science.

Socioeconomic background

The OECD does not provide data on the socioeconomic background of students in tertiary education. However, most researchers believe that ASTE Tier III institutions tends to attract students from disadvantaged groups, such as those without a family history of participation in tertiary education (the so-called “first generation” students), students who have working class parents, students with disabilities, students from minority ethnic groups, and mature students and/or students with non-standard qualifications. One of the key findings of research in the United Kingdom is that men from socially disadvantaged groups are twice as likely to be studying for FE qualification compared to those with parents from professional and managerial groups (Dearden et al. 2000). In the academic year 2001–2002, over 75 percent of the students in FE programs in the United Kingdom, for example, were enrolled as part-time students. The proportion of older mature students at ASTE Tier III institutions is also substantially higher than the corresponding proportion at universities.

Admission criteria

The admission criteria and thresholds of ASTE Tier III programs are generally lower than those required by institutions in tiers I or II. However, the data is not conclusive: in France, for example, the IUTs enjoy the same high status and esteem as the universities, and their admission criteria are as stringent as those required for universities in Tier II. In addition to a credible secondary school record, admission to some popular disciplines, such as computer animation and graphics in Canadian community colleges, requires evidence (in the form of a competitive portfolio) of a student’s artistic and animation skills. Box 2 outlines some the characteristics of students in certificate programs in American community colleges.

Box 2. Students in American community college certificate programs

Students in certificate programs are a subpopulation of community college students and their uniqueness is manifested in a number of demographic and enrolment characteristics:

- **Ethnicity and age.** Certificate students have the highest proportion of minority students (44 percent) and students aged 24 or older (65 percent) of any postsecondary subpopulation.
- **Socioeconomic status.** Certificate students are the most economically disadvantaged (median parental income of a dependent student is US\$39,441), have the highest proportion of parents whose highest level of education is a high school diploma or less (56 percent), and are the most likely to be single with a dependent (25 percent).
- **Educational background.** With respect to preparation for post-secondary education, certificate students are the least likely to have taken a rigorous academic curriculum in high school (8 percent) and the most likely to have taken either a vocational (23 percent) or a non-focused curriculum (24 percent). They are also the least likely to have been ranked in either the top quartile of their high school class (10 percent) or the top quartile of combined scores of standardized reading and math tests (6 percent). Interestingly, however, certificate students have the highest proportion of students with previous post-secondary degrees (37 percent), regardless of the type of degree: certificate (22 percent), associate (7 percent), or bachelor's (8 percent).
- **Enrolment patterns.** Certificate students are far more likely to have non-traditional enrolment patterns than other postsecondary students: 64 percent delay post-secondary enrolment after completing high school and only 20 percent attend on a full-time, full-academic-year basis.
- **Reason for enrolling.** A final example of the outlier status of certificate students is their primary reason for enrolling. Almost half (48 percent) say their primary reason is to obtain job skills, while 32 percent cite the attainment of a degree or certificate, and a mere 4 percent enroll for future transfer.

Source: Bailey et al. (2004).

Teaching and Learning in ASTE Institutions

ASTE Teachers

The status and work conditions of ASTE teachers have some similarities with, but many differences from, their counterparts in USTE institutions, as outlined below.

- First, the qualifications for a full-time entry teaching position in an ASTE institution is not solely dependent on the academic attainment and publication record of the candidate. In addition to minimum academic qualifications—originally a Bachelor's, but now increasingly, a Master's degree—ASTE teachers are also expected to have relevant recent work experience.
- Second, while progression through the academic ranks towards a tenured position in USTE institutions is governed by clearly understood requirements for publications and scholarship, the situation in ASTE institutions is less clear. In some countries, such as France, ASTE institutions (the IUTs) are an integral part of a parent university and their

teachers have very similar conditions of employment and progression through the ranks as their university colleagues. In the Anglo-Saxon countries, on the other hand, including the United Kingdom, Canada, the United States, and Australia, the working conditions and progression through the ranks of ASTE teachers are governed by collective agreements that clearly define their workloads, rights, and responsibilities. However, in many ASTE institutions, there are no ranks and all full-time teachers progress towards higher salaries and benefits strictly by seniority.

- Third, due to the lower level of per-student funding in ASTE institutions, these institutions typically hire a larger proportion of part-time teachers than do USTE universities. The hiring of part-time teachers can, however, be a two-edged sword: if part-timers are fully or partially employed in meaningful positions in enterprises, they can bring relevant knowledge and experience to the programs; otherwise their contribution is often marred by the transient nature of their contact with students, who often cannot access these teachers outside contracted lecture or laboratory hours.

Student-centered teaching and learning

Universities in many OECD countries have often been accused of providing a poor learning environment for students, one dominated by theoretical lectures in large classes where there is very little room for interaction between students and professors and little attempt to connect the subject matter to relevant applications. In some countries, such as France, the low quality of university teaching was the root cause of the establishment of the Instituts universitaire de technologie (IUTs). ASTE institutions, on the other hand, pride themselves on being “teaching institutions”—community colleges in the U.S. and Canada, and the FE colleges in the United Kingdom consider themselves first and foremost student-centered institutions. It is frequently argued that contemporary ASTE programs are much more student and learner centered than their USTE counterparts. An emerging consensus identifies the following attributes of contemporary ASTE programs:

- **Strong links to employers and the labor market.** ASTE graduates are a major resource for employers, as they graduate with the knowledge, skills, and competencies needed for modern sectors of the economy. The active participation of employers in the development of ASTE programs ensures the occupational relevance of graduates, as well as the continued relevance of program faculty.
- **Professional faculty development.** ASTE institutions in many jurisdictions have adopted measures to ensure the continued professional development of faculty, including: (i) reviewing and updating employment and tenure conditions; (ii) establishing incentives for professional faculty development; (iii) developing and implementing comprehensive and ongoing professional development programs; and (iv) ensuring the participation of qualified employer representatives among the faculty.

- **Undergraduate applied research and development.** Contemporary ASTE programs emphasize the importance of early student engagement in open-ended design projects, as well as applied research and development initiatives that use knowledge to address the social and economic development challenges of society.
- **Cooperative, modular framework.** Another hallmark of contemporary ASTE programs are cooperative education models that sequence study and work semesters so as to shift the burden of acquiring practical experience with equipment and technology to participating employers. The benefits of cooperative models are further enhanced by the adoption of a modular, credit-based approach to academic program design, with the amount of academic credit representing a measure of the average, or “notional,” learning effort required.
- **Competency-based evaluation of learning outcomes.** The adoption of a competency-based model for program design has become the hallmark of progressive ASTE education. Competency-based outcomes address the following dimensions: (i) breadth and depth of knowledge and understanding of the subject; (ii) cognitive and analytical skills and associated degree of creativity; (iii) leadership, communication, and team skills and competencies; and (iv) degree of autonomy and accountability in working with others and carrying out tasks and assignments.

The hope that the occupational orientation of alternative tertiary institutions can create new cultures of student-centered teaching and learning, as well as inclusive academic program design, is, sometimes dashed by the different reality of many ASTE institutions. In Great Britain, for example, researchers found that, while many instructors claim to use discussion and small-group techniques, their practices are dominated by traditional lecture methods (Harkin and Davis 1996). In other countries, such as the United States and Canada, community colleges use a high proportion of part-time instructors, who normally work in industry but often have little or no preparation in adult education methods. Other research findings indicate that while community colleges are universally dedicated to the image of being “teaching institutions,” teaching practices in many such colleges follow “the same dreary, theoretical, lecture format for which universities have been criticized, even though classes are smaller” (Grubb 1999, 48). The teaching of occupational and professional subjects also involves issues that do not arise in university academic instruction. These issues, such as the need to integrate classroom-based lectures with practice-oriented instruction in workshops, present special challenges for instructors. Subjects that often require workshops or labs, for example, include engineering, health sciences, computer-related fields, tourism, the culinary arts, and traditional vocational fields, such as construction trades, automotive technology, and agriculture.

While considerable attention has been given to teaching the basics of science, mathematics, and humanities in USTE institutions, comparable attention has not been paid to the nature of teaching occupational subjects in ASTE institutions. For example, the teaching of engineering has traditionally used deductive methods, beginning with theories and progressing to the application of those theories (Prince and Felder 2006). Inductive methods, on the other hand, which involve a variety of approaches, including guided inquiry, problem- and case-based studies, and project-based investigations, are better suited for the teaching of technology in ASTE institutions. In most OECD countries, however, there is no meaningful community of teachers studying and writing about the nature of teaching in occupational and professional subjects. This type of teaching is in many ways more difficult than the teaching of standard academic subjects, yet such teachers appear to have fewer sources of information and support on pedagogical issues. The current literature on ASTE, for example, pays strikingly little attention to teaching issues, including institutional practices that support teaching and teaching innovation.

The Link to Economic Development and Employment

Tertiary education has always been seen as an engine for national economic growth and an important instrument for the realization of the collective aspirations of society. Throughout the OECD and, indeed, the world, new demands and expectations are compounding the long-established role of tertiary education in educating future professionals and political and industrial elites. This type of education is increasingly seen as raising the educational level of the typical citizen, employee, and community member. This role has become more complex due to rapid growth in participation rates and the diversity of interests, backgrounds, and aims of participants. Institutions of tertiary education are no longer seen as remote places where students acquire academic knowledge and professional qualifications. Instead, they are a major force in ongoing economic development and the advancement of knowledge.

Wage premia for tertiary education graduates

Tertiary education is an important determinant of individual earning capacity and employment prospects and therefore plays an important role in determining the level and distribution of income in society (see, for example, Bondal, Field, and Girourad 2002). These studies clearly show that the pre-tax wage premia earned by graduates of tertiary education, compared to those

of graduates of upper-secondary educational institutions, is substantial in all OECD countries, particularly the United States, France, and the United Kingdom. Tertiary education appears to provide not only an initial earning advantage, but also a wage premium that increases with time spent in the labor market. Table 6 shows the earning premia of university graduates (USTE sector) and graduates of alternative tertiary education institutions (ASTE sector) for the population aged 25–64 years, relative to workers who completed only upper-secondary education. The table clearly shows the benefits of tertiary education in both sectors in terms of the earning power of its graduates compared to individuals without the benefit of such education.

Table 6. Wage premia of tertiary education graduates, selected OECD countries, 2004–2006

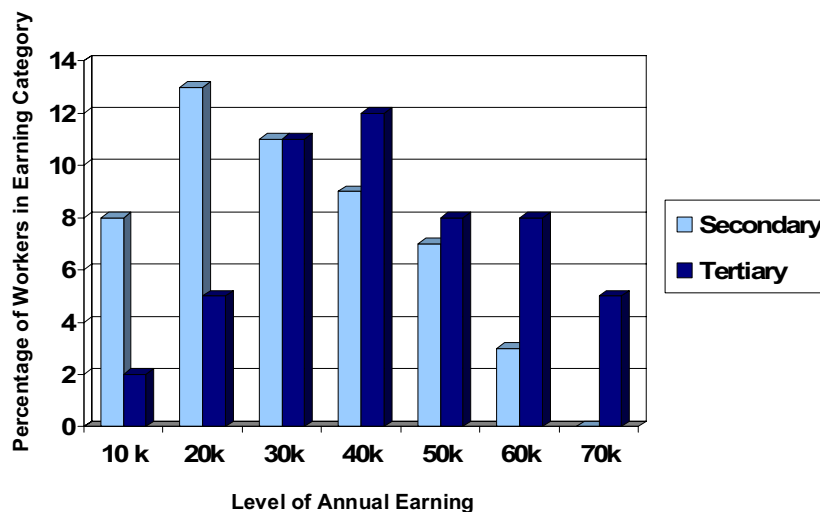
(wages earned by upper-secondary school graduates = 100)

<i>Country</i>	<i>ASTE graduates relative to upper-secondary education graduates</i>	<i>USTE graduates relative to upper-secondary education graduates</i>
Australia	116	144
Canada	112	162
Finland	120	190
France	125	169
Germany	130	165
Ireland	111	157
Korea	106	147
Mexico	NA	NA
Norway	136	141
Spain	128	138
United Kingdom	128	181
United States	114	180

Source: OECD (2004, 2005, 2006a), Grubb et al. (2006).

Figure 8 shows the distribution of earnings of workers with tertiary education compared to workers with upper-secondary education in the United States, revealing that the lifelong earnings of the former are substantially higher.

Figure 8. Annual earnings of full-time workers in the United States, by educational attainment



Source: Grubb et al (2006)

Employment opportunities

A further important benefit of tertiary education is the lower risk of unemployment for graduates. This risk differential is notably large for young graduates. High youth unemployment provides a strong incentive for young people to continue their education at the tertiary level. Not only are educated workers more likely to participate in the labor market, their active working life is generally longer than that of workers with lower educational attainment (OECD 2006a). Table 7 shows employment rate by level of educational attainment among male and female workers aged 25–64 years in selected OECD countries. As the data confirm, one clear benefit of tertiary education is an improvement in the employment rate for both males and females, with an average employment premium of 6 and 7 percent for male graduates of ASTE and USTE programs, respectively. The corresponding respective premiums for female graduates are 12 and 14 percent.

Table 7. Impact of tertiary education on employment, selected OECD countries, 2006

<i>Country</i>	<i>Employment rate of workers aged 25–64 years, by educational attainment (%)</i>					
	<i>Upper secondary</i>		<i>ASTE (Type B)</i>		<i>USTE (Type A)</i>	
	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
Australia	86	66	87	74	90	81
Canada	82	69	87	79	85	78
Finland	75	71	83	82	90	85
France	82	73	90	81	84	76
Germany	75	64	83	77	88	79
Ireland	89	61	91	79	91	83
Korea	86	54	90	58	89	57
Mexico	91	56	94	63	91	73
Norway	82	77	91	88	91	86
Spain	84	60	89	70	86	78
United Kingdom	88	79	89	85	91	86
United States	79	68	83	87	88	78
OECD Mean	82	65	88	77	89	79

Source: OECD (2006a).

Contribution to local and regional economic development

In many OECD countries, ASTE institutions tend to be more numerous and better geographically distributed than universities. As a result, they have a closer link to and understanding of the economic needs of local communities. In northern Ontario, Canada, for example, local community colleges are often the only tertiary education institutions in the region and provide programs for training forestry and mining personnel for the local economy. In Norway, state colleges likewise provide training programs in the management of fish farming, an enterprise in many local communities. Inner-city community colleges in the United States provide a strong link to the local economy through occupational programs that respond to clearly identified training needs—programs that explicitly serve ethnic and economically disadvantaged minorities.

Links between ASTE and USTE Institutions

ASTE institutions often serve clearly defined roles within tertiary education, such as providing vocationally and occupationally oriented education, as well as greater geographic coverage and

equitable access to tertiary education. However, the nature of the links between these institutions and their counterparts in the university sector differ. Grubb (2003) has proposed a typology that categorizes these links as either relatively *segregated* from or relatively *integrated* with the rest of tertiary education and training. In no country of the OECD are ASTE institutions completely segregated. TAFE colleges in Australia are probably the closest to this end of the spectrum because they are only weakly linked to universities and tend to simply offer rosters of courses, rather than create programs with potential transfer linkages. Certain community colleges in parts of the United States and Canada are also segregated from the rest of the tertiary education system. In Germany, the dual apprenticeship system is not considered a part of tertiary education and its providers are also segregated from tertiary education.

Relations and articulation with universities

The articulation arrangements of ASTE short-cycle programs of Tier III institutions with USTE university programs can be classified using a framework that defines three types of these arrangements:

- **Type A: Systemic articulation.** Articulation is systemic and formally recognized by legislation, allowing students who complete short-cycle studies in ASTE Tier III institutions (with an acceptable level of academic achievement) to be granted advanced standing access to degree-level programs in USTE institutions. This articulation involves direct transfer of all credits earned in short-cycle programs to degree programs. The French system is an example of this type of articulation. The IUTs were originally created to provide occupational studies at the tertiary level. However, a large percentage of students (as many as 60 percent) who complete the two-year program of IUTs now go on to universities, both because of well-defined articulation rules and the higher status and employment benefits of a university degree. Such articulation is facilitated by the fact that IUTs are linked with particular universities. Some U.S. colleges have also established articulation agreements with nearby universities so that the transfer of ASTE students into baccalaureate programs is all but automatic.
- **Type B: Facilitated articulation.** This type of articulation can sometimes be governed by legislation, but is often only managed by agreed principles applied to targeted disciplines in all ASTE and USTE institutions in a specific country or jurisdiction. Articulation is facilitated by providing interested ASTE graduates from short-cycle programs access to a range of intermediate initiatives, including: (i) bridging programs, (ii) remedial courses, and (iii) online courses. In the United States community colleges were created in part so that universities would have to do less “lower-level” work in the first two years. The “transfer function” of such colleges was thus always considered an important element of their mandate. However, there are frequent complaints that transfer rates are too low. It remains a point of controversy whether universities are to blame

because of their reluctance to accept community college students or whether community colleges are to blame for not preparing students adequately.

- **Type C: Institution- and program-specific conditional articulation.** This type of articulation is both conditional and institution- and program-specific. It involves negotiated bilateral agreements between institutions of both sectors that provide students with conditional opportunities to continue their studies in a degree program. In the United Kingdom educational policy clear separates *higher (tertiary)* education and *further* education, which are considered two distinct sectors with few links between them. In practice, however, local FE colleges often seek articulation arrangements with local universities regarding specific disciplines.

Table 8 provides a summary of the articulation and transition arrangements in selected OECD countries.

Table 8. Classification of ASTE articulation arrangements with USTE institutions, selected OECD countries, 2006

Country	Articulation type			Comments
	A	B	C	
Australia		X		The Australian Qualification Framework provides the rules and guidelines for Type B articulation between sectors.
Canada		X	X	Articulation agreements vary considerably among provinces.
Finland		X		Articulation between Tier II polytechnic institutes and Tier I universities is governed by agreed principles and guidelines.
France	X			Articulation between IUTs and university programs is legislated and formal.
Germany			X	The distinction between USTE and ASTE is very clear and articulation very limited. The FHS, once considered part of ASTE, are now Tier II institutions and part of USTE.
Ireland		X		Articulation between certificate, diploma, and degree programs of Technical Institutes is facilitated.
Korea			X	Although about 20 percent of college students transfer to universities or among colleges, articulations are not regulated and no policies are in place to facilitate system flexibility.
Mexico		X		National and state higher education networks (i.e., those that facilitate academic collaboration and exchange across academic bodies and institutions) are starting to implement student mobility via mechanisms for transferring credits among institutions that offer complementary and comparable quality education.
Norway		X		The two sectors both offer degree-level programs. Articulation between the degrees awarded by state colleges and university graduate programs is conditional.
Spain			X	Legislation is being introduced that allows students with ASTE qualifications to use online courses to become qualified for transition to universities.
United Kingdom			X	Articulation between FE colleges and institutions in Tiers I and II is conditional and program specific.
United States	X	X		Articulation arrangements between community colleges and universities vary among states.

Source: OECD (2006a); Grubb et al. (2006); SEP (2006).

In countries where no systemic articulation between the two sectors is governed by legislation, or where no agreed principles exist, students are at the mercy of USTE institutions, which unilaterally decide whether or not a given student will be accepted into a degree program and how many credits will be awarded for the qualifications he or she has acquired in an ASTE institution. In Spain legislation is underway regarding the “Formación Profesional Especifica de Grado Superior” (Professional Tertiary Education), which will create bridging programs that allow students with professional experience to take exams to receive the qualification of “Tecnico Superior” (Qualified Technician Diploma). The same law will also provide for the use of online courses to qualify ASTE students for university entry.

University status and the search for identity

Articulation between ASTE institutions and universities is often influenced by competition for status among ASTE institutions. In some countries, ASTE institutions clearly aspire to become universities and spend a great deal of energy and resources trying to achieve this goal. At the same time, universities spend a great deal of political energy trying to prevent ASTE institutions from taking over their “turf.” In Norway, for example, three or four of the state colleges aspire to become full universities with the authority to award master’s degrees; they accordingly call themselves “university colleges.” In Germany the Fachhochschulen have gained university status by seeking parity with universities in everything they do: in the salaries and civil service grade of faculty, assigned teaching hours, and the conduct of research and scholarly work. They have also been given the right to translate their title as Universities of Applied Science in English. In the Netherlands, the Hoger Beroeps Onderwijs (HBOs) have been awarded the status of “Occupational Universities.” In France the institutes *universitaires de technologie* (IUTs), have now been awarded the right to offer three-year vocational degrees under the auspices of the Bologna process, which involves restructuring all European higher education programs into three cycles similar in spirit to the Anglo-Saxon model of Bachelor’s, Master’s, and Ph.D. cycles.

As noted, these efforts of ASTE institutions have generated opposition from universities. In Finland universities are currently resisting the role of the polytechnic institutes in research, as well as their proposal that students who receive a degree at a such an institution be allowed to continue in a master’s program at the same institution. In England the distinction between *further* education and *higher* education is a rigid divide. In Australia TAFE colleges are firmly

entrenched in the Vocational Education and Training (VET) sector, which is governed by different funding and governance mechanisms than universities that are part of the higher (tertiary) education sector.

The effort by some ASTE institutions to become universities negates the whole purpose of creating a differentiated tertiary sector in the first place. Policy makers who want differentiated sectors may have to resort to incentives and rewards, as well as governance mechanisms and regulations, to stem the tide of ASTE institutions seeking to become universities. Many ASTE institutions soon realize that the battle cannot be won and start looking elsewhere in pursuit of status. A clear alternative is to develop into distinctive, more flexible local or regional institutions that are: (i) more responsive to local labor market conditions; (ii) better at providing a wide range of programs, including lifelong learning, training for employers, and adult education, as well as conventional pre-employment preparation; (iii) better at technology transfer; (iv) better at providing public service to local employers and governments; and (v) better able to participate in local economic development. This approach is characteristic of the French IUTs, the English FEs, and many community colleges in the United States and Canada.

Equity

Equity in the treatment of the two sectors, especially in the provision of financial support for students, is major challenge for policy makers. As outlined earlier, the alternative sector of tertiary education attracts students from more modest social origins who are typically older and often have to work to afford the cost of attendance. Governments in most OECD countries have attempted to create a level playing field by ensuring that students in the emerging alternative sector have access to the same range and level of financial aid and scholarships that are traditionally available to their counterparts in the university sector.

In the United States and Canada, the two sectors differ with respect to the levels, policies, and procedures governing financial aid and scholarships, but the differences are minor and can be attributed to different institutional cultures and the nature and duration of their respective academic programs. The same situation prevails in the United Kingdom, Ireland, and Scotland. In France, the IUTs are university institutions and their students receive very comparable levels of financial support and scholarships.

Despite the availability of financial support, student perceptions of cost can still discourage people from attending an ASTE institution. Research in the United States suggests that low-income high school students may opt out of enrolling in a community college because they believe tertiary education is more than they or their parents can afford, yet federal and certain state agencies indicate that available student aid goes unused every year (see box 3). In response to these misconceptions, as well as to shifts in the types of financial aid available, a variety of programs, such as the privately funded “Twenty-first Century Scholars” initiative in Indiana, have been created to provide what has come to be known as “early commitment aid.”

Box 3 Equity in Financial Aid Policies in the State of Texas

In *Closing the Gaps*, the Texas Higher Education Coordinating Board (THECB) makes it very clear that the state’s intent is to focus on enrolling larger numbers of students, especially minorities, into higher education in Texas by 2015. The University of Texas at Austin undertook a research initiative in 2006 to assess the factors that could support this goal. The two-year community colleges of Texas will understandably have to play a major role in this expansion since a significant number of targeted students will come from low-income and working-class families.

The study analyzed financial aid awards and/or packages, together with the financial aid policies, practices, and procedures of 55 of the 100 Texan public institutions of higher education in order to better understand the relationships between them. It then compared data from Texas public two- and four-year institutions to data from a subset of “model” institutions in an effort to understand how financial aid was awarded to students. Generally, the process of awarding and/or packaging financial aid for Texas students involved matching student applicant data with specific program eligibility requirements. Typically, student applicants provided data to financial aid administrators at institutions of higher education. These administrators processed the data, matched student data to program requirements, and awarded and/or packaged financial aid for individual students.

The findings of the study demonstrated that although differences existed in patterns of awards and policies, practices, and procedures in Texan public institutions of higher education, these differences were not extreme. It was posited in the research that: (i) financial aid awarded to or packaged for students of public institutions had specific patterns; and (ii) this pattern varied by institutional type. These theories were evidenced through examination of award data. Indeed, two-year community colleges typically awarded more grants and scholarships, made a greater proportion of awards to minority students, and gave a greater proportion of awards to minority females. Four-year colleges and universities, on the other hand, typically awarded more educational loans and made a greater proportion of awards to white females.

Source: Byrne (2006).

Quality Assurance and Accreditation

Quality Assurance

Although circumstances vary among countries, several broad trends are prompting governmental interest in using policy mechanisms to ensure quality and accountability in tertiary education.

Particularly significant has been the trend toward mass tertiary education. The rapid increase in participation rates at this level of education has resulted in a greater diversity of educational offerings, which is reflected in the development of ASTE programs, the introduction of different types of institutions, different lengths of programs of study, and diverse modes of instructional delivery. As noted earlier, tertiary institutions of all types are becoming larger and more specialized and are also adopting more diverse roles, often seeking to serve the needs of business and industry or to strengthen their contributions to local, regional, or economic national needs.

Traditional, often informal, procedures for educational quality assurance that were deemed suitable for only a few institutions of higher education with relatively small enrolments are now seen as insufficient for a more diverse, larger tertiary education system. The shift to formal systems of quality assurance, evident across many countries and regions, has been one of the most significant trends in tertiary education over the last two decades. Today, many countries have organizations or agencies responsible for conducting quality assurance reviews of academic institutions, a shift that has been accompanied by the emergence of international networks, journals, conferences, and newsletters that address issues related to educational quality assurance.

Academics seem to have conceded that the dual pressures of mass tertiary education and financial constraints have made externally validated methods of quality control an essential component of tertiary education. Although the policy debate continues, some consensus has emerged, especially with respect to the core elements of the type of quality assurance appropriate for tertiary education. Quality assurance (QA) structures for ASTE today share the following core elements: (i) responsibility for QA must reside with semi-autonomous agencies; (ii) quality standards and expectations must be clear, transparent, and explicit; (iii) the process must include both a self-assessment by the institution or academic unit assessed and an external review by visiting experts, (v) the process must include written recommendation and public reporting, and (vi) the criteria must use balanced input, process, and output metrics (El-Khawas, DePietro-Jurand, and Holm-Nielsen 1998).

Almost all OECD countries have some type of quality assurance body responsible for ASTE institutions. Ireland and Sweden are the only two OECD members that use foreign experts in their respective quality assurance agencies. In many cases, a national quality assurance agency subjects both private and public institutions to the same quality assurance review. In Spain, for

example, tertiary educational quality is the purvey of the Inspectorate of the Ministry of Education.

Accreditation

The present concept of accreditation in tertiary education serves to assure and develop quality.² The multistep process includes self-evaluation and documentation (submitted by the unit undergoing accreditation); external assessment by independent experts; and, finally, an accreditation decision based on internationally accepted quality standards. The process can focus on institutions, constituent units, or study programs in order to: (i) ensure or facilitate recognition of “credits” and academic awards to facilitate the transfer of credits among institutions or sectors; (ii) inform current and prospective students about the value of certain academic programs (this functions as a type of consumer protection); (iii) allow employers to check the value and status of graduate qualifications; and (iv) give institutions of tertiary education the opportunity to demonstrate appropriate allocation and use of public funds. Accreditation procedures contribute to the continued quality development of an accredited academic unit. Institutions receive advice about quality improvement throughout the accreditation process, which may extend beyond the “yes/no” decision itself.

National Qualification Framework

A National Qualification Framework (NQF), which has been adopted in slightly different form by Scotland, Ireland, and Australia (see OECD 2003), is intended to provide a comprehensive, consistent framework for all qualifications offered by post-compulsory education and training programs in a given country. The framework aims to encourage lifelong learning by providing individuals with a road map through the different levels of education and training, improving their access to qualifications, clearly defining avenues of achievement, and promoting national and international recognition of qualifications offered in the country. An NQF is usually explicitly committed to flexible, transparent, and systematic learning pathways; removing boundaries between education sectors; encouraging parity of esteem between academic

² The European Consortium for Accreditation (ECA) defines accreditation as “a formal and independent decision, indicating that an institution of higher education and/or programs offered meet certain standards.”
www.eaconsortium.net/index (May, 2006)

and vocational qualifications; promoting cross-sectoral partnerships; and supporting national policies on quality assurance, articulation, and credit transfer.

To achieve these goals, frameworks use a variety of mechanisms. The Australian Qualification Framework (AQF), for example, uses such mechanisms as: (i) secondary-school vocational courses that earn students industry-based units of learning, which can be applied toward two different types of academic awards (the Senior Certificate of Education and Certificates I–IV); (ii) efficient articulation and credit transfer arrangements between registered training organizations (RTOs) and universities that facilitate maximum credit transfer; and (iii) credits for prior learning based on assessment of an individual’s knowledge and skills.

III. National Models and Case Studies of ASTE Institutions in OECD Countries

The U.S. Community College System

The community college system in the United States traces its roots to the early twentieth century, when vocational education reform activists campaigned for the establishment of shorter alternatives to the four-year university and liberal arts college model. Since their emergence on the tertiary education scene, community colleges have been alternately lauded as truly democratic institutions for providing access to tertiary education to previously underserved groups and attacked for accentuating, rather than reducing, the prevailing patterns of social and class inequity by dampening the educational aspirations of students.

Among the stakeholders that supported the creation of community colleges were industry associations in need of skilled personnel, school boards in need of teacher training institutions, and universities and four-year colleges, which felt that the junior colleges and, later, community colleges, could provide the first two years of a university program more cost effectively and thus free them to pursue scholarship and research. Until the early 1970s, community colleges were referred to as junior colleges and the term is still used in some states. At present, however, the term “junior college” refers mostly to private two-year institutions, whereas “community college” refers to publicly funded institutions. In some states, rural community colleges are referred to as county colleges, and in urban centers they are often referred to as city colleges.

Organization and geographic distribution of colleges

At present there are over 1,500 junior and community colleges in the United States that have a combined enrolment of more than 6 million full-time equivalent students (see table 9). Overall, graduates from public community colleges constitute 46 percent of all U.S. college graduates.

Many of the early colleges were extensions of high schools. They were very small (less than 200 students), focused on liberal arts education, and lacked a defining identity. The onset of the Great Depression in the late 1920s and early 1930s, together with the attendant rise in unemployment, forced these colleges to shift their purpose to develop “paraprofessionals” for the workforce. This aim continued to hold until the onset of World War II, when the colleges came

to be seen as socially desirable and cost-effective institutions for preparing the workforce to meet the needs of American industry. This shift in focus was also accompanied by a separation of junior colleges from high schools and their development of a separate identity as alternative tertiary institutions. See figure 9 for a schematic diagram of the U.S. education system that shows the position of the community colleges.

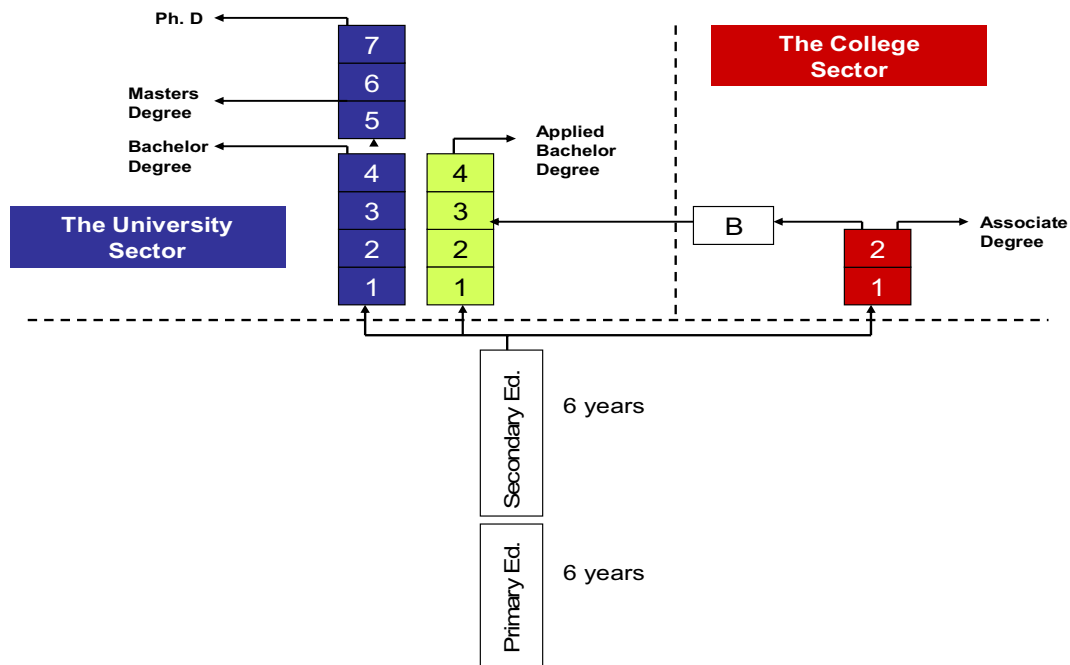
Table 9. Distribution of community and junior colleges in the United States, 2007

<i>Region</i>	<i>Number of colleges</i>	<i>Full-time equivalent enrolment (millions)</i>
Eastern Seaboard	332	1.058
West & South West	398	2.551
South & South East	385	1.258
Mid-West	388	1.431
Other	23	39,340
Total	1,526^a	6.338

Source: Web sites of the AACC (www.aacc.nche.edu) and AAJC (www.aajc.nche.edu), accessed June 2006.

Note: ^a Includes branch campuses. Without branch campuses, the total number of community colleges is 1,202.

Figure 9. The U.S. education system



Source: Mikhail (2006).

After the war, several factors contributed to an unprecedented expansion of the college sector: the introduction of the G.I. Bill for returning veterans, the need for skilled workers in the expanding economy, and a growing social need for adult and community education. The 1947 Truman Commission, which supported the development of a nationwide community college network that would provide tertiary education to diverse groups, was a major milestone in the development of the ASTE sector. Community and junior colleges have continued their rapid expansion over the past four decades, cementing their identity and role in the U.S. tertiary education system. The U.S. community college model has, in fact, been adopted by many countries, including Canada, Japan, Korea, and others, in an effort to reform and expand tertiary education.

Autonomy and accountability

Governance in American community colleges varies by state, with the most common variations being state vs. local, elected vs. appointed, state appointed vs. locally appointed, taxing authority vs. no taxing authority, voluntary shared governance vs. mandated shared governance,³ and various combinations thereof (Scheutz 1999). Most community colleges are governed either as special community college districts or divisions of a state university. In the special district models, a college is governed by a Board of Trustees that includes both appointed and elected members of the local community and is subject to limited control by the relevant district. In the university model, Boards of Trustees select and appoint the college president as chief operating officer of the community colleges.

The performance and accountability of community colleges are monitored through the use of instruments such as the Community College Survey of Student Engagement (CCSSE), which surveys hundreds of institutions annually. (Measures of student engagement serve as a proxy for the value and quality of undergraduate experience.) The CCSSE, the results of which are publicly reported, provides community colleges with readily usable data both to improve student engagement and create benchmarks against which similar institutions can compare themselves. With surveys from several million students, these instruments provide a comprehensive picture

³ The California community college system is an example of a shared governance system.

of student learning at two-year institutions, giving institutions and external stakeholders the information needed to improve institutional performance and strategic planning.

The National Forum on College-level Learning, an organization sponsored by the Pew Charitable Trust, has organized a campaign to measure what college-educated people know and can do across states. First piloted in 2002 in Illinois, Kentucky, Nevada, Oklahoma, and South Carolina, the study now collects data on student learning in more than 15 participating states using multiple assessment instruments, such as the National Adult Literacy Survey and the College Learning Assessment. Results from these assessments provide comparable information at the state level on how community colleges contribute to student learning. They also identify such challenges as performance gaps and inconsistent teacher preparation, together with best practices and useful information on how to create policies and programs that improve the intellectual capital of a state.

Funding

According to the American Association of Community Colleges (2007), public community colleges in the United States receive the majority (38 percent) of their revenue from state grants. The remainder of their revenue comes from tuition and fees (20 percent), local funds (19 percent), federal funds (7 percent), and other sources (16 percent). In 26 states, community college systems depend on local funds, usually property taxes. The remaining systems receive the bulk of their fiscal support through annual or biennial state legislative appropriations, although all state systems are funded in part by some level of state appropriation.

There are two methods for allocating funding to community colleges: (i) a legislated funding formula, used in 29 states, and (ii) legislative hearings and/or deliberations based on board recommendations, used in 15 states. Funding formulas are used either to determine either the total amount of funds to be allocated or how the funds will be distributed. Some states use a combination of both. The majority of states that use the allocation mechanism also use an enrolment-based funding formula. In many states, funding systems are being redesigned to include performance-based criteria. Overall, 27 states require community colleges to report on specific performance indicators, and in 10 states, these indicators are directly linked to budget allocations (see CCCP 2005).

Access and equity

Several recent national studies confirmed that high school graduates were inadequately prepared for either community college or university work. These studies pointed out that close to 25 percent of all students in public high schools do not graduate—a proportion that rises among low-income, rural, and minority students, who are often potential candidates for enrolment in community colleges. The educational achievement levels of young people that do complete high school are often not high enough to allow them to succeed in tertiary education. According to the National Assessment of Educational Progress (NAEP), only 17 percent of seniors are considered proficient in mathematics and 36 percent, in reading (Phillipe and Gonzalez Sullivan 2005). Access and achievement gaps disproportionately affect low-income and minority students, who face the greatest academic and financial challenges in gaining access to community colleges. Regardless of age, most students at these colleges will work close to full-time while they are in a program of study and attend a college close to home. Despite years of student aid programs, family income and the quality of high school education remain major constraints to access and success.

Access problems also affect adult students. More and more adults are looking for ways to upgrade and expand their skills in an effort to improve or protect their economic position. Nearly 40 percent of today's community college students are self-supporting adults aged 24 and older; almost half attend school part-time; more than one-third work full-time; and 27 percent have families and children. In 2005, more than 4.5 million adults aged 25 years and older were participating in community college programs. Enrolment in U.S. community colleges has been growing significantly, in part because they provide a place for many disadvantaged students to begin tertiary education. Of note, 49 percent of students who received a baccalaureate in 1999–2000 attended a community college at some point in their tertiary education. Furthermore, in spite of demographic differences between the students of community colleges and other tertiary education institutions, both groups appear to have similar work opportunities, educational aspirations, and financial challenges after completing a baccalaureate (McPhee 2006).

Students

Students enrolled in community college programs comprise nearly 60 percent of all post-secondary enrolments. Over half of all community college students and nearly 30 percent of all

post-secondary undergraduates are enrolled in *occupational* programs. Only 15 percent of post-secondary students become traditional college students enrolled in a baccalaureate institution with a major in the liberal arts, whether the humanities, mathematics, science, or the social sciences. More than three-quarters (78 percent) of community college students attend public two-year institutions, and nearly nine out of ten (89 percent) attend some public institution of higher education. The remainder attend private for-profit and not-for-profit institutions. While occupational students are more likely to attend private post-secondary schools compared to their non-occupational peers, over 82 percent are nevertheless educated at public institutions (Bailey et al. 2003).

There are significant differences between community college and baccalaureate students. First, community college students are slightly more likely to be female (57 versus 55 percent), more likely to be from a minority population (35 versus 29 percent), and much more likely to be older (52 versus 29 percent are aged 24 years or older) than are baccalaureate students. Second, according to measures such as household income, parent education, and parent marital status, community college students are socioeconomically disadvantaged relative to baccalaureate students. Third, community college students are much less likely than baccalaureate students to have taken a rigorous academic curriculum in high school (16 versus 37 percent), more likely to have taken a curriculum that includes a vocational focus (15 versus 4 percent), and less likely to be in the top academic quartile of their high school class. Finally, community college students are more likely to have non-traditional enrolment and attendance patterns in tertiary education—a larger proportion of these students than baccalaureate students delay their initial postsecondary enrolment by at least a year after completing high and a much smaller proportion (26 vs. 62 percent) attend college on a full-time academic year basis (Bailey et al. 2003).

Academic programs

The fields of study with the largest percentage of community college occupational students are business and office management (27 percent), health (26 percent), computer and data processing (17 percent), trade and industry (10 percent), and engineering and technologies (7 percent). The two main credential awards pursued by community college students are associate degrees and certificates. Responsible for nearly two-thirds of all community college graduates, associate degree programs are by far the most popular among students. In addition, occupational education

students take non-credit courses, usually because they are seeking very specific job skills, preparing to take industry certification exams, or simply desire personal enrichment (Kasper 2002).

Links to employers

The development of any occupational program in community colleges usually requires the sponsoring department or unit to provide evidence of having:

- (i) collected and analyzed relevant, updated market intelligence that shows clear evidence of the potential employability of graduates with the skills and competencies needed with surveyed employers;
- (ii) convened an academic advisory committee of credible representatives from the sector under consideration, which has actively participated in a sufficient number of meetings to vouch for the occupational relevance, knowledge, skills, and competencies that successful graduates would likely acquire from the proposed programs; and
- (iii) ensured that the program has the right balance of general education courses and other elements to provide potential graduates with all relevant work-related interpersonal, soft, and team skills needed in the modern workplace.

Articulation with universities

Throughout the past three decades, “academic alliances” have grown impressively in the United States. These alliances have been pivotal in ensuring quality in tertiary education. Such alliances include technology-sharing partnerships, library consortia, high school and college dual-enrolment opportunities, distance education consortia, and workforce development partnerships. Another type of partnership that has emerged in recent years is referred to as an articulation or transfer partnership, that is, collaboration between one or more community colleges and a bachelor degree-granting institution for the purpose of increasing credit transfers and baccalaureate attainment for all, or a particular subset of, students (Kisker 2005).

Articulation agreements are the most basic form of interinstitutional collaboration in the United States today, not active collaborative partnerships. Formal arrangements that identify different types of transferable credits and the conditions under which they can be transferred, articulation agreements have been widely touted as an essential first step in providing broad access to university programs. However, many scholars argue that, due to significant increases in credit transfers and baccalaureate attainment, educators must move beyond articulation agreements and closely collaborate with complementary institutions. Many states, for example,

tout community college–university partnerships as an example of “best practice” in the promotion of student transfers, perhaps because many transfer partnerships, unlike isolated programs that concentrate on the transfer of a select group of students, seek to modify the organizational structures and practices of both the relevant community college and the university in order to improve the overall transfer process.

A study sponsored by the American Association of Community Colleges (McPhee 2006) found that almost all community college students attempt to transfer credits to a baccalaureate institution and that 98 percent are able to do so to some extent. However, only a little over a half of such students are able to transfer all credits earned at the community college level, given current articulation policies with four-year institutions. Overall, the study suggests that baccalaureate-granting institutions may offer a less-than-seamless process for transferring credits, even when policies are in place that institutionalize the process.

Recently, reverse articulation, or reverse credit transfer, has become a topic of interest in the United States, as it appears that university graduates are having difficulty finding good jobs in some disciplines and are enrolling in community colleges to become more competitive on the job market. A study of the California Postsecondary Education Commission (CPEC 2006) analyzed enrolment data from community colleges against data on degrees awarded from the University of California (UC) and California State University (CSU). The analysis found that recent university graduates, like other state residents, were taking classes at community colleges, but not to qualify for an associate degree. (This goal was being pursued only by 1.5 percent of UC graduates and 1.0 percent of CSU graduates.) Over a quarter of the graduates of UC and CSU who took community college courses of some kind in the three years following graduation took non-credit courses or a very light course load. Among graduates taking courses for credit, nearly 60 percent took six or fewer units in the seven semesters between fall 2001 and winter 2004.

Quality control and accreditation

Institutional accreditation is a voluntary, non-governmental activity administered by eight post-secondary accrediting commissions, which are part of six regional associations that serve community colleges and universities in the United States.⁴ These commissions comply with the

⁴ The six commissions are: the Northwest Association of Schools, Colleges and Universities; the Accrediting Commission for the Community and Junior Colleges in the Western Association of Schools and Colleges; the North

standards set by the Council for Higher Education Accreditation (CHEA). In two regions (Western and New England), the association has a separate commission for community colleges or technical and career institutions. The institutional accreditation process occurs every 5 to 10 years, depending on the time line established by the governing regional accrediting association. The process includes a comprehensive self-study, plus an on-site evaluation by external peer reviewers. The peer review measures the level of an institution's educational quality with respect to its stated purposes, the appropriateness of its fiscal resources, its ability to obtain operating resources, and its commitment to improving educational quality in accordance with regional commission standards (see Faulkner 2002).

The Canadian Community College System

Most community college institutions in the Canadian system were established in the period from the mid-1960s to the mid-1970s. The term "postsecondary" emerged in that decade as the defining label for all educational institutions after secondary school: universities, degree-granting institutions, community colleges, and specialized institutions. The common factors that contributed to the rapid growth of the Canadian college sector in that decade included: (i) explosive growth in the demand for higher education among the 18–24-year-old age cohort, together with concern about the capacity of universities to absorb that growth; (ii) technological change and the need for a new cadre of workers in the Canadian economy, and (iii) the growing importance of "human capital" as a perceived social benefit of investments in tertiary education.

The development of the Canadian community college sector was influenced by developments in the United States, where the ideal of equal opportunity through education led to the establishment of comprehensive public schools and the avoidance of the European model of early student tracking in primary and secondary education. American universities, especially state-supported universities, are thus required to accommodate a heterogeneous student population. The result, in the Canadian view, was that many of these students were academically and emotionally unprepared for the rigors of higher education (Dennison and Gallagher 1986).

Central Association of Colleges and Schools; the Middle States Association of Colleges and Schools; the Southern Association of Colleges and Schools; and the New England Association of Schools and Colleges. A Commission on Technical and Career Institutions exists as a separate body in the Western and New England Regions. (See Web site of the Council for Higher Education Accreditation, Washington, DC, <http://www.chea.org/Directories/index.sp> [Accessed March 2007]).

This situation led to the establishment of American junior and community colleges in the 1920s and 1930s as open access institutions; a model that Canada emulated three decades later.

Organization and distribution of institutions

The institutions broadly known as Canadian community colleges are a diverse group of organizations that include Institutes of Technology and Advanced Learning (ITALs), Colleges of Applied Arts and Technology (CAATs), University Colleges (UCs), and in Québec, the *Collèges d'enseignement général et professionnel* (CEGEP). Education in Canada, including tertiary education, is under provincial or territorial jurisdiction—no formal federal government agency governs the affairs of the country’s community colleges. However, the Association of Community Colleges of Canada (ACCC) represents the interests of the colleges nationally and internationally.

Canadian colleges are found in all ten provinces and three territories and are geographically distributed to ensure the availability of higher education to rural and remote communities. In 2005, there were approximately 178 such institutions in Canada, as presented in table 10.

Table 10. Distribution of public community colleges and universities in Canada, 2005

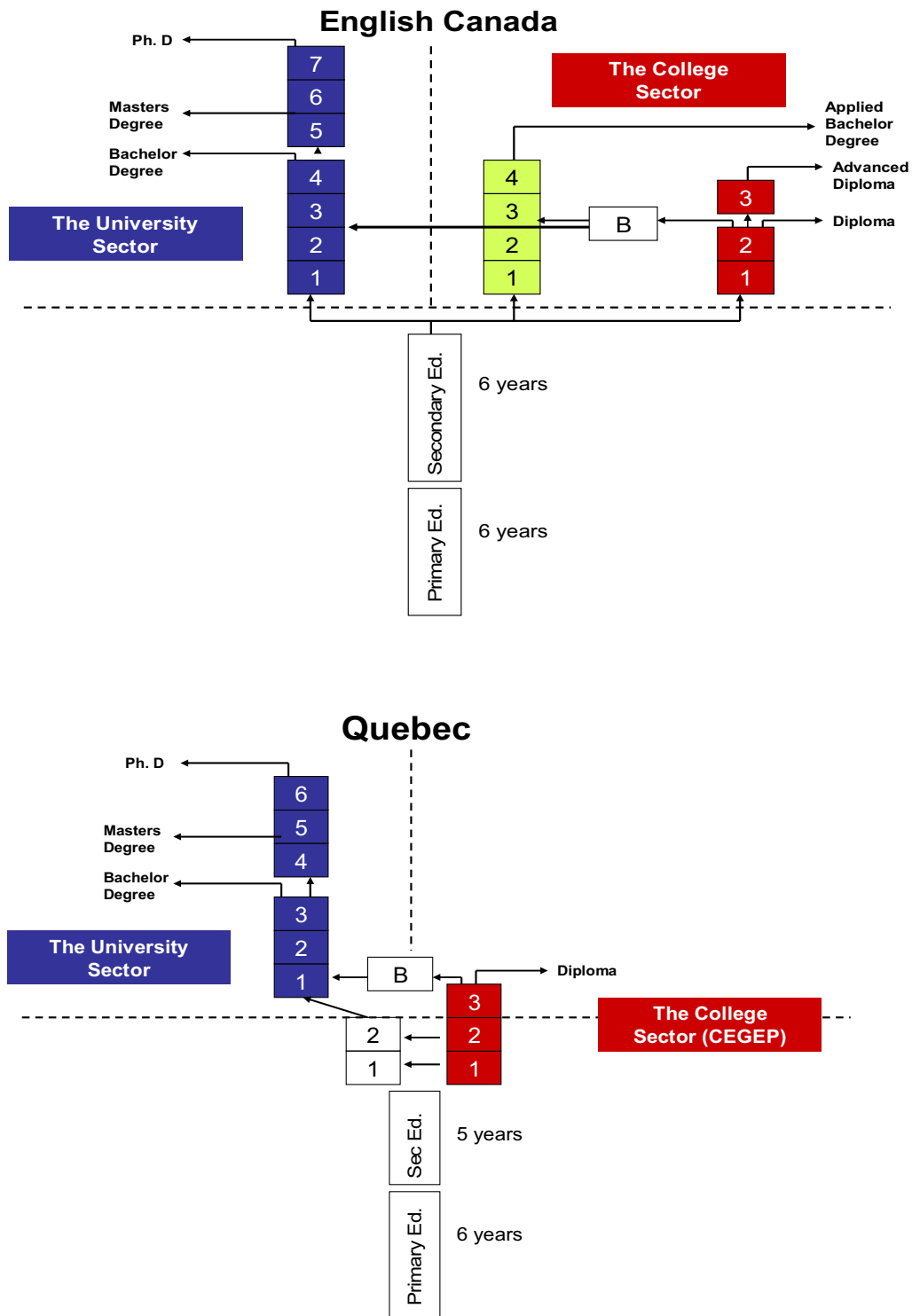
<i>Province or territory</i>	<i>Number of institutions</i>	
	<i>Universities</i>	<i>Colleges</i>
Newfoundland ^a	1	18
Prince Edward Island ^a	1	4
Nova Scotia ^a	10	14
New Brunswick ^a	4	8
Quebec	19	56
Ontario	21	25
Manitoba	4	6
Saskatchewan	6	10
Alberta	6	16
British Columbia	10	18
Yukon	-	1
North West Territories	-	1
Nunavut	-	1
Total	82	178

Source: ACCC (www.accc.ca). (Accessed June 2007).

Note: ^a Multicampus, province-wide college system.

The organization of the system of higher education in both English and French Canada is shown in figure 10. Québec's CEGEPs were established as collegiate academies positioned between secondary school and university. They offer two streams of programs: a pre-university academic stream of grades 12 and 13, leading to university admission; and two- and three-year vocational and technical programs leading to employment. Most community colleges in Canada are comprehensive institutions that offer programs in a wide range of academic and occupational disciplines, including engineering technology, business management, health sciences, community services, applied arts, and communications.

Figure 10. Canadian education system



Source: Mikhail (2006). Reprinted with permission.

Autonomy and accountability

All Canadian colleges operate under provincial legislation. Their governance was initially intended to be a balance between autonomy and responsibility to the respective provincial government (Campbell 1971). When necessary, the provinces have introduced reforms to provide the colleges with autonomy similar to that enjoyed by universities. In such cases, government intervention is generally limited to funding, fee structures, and the introduction of new programs. In most colleges, however, government involvement can extend to admissions policies, program approval, curricula, institutional planning, and working conditions.⁵

Most colleges have Boards of Governors that are appointed by the provincial or territorial government, with representation by the public, student body, and faculty. Programs are planned with input from business, industry, and labor representatives on college advisory committees. The Board elects a chair who is accountable to the government for the effective management of the college. The president reports regularly to the Board on the affairs of the college. Colleges are accountable to their corresponding provincial ministry for tertiary education. A recent trend towards implementing performance-based funding to enhance accountability in the system has been observed.

Funding

Public funding for Canadian community colleges comes from federal and provincial sources. At the federal level, nominal transfer payments for tertiary education are overseen by the Department of Finance. Other federal transfers include student loans (overseen by the Department of Human Resources and Skills Development, or HRSD), support for official languages in education (overseen by the Department of Canadian Heritage), and academic exchanges (overseen by the Department of Foreign Affairs and International Trade, or DFAIT). Overall, public postsecondary education institutions in Canada derive most of their direct public funding (65 percent) from provincial and/or territorial sources, with the balance obtained from

⁵ The Web site of Council of Ministers of Education (CMEC) of Canada (www.cmec.ca) includes links to the Web sites of the provincial and territorial ministries and departments responsible for education: <http://www.cmec.ca/2006/indexe.stm> (accessed June 2006).

tuition fees, research grants, contracts with business and industry, government research contracts, donations, and investment income.

The level of public funding for tertiary education varies among provinces and is affected by equalization payments that the federal government transfers to poorer provinces. Student loans are made available by provincial governments to all eligible students and repaid by students upon graduation and employment. Part of public funding is tied to individual college performance, which is assessed through the use of key performance indicators, which include student satisfaction, graduate satisfaction, employer satisfaction, graduation rate, and graduate employment rate (Statistics Canada 2007, FAIT 2002).

Access and equity

The Canadian college system is similar to that of the United States in terms of access, although admission standards are less selective and the colleges are more accessible to an academically diverse student population. The student population consists of high school graduates who meet the minimum entrance requirement of their chosen programs; mature students (19 years and older) who do not academically meet all requirements, but can still access chosen programs through placement tests in mathematics, language, and foundation subjects; and students who have completed, or partially completed, a university program and want an opportunity to study in a more career-oriented program. The first group represents approximately 40 percent of first-year entrants, with the latter two groups making up the remaining 60 percent.

Students

Students admitted to community colleges in Canada come mostly from the geographic coverage area of the respective college. Students tend to be diverse in age, academic background, aptitudes, abilities, and goals—reflecting the make-up of the communities that each college serves. Colleges in urban centers, such as Toronto, Montreal, and Vancouver, for example, have a very varied student population, both ethnically and socioeconomically. Colleges in rural and remote areas, however, reflect the more homogeneous nature of their surrounding populations.

Academic programs and curricula

Most colleges offer a wide range of programs that cater to the diverse needs of their students. The common elements of a typical college program include career-oriented programs of two to

three years in duration, apprenticeship training or dual apprenticeship-diploma programs for occupations and trades, and university transfer programs (which vary by province). Career programs generally lead to college diplomas and advanced diplomas in designated disciplines. Graduates of these programs find employment in technical, mid-management, and paraprofessional occupations in business, industry, and the public sector. Pre-college programs are also available to upgrade the knowledge and skills of adult students who did not successfully complete a secondary school education. In addition, most colleges offer a broad range of continuing education programs to upgrade the skills of workers, and a number also provide contract training for local enterprises and industry.

In Québec, university preparation is an integral part of the mandate of the CEGEPs and the transfer of their credits to universities is mandated by law. In British Columbia and Alberta, college-university agreements are also mandated by the provincial governments to facilitate student mobility from colleges to universities. Such agreements can also be found in Ontario and the Atlantic provinces, but the government does not enforce or arbitrate their implementation.

The curriculum design of a typical community college is usually informed by three standards: (i) broad program standards defined by the provincial ministry responsible for tertiary education; (ii) program-specific standards identified by the relevant Program Advisory Committee that provides guidance on sector trends and emerging skills requirements; and (iii) accreditation standards required by relevant accrediting bodies. Curricula are application-oriented and involve a balance between theory and practice, with a focus on state-of-the-art application of knowledge and practice in the discipline. Programs are periodically reviewed to maintain the relevance of their curricula standards.

Articulation with universities

The first type of articulation between Canadian colleges and universities is systemic articulation, in which graduates of a college program are guaranteed access to their university program of choice, provided that their academic record meets program requirements. This type of arrangement is found in Québec and, to a lesser extent, Alberta and British Columbia. A second, conditional type of articulation is the most prevalent form of articulation among ASTE and USTE institutions in Canada and involves degree completion arrangements in targeted disciplines. The third type of articulation is represented by joint programs in both institutions in

which students are co-registered and receive two academic awards upon completion of their studies. The fourth type of articulation, which is very important for the colleges, is reverse articulation, in which university graduates or partial graduates are granted advanced standing in a related college program.

Quality assurance and accreditation

There is no pan-Canadian entity for quality assurance or accreditation in tertiary education, although there are several national associations that support best practices in this sphere.⁶ The Association of Canadian Community Colleges (ACCC), for example, supports maintenance of high-quality programming in colleges, but is not an accreditation body. The ACCC requires its members to deliver postsecondary programs that meet the academic standards for diploma and certificate qualifications established by the relevant jurisdictional authority, as well as to operate as an integral part of educational activities of a provincial or territorial government. Its members are funded primarily by such governments. The Association of Accrediting Agencies of Canada (AAAC), on the other hand, is a national organization of professional associations involved in promoting good practices in the accreditation of educational programs.

Some provinces have quality assurance agencies that operate at arm's-length from the local government and certain professions and regulated fields have national accrediting bodies. Other provinces operate individual standards authorities. In fact, the development of quality assurance bodies by acts of legislation in many provinces has brought about systemic changes which have impacted institutional and program differentiation. For instance, four provinces (Alberta, British Columbia, New Brunswick, and Ontario) have permitted private degree-granting institutions, including for-profit institutions, to develop or operate within their jurisdictions. Another four provinces (Alberta, British Columbia, Ontario, and Prince Edward Island) have enabled local colleges to offer applied-degree programs.

⁶ This section relies on Web site of Council of Ministers of Education (CMEC) of Canada, Toronto, Canada, <http://www.cmec.ca> (accessed June 2006). The CMEC site includes links to the education quality assurance bodies of the provinces and territories.

The Further Education Colleges in England

Prior to the Education Reform Act of 1988, tertiary education provision in the Further Education (FE) Colleges of England was the responsibility of local education authorities, which owned, controlled, and funded these colleges, together with the polytechnic institutes. During the period of the Dearing Inquiry into tertiary education (1988–1997), the education programs of FE colleges were considered ancillary activities. The development of these colleges was, moreover, hindered by the dual arrangements governing their planning, funding, and quality assurance. Following the inquiry and the implementation of the Further and Higher Education Act 1992, a single system for all tertiary education was implemented in England and Wales. Tertiary education programs are presently offered by FE colleges, universities, and other traditional institutions of tertiary education. Of note, many universities were former polytechnic institutes that were originally created by charitable endowment to enable working-class men and women to advance their general knowledge and industrial skills on a part- or full-time basis. Later maintained and regulated by local authorities, the polytechnic institutes gained university status as a result of the 1992 Act. Another relevant legislative framework for higher education in England is the Learning and Skills Act of 2000, which reformed the organizations responsible for managing the FE sector (see EC 2003a).

Organization and regional distribution of colleges

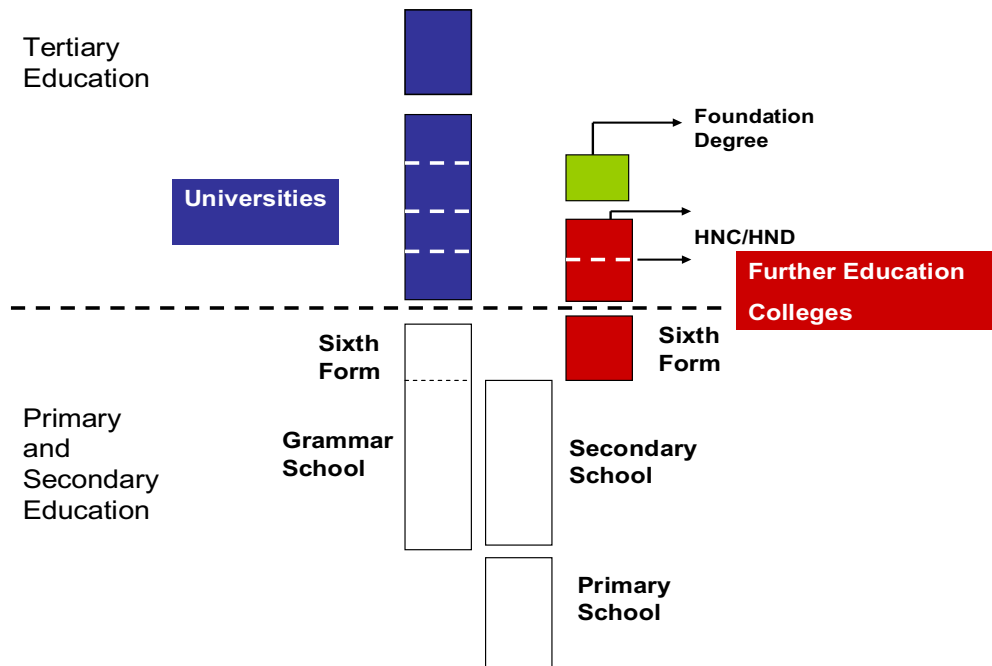
The FE sector in England consists of 260 colleges distributed across the nine English regions, as shown in table 11. Approximately 95,000 students, of which 72,025 were considered FTE, were enrolled in tertiary education level programs in 2005. Figure 11 outlines the organization of the education system in England and Wales as a whole, including the position of the FE colleges within the system.

Table 11. Regional distribution of and enrolment in tertiary education programs in England, 2005

<i>Region</i>	<i>Number of FE colleges</i>	<i>Full-time equivalent student enrolment</i>
East Midland	18	4,850
Eastern	29	9,650
London	26	6,150
North East	13	5,750
North West	34	11,220
South East	42	9,460
South West	26	9,345
West Midland	46	5,725
Yorkshire Humberland	26	9,875
Total	260	72,025

Source: HERO Web site, <http://www.hero.ac.uk> (accessed March 2007).

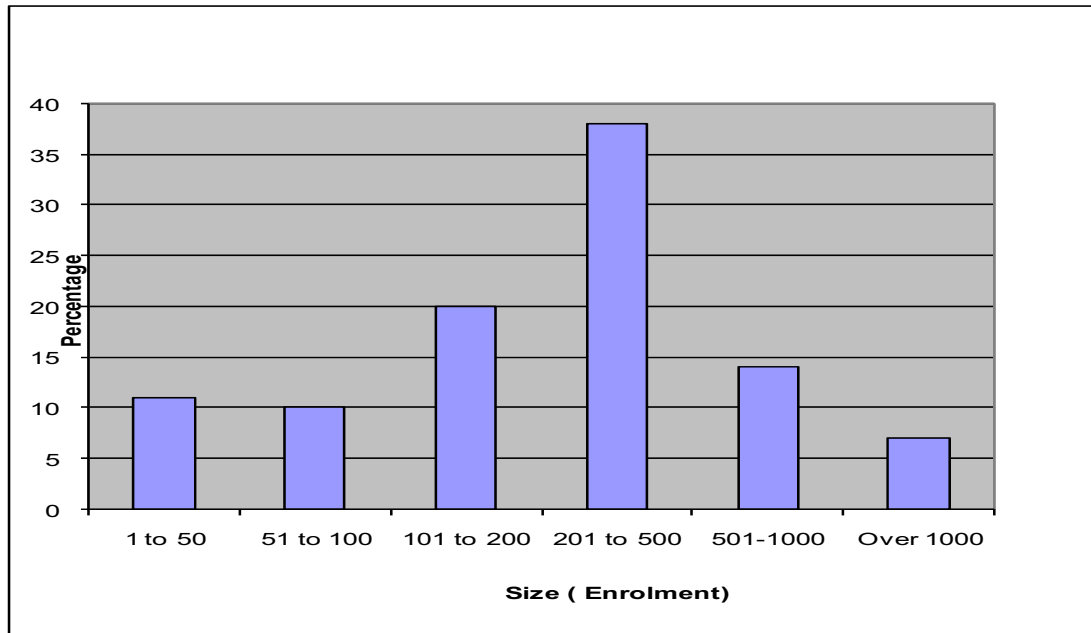
Figure 11. Education system in England and Wales



Source: Mikhail (2006). Reprinted with permission.

Figure 12 outlines the percentage distribution of FE colleges by size in the United Kingdom. (The majority of these colleges are smaller institutions than their counterparts in North America.)

Figure 12. Distribution of FE colleges in England and Wales, by enrolment size



Source: Compiled from data on HERO Web site, <http://www.hero.ac.uk> (accessed March 2007).

Autonomy and accountability

The Further and Higher Education Act of 1992 removed FE institutions from the jurisdiction of local authorities and gave them the autonomy to run their own affairs. A corporation (governing body) is accountable for the management of the college and the proper use of public funds entrusted to it. An FE College has full responsibility for internal organization, including staff employment, and all aspects of educational provision. FE governing bodies consist of 10–20 members, including the principal and a member of the local Learning and Skills Council.⁷ Other members include local business and industry representatives, staff members, students, and parents (EC 2003a).

Funding

The Learning and Skills Council (LSC) for England and the National Council for Education and Training for Wales became responsible for funding further education as a result of the Learning

⁷ The Learning and Skills Council is a statutory public body, the members of which are appointed by the central government. It is responsible for the planning and funding FE institutions.

and Skills Act of 2000. Both bodies are themselves funded centrally: by the Department of Education and Skills in England, and by the Welsh Assembly Government in Wales. The LSC and National Council fund both formal and informal learning in further education, including work-based training.

Funding is provided to institutions in England and Wales using separate formulas, which take into account input measures (i.e., enrolment, supply), structural measures (i.e., location of institutions, level of social deprivation), and output measures (i.e., student achievement). Institutions may receive additional income through a variety of other sources, such as consultancies, research work, and full-cost fees for international students. A number of government-supported training schemes are also largely funded through the local arms of the LSC and National Council.

In Northern Ireland, further education colleges receive their funding directly from the Department for Employment and Learning. A new funding formula that includes performance measures is currently under consideration, and transitional arrangements are currently in force. In terms of tuition, students over the age of 19 may be charged fees in England and Wales. In Northern Ireland, however, fees were abolished for students over 19 enrolled in full-time vocational courses after a Student Support Review was conducted (EC 2003a).

Access and equity

Tertiary education qualifications are awarded by universities and colleges in England and Wales at five levels: the certificate, intermediate, honors, master's, and doctoral levels. The intermediate level includes ordinary (non-honors) degrees, the foundation degree, diplomas of higher education (i.e., the Higher National Diplomas and Higher National Certificates), and other higher diplomas. Overall, the participation rate in FE colleges is between 40–45 percent of total enrolment in tertiary education, with approximately 17 percent of students enrolled in sub-degree occupational programs. The distribution of student enrolment by the type of academic award is outlined in table 12.

Table 12. Distribution of tertiary education enrolment by type of academic award, England and Wales, 2005

<i>Type of academic award</i>	<i>Full-time enrolment</i>	<i>Part-time enrolment</i>
Degree	14,500	4,200
Foundation degree	15,200	6,100
HNC/HND	15,700	19,200
Other	2,800	17,300
Total	48,200	46,800

Source: HERO Web site, <http://www.hero.ac.uk> (accessed March 2007).

Widening participation in tertiary education (including in FE colleges) is a key goal of current policy in England: the government has set a target of half the population entering tertiary education by the time they reach the age of 20. A proposed Office for Fair Access (OFFA) is slated to manage strategies for widening the participation of underrepresented groups.

FE students

FE students are admitted on the basis of a school-leaving certificate from a general and/or vocational secondary education institution, or for mature students, on the basis of a learning assessment and age requirement. A large majority of students (63 percent) in subdegree higher education programs in England and Wales are female, most also take courses on a part-time basis. The finding on part-time study might be explained by the fact that the majority of students in short-cycle tertiary education programs come from either lower-class or lower-middle class social backgrounds and have to work to support their further education. Although no precise figures are available, the teachers in these programs likely have a mix of bachelor's and master's degree qualifications.

Academic program characteristics

While the nature of tertiary education programs in FE colleges is “multidimensional” and differs among individual colleges, a number of distinctive features can be identified (Parry and Thompson 2004):

- **Vocational emphasis and close links to the work world.** FE colleges account for a significant proportion of all vocational sub-degrees awarded in tertiary education in England. Most students are registered in programs in such areas as business management, engineering technology, and art and design.

- **Regional and local availability broadens access.** FE colleges are well placed to serve geographically dispersed and educationally marginalized populations of students; they thus play a key role in widening access to tertiary education, especially for mature, part-time students.
- **Adult and lifelong learning.** FE colleges provide a seamless transition from secondary to tertiary education for mature adults, offering knowledge and expertise in the provision of adult education and lifelong learning.
- **Specialized focus.** FE colleges often provide unique, specialized programs in response to the needs of local employers.

Links to employers

Subdegree, short-cycle programs are organized by individual institutions in cooperation with industry and professional organizations. New industry-based Foundation Degree programs have been introduced in England and Wales, as well as the rest of the United Kingdom. In addition to traditional Higher National Certificates and Diplomas (HNCs and HNDs), other subdegree programs continue to be offered by FE colleges, which are continually developing programs in new fields. These programs consist of a combination of practice and theory and sometimes include work placement; their objective is either further professional specialization or preparation for degree studies.

Quality assurance and accreditation

Under the Learning and Skills Act of 2000, the Office for Standards in Education (OFSTED) assumed responsibility for quality inspection of institutions that provide further education for 16–19-year-olds in England. A new independent inspection body, the Adult Learning Inspectorate (ALI), assumed the same responsibility for institutions that serve students aged 19 years and over, as well as for work-based training programs for all ages provided by all types of publicly funded institutions. In cases where an institution falls within the remit of both bodies, the Act calls for a single common inspection framework to be drawn up and agreed by them for joint inspection. The two inspectorates report on the quality of education, training standards achieved by students, and efficient use of resources. In Northern Ireland, the Education and Training Inspectorate (a branch of the Department of Education) assesses the vocational education and training of young people and adults in grant-aided training organizations. This body reports its findings to the Learning and Skills Advisory Board of the Department for Employment and Learning (EC 2003a).

Private institutions are subject to the same quality assurance as public institutions except in Northern Ireland, where there are no private education providers. Most private further education institutions are accredited by the British Accreditation Council for Independent Further and Higher Education. Accreditation of alternative subdegree programs in the United Kingdom can also be awarded by either a national or international accreditation agency, or by a foreign Higher Education Institution (HEI). Many programs are also accredited by universities and other degree-awarding HEIs.

France: Instituts Universitaires de Technologie

France has emphasized short-term vocational education at the secondary level, where only one-third of all students earn the general *Baccalaureat* (level 3A) qualification, while the remainder earn either level 3B or 3C qualifications (i.e., technological or vocational education). In tertiary education, however, the number of students earning level 5B qualification is practically the same as the number earning level 5A qualifications. This almost 50-50 split between level 5A and level 5B is unique in Europe. It should be noted here, however, the *Baccalaureate* is not the qualification granted at the end of secondary studies, but the qualification required for access to tertiary education. Nontertiary postsecondary education (level 4) does not exist in France, which means that any studies beyond the baccalaureate are classified as ISCED level 5.

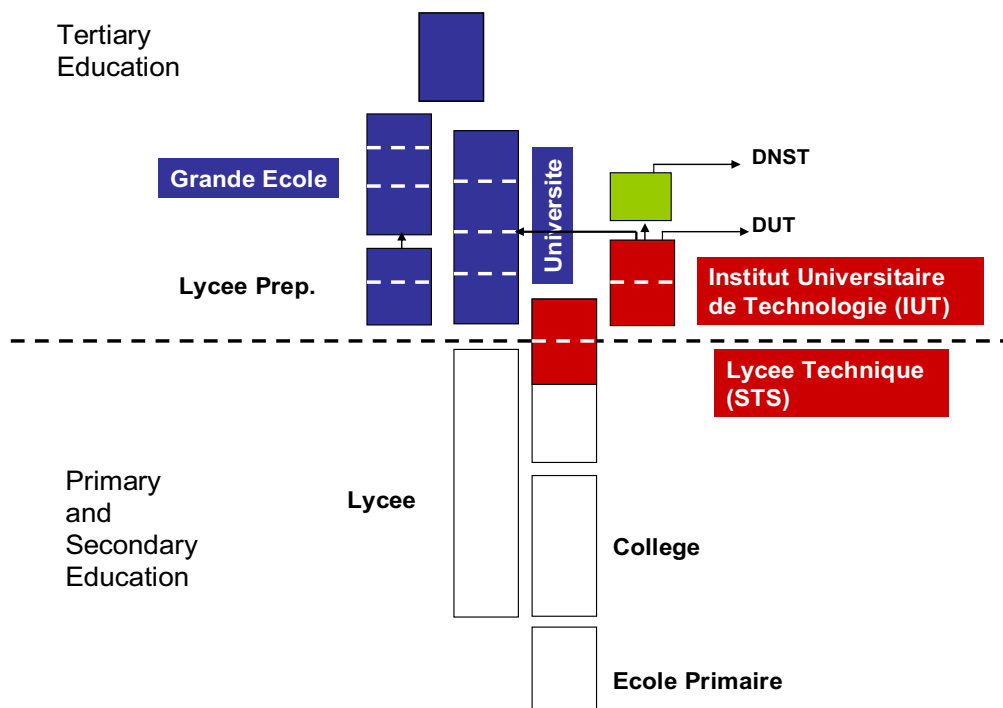
Organization of the sector

Tertiary education in France is organized at the national level, with clear legislation governing tuition fees, entrance requirements (with the exception of private programs not under contract with the state), fields of study, quality assurance, accreditation, transition from subdegree to degree studies, number of students per institution, and type of diploma awarded (EC 2007a). There are three types of institutions at this level, each subject to different legal requirements: universities, professional schools of higher education (*instituts* or *écoles publiques*, as well as *Grandes Écoles*), and private institutions of higher education (see figure 13). Some technical schools in the private sector are also recognized by the state. The system is also divided between institutions offering short (*filières courtes*) and long (*filières longues*) programs.

Among the short programs, a distinction is made between (i) awards given by university institutes of technology, or *Instituts universitaires de technologie* (IUTs), which lead to a

University Diploma of Technology (*Diplôme universitaire de technologie*, or DUT); (ii) the Vocational Degree (*Licence professionnelle*) and the Diploma of Scientific and Technical University Studies (*Diplôme d'études universitaires scientifiques et techniques*, or DEUST) awarded by universities; and (iii) the Specialized Technology Diploma (*Diplôme national de technologie spécialisé*, or DNTS), which is also offered by IUTs. In addition, the higher technician departments of *lycées* (*Sections de techniciens supérieurs*, or STS)—departments of higher technical studies in upper-secondary schools—also offer a higher education technical diploma (*Brevet de technicien supérieur*, or BTS).

Figure 13. Organization of tertiary education in France



Source: Mikhail (2006).

Over 120 IUTs in France offer professionally oriented programs (covering 26 majors) that aim to prepare increasing numbers of graduates to hold staff positions in the corporate world. IUTs mainly accept secondary school graduates with a general or technological *Baccalaureate*; very few holders of the vocational *Baccalaureate* attend the institutes. Their teaching staff includes university- and secondary-level teachers, together with people working in the business world.

Autonomy and accountability

IUTs fall under the remit of the Ministry for Higher Education of France. Since 1968, these institutions have been accorded a degree of pedagogical, scientific, administrative, and financial autonomy. Redefined in 1984 by the "Savary" law, IUTs exercise this autonomy within a framework of (i) national rules and regulations on tertiary education and (ii) contractual policy guidelines in which the state specifies the mandate and responsibilities of IUTs. Within this framework, the state retains essential responsibilities, such as the validation of national diplomas. Yet IUTs have a significant amount of independence in terms of how they allocate public funding that they receive, how they are governed (through administrative boards), and who they recruit as teaching staff. Their autonomy, however, remains a subject of conflict with the university community (Kaiser 2001).

Funding

The French government introduced a new funding contract arrangement for institutions of tertiary education in January 1984. Initially, this funding arrangement was limited to research and development, but was later extended to cover all aspects of funding. State funds are now earmarked for specific activities or categories, including research, buildings and facilities, and other activities (e.g., new technology, student life, libraries). A multi-annual framework governs contractual negotiations between the state and higher education institutions; this framework guides the annual decisions of individual administrations, ensuring financial transparency in the medium term (EC 2007).

In 1999, an enrolment-based funding model was introduced to allocate staff and financial resources to the IUTs. Distribution of resources is determined by four criteria: the need for additional staff hours, type of pedagogical function (technical versus general), amount of physical space, and compensation of nonacademic support staff. Fees paid by students are subtracted from the state subsidy for individual institutes. The theoretical results of applying the model are then "corrected," based on an evaluation of the balance of resources between universities and the given IUT, current labor contracts, and particular circumstances (MENRT 1999).

Another source of IUT funding is the apprenticeship tax. Companies in France are obliged to pay a percentage of their payroll (1 percent) as an apprenticeship tax. If they participate in an

apprenticeship program with an IUT, however, they may apply this money to the program. The funds received by IUTs from this arrangement are quite small, although the funding situation has improved over the past decade (Kaiser 2001).

Access and equity

As noted earlier, national legislation governs tuition fees and entrance requirements for all institutions of higher learning (EC 2007a). Admission to IUTs is subject to a highly selective examination and admission process that attracts high-caliber students. After completion of an IUT program, these students usually choose to continue their education rather than go to work as technicians or middle-level employees. Students in these institutions come from a variety of backgrounds and gain access to IUTs in various ways: (i) by successfully completing the end of secondary school studies and obtaining a *Baccalauréat* (or *Bac*), (ii) obtaining equivalent training in industry, (iii) completing a diploma that grants them access to university studies, or (iv) obtaining validation of professional experience or prior learning.

In 2005, there were approximately 2.3 million students enrolled in tertiary education in France. Of this number, 60 percent were enrolled in universities; 8 percent, in teacher education (*Instituts universitaires de formation des maîtres*, or IUFM); 9 percent in preparatory classes for the entry examination to the *Grandes Écoles*; 3 percent in independent engineering schools; and approximately 10 percent in the IUTs. The remainders were enrolled in the higher technical studies departments of secondary schools (STS).

IUT programs of study

IUT programs are a mixture of theory and practice and include a ten-week internship in an enterprise. The programs are typically two years in duration, consist of general and professional training, and lead to a *Diplôme universitaire de technologie* (DUT). Professional organizations and employers actively participate in the design and restructuring of IUT curricula, as do chambers of commerce. IUTs offer 26 specializations decreed by the Ministry of Education. The specializations offered are based on recommendations made by national pedagogical commissions, which are composed of representatives from universities and professional bodies. Although national in scope, IUT programs can be adapted to a regional economic context. As noted earlier, the teaching staff of these institutions are university professors with either a

master's degree or Ph.D.; many teachers also have close links with industry, including specific enterprises.

The DUT diploma awarded by IUTs can be followed by a further year of specialization, resulting in a *license professionnelle*. The DUT is understood to be the equivalent of one or two years of the DEUG award (*Diplôme d'études universitaires générales*), the basic diploma obtained at the end of the first two-year cycle of study at a French university.

Links to employers

The IUTs have strong ties to employers through such forums as *Commissions professionnelles consultatives* (CPCs), professional advisory committees composed of government representatives, teachers, employers, and employees. In principle, the CPCs are only advisory committees, but they have significant influence on the decisions made by the government, particularly in terms of the content of IUT programs, although less so in terms of policies for opening new institutions. It should come as no surprise, then, that the IUTs have excellent graduate employment rates. In a country that experiences difficulty in getting its young people into the job market, holders of a DUT are fortunate in that their employment rate is markedly higher than that of other students, save for graduates of the *Grandes Écoles*.

The Bologna process and IUT links to universities

Although the situation of IUTs has remained stable since 1995, the advent of the Bologna Process⁸ and the need to apply its recommendation to sequence tertiary academic awards in France into three phases—the *licence*, *master*, and *doctorat* (the LMD system)—has produced a shock wave in the tertiary sector. The ultimate consequences of this change remain unclear. The first issue, which is not in the least hypothetical, is the possibility that students will go on to obtain a vocational degree after completing a DUT. While the vocational nature of the DUT is well recognized and the degree confers good employment prospects, the question of further study after completion of an IUT program is a longstanding issue in the French system of higher education.

⁸ A process of the EU that involves restructuring all European higher education programs into three cycles similar in spirit to the Anglo-Saxon model of Bachelor's, Master's, and Ph.D. cycles.

The idea of extending IUT courses by one year has been a challenge for many years. The response from politicians to the idea has been consistently negative, given that employment rates at the *Bac+2* level (Baccalaureate plus 2 years' tertiary education) are excellent and the cost of adding a third year has therefore been difficult to justify. Nevertheless, the DNTS, *Diplôme national de technologie supérieur*, an additional one-year program, was created in 1994. This initiative was a relatively good response to another seemingly illogical ministerial initiative that introduced a new four-year vocational course of study into new university institutions: the IUP (*Institut universitaire professionnalisé*), or a university institute for vocational training.

The introduction of the LMD system resurrected the issue of a vocational qualification at the degree level in order to provide graduates with better recognition within the tertiary education system. As a consequence, a three-year program vocational degree was created in 2002, which in the Bologna scheme is equivalent to a university degree. The new degree, which is enjoying considerable success, is intended as a degree completion initiative for all students that have completed a *Bac+2* program, especially those with a BTS or DUT. In the five years since the program was introduced, many vocational degrees have been created, with all universities in France supporting the move. Whereas in theory this type of degree is awarded by universities, all the IUTs have become involved in the design and delivery of these degree programs, which are now mostly offered by them.

Quality control and accreditation

A national qualification framework, the Répertoire National des Certifications Professionnelles (RNCP), was established in France in 2002. The framework requires regular internal and external assessments of all upper secondary and higher education institutions, their programs, and academic awards, as well as the contractual agreements between the state and these institutions. Continued accreditation (*habilitation*) is based on such periodic evaluations, without which the French state will not recognize, categorize, or fund a public tertiary education institution. The results of an external evaluation, which covers all activities of higher education institutions (academic program development and delivery, scientific research and development, and institutional management) are considered by the state during its negotiation of the four-year contracts that it concludes with these institutions.

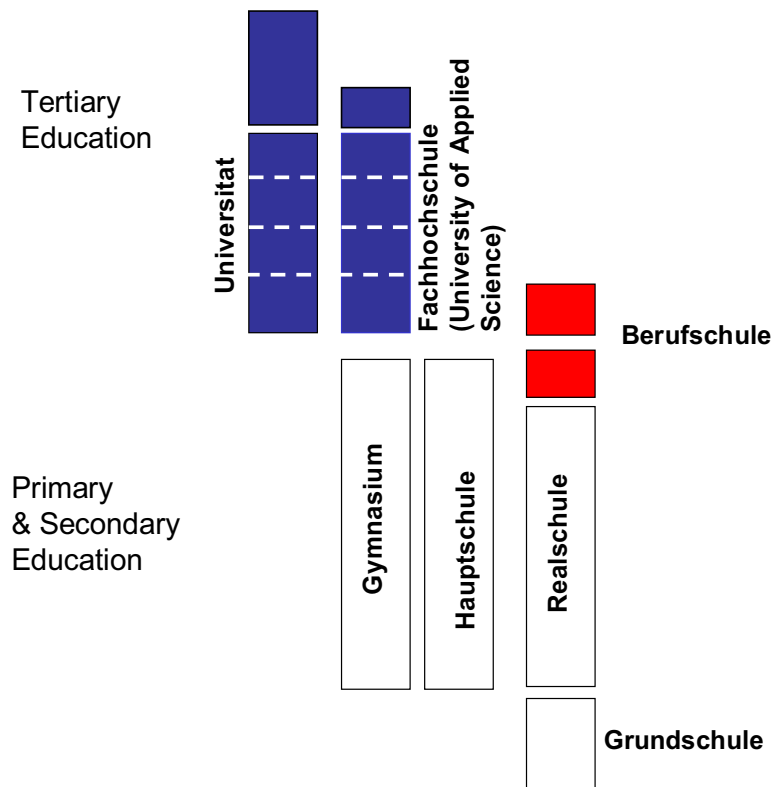
The *Comité national d'évaluation* (CNE), or National Evaluation Committee, is an independent body with the mission of assessing public institutions of higher education in France. A member of the European Network for Quality Assurance, CNE was undergoing a complete overhaul in late 2006 and expected to launch its accrediting body, the *Agence pour l'évaluation de recherches et d'éducation supérieure* (AERES), in 2007. All CNE evaluations are based on a self-evaluation ("internal evaluation" in French) provided by the institution in question and publicly posted on the CNE Web site: www.cne-evaluation.fr (EC 2007b).

The German "Dual" System

The German system of tertiary education has evolved into an essentially unitary system with only university-level institutions, albeit within a hierarchy that clearly differentiates between traditional research-oriented universities and the newer *Fachhochschulen*, or as they are known in English, Universities of Applied Science. An alternative to the schooling offered by these two sets of institutions is the occupational education offered by the famous German *dual* system, an integrated program of school-based education and work-based training. Youth in the dual system spend a certain amount of time in formal educational institutions known as *Berufsschulen*, and the remainder at the workplace. (See figure 14 for an illustration of the German education system as a whole.)

Research findings on the relationship between the institutional setting of higher education and youth employment indicate that apprenticeships have a positive effect on early career unemployment outcomes because they do a better job of matching training to labor market demand than do other types of education programs. Research also indicates that European countries with apprenticeship systems, including Germany, Austria, Denmark, and Switzerland, enjoy better youth employment patterns than countries without such systems, with larger youth employment shares in skilled occupations and high-wage sectors (Quintini, Martin, and Martin2007).

Figure 14. German system of tertiary education



Source: Mikhail (2006). Reprinted with permission.

The dual system has proven quite successful in giving young people a good start in the labor market—Germany is among the OECD countries with the lowest share of youth who experience multiple periods of unemployment. Avoiding early labor market difficulties is particularly important for youth because long-term unemployment at entry usually produces persistent negative effects on employment probabilities and wages later in life. However, evidence also shows that the effects of apprenticeship training on long-term employment outcomes and post-apprenticeship wages are mixed (see Gangl and Muller 2003).

Organization of the system

The dual framework involves an employment relationship *plus* formal schooling—normally two days a week—over a period of three, or sometimes four, years (EC 2005). At the end of the

program, apprentices graduate after passing a final examination in which they must prove their theoretical and practical grasp of the occupation concerned.

Currently, about 340 professions or occupations—ranging from engineering to construction to service sector professions such as banking—are recognized by the German state and thus qualify for apprenticeship programs. Courses are not modularized and are based on the amount of time spent in training (which averages between 35 and 37 months), rather than on competency achieved. Final oral, written, and practical examinations are administered by boards consisting of experts that, in most cases, are commissioned by local Chambers of Commerce or Crafts Chambers.

In 2004, approximately 24 percent of Germany's companies offered training places in the dual system. The larger a company, the more likely it is to be part of the dual system: 93 percent of companies with more than 500 employees, 70 percent of companies with between 50 and 499 employees, and 47 percent of companies with 10 to 49 employees offered apprentice training places. Many small companies, however, are unsuited for the training program, either because their business is highly specialized, the expense of training, or other reasons.

Over time, the approaches to providing enterprise-based training and school-based education in Germany have become more diverse. Nowadays, certain parts of enterprise training may be provided through extra-plant training centers, which provide better quality training and facilitate the provision of certain types of training for small and medium-sized firms. Some larger firms even provide the school-based part of the training *within* the enterprise.

Governance

The Vocational Training Act regulates the dual system in the country. Employers are not legally obliged to hire apprentices, but if they do, they are required to let them go to school during work time and provide the enterprise-based portion of their training in accordance with national standards. That is, only a certified teacher who has completed apprenticeship training and obtained the Trainer Aptitude or *Meister* certificate, is allowed to supervise enterprise-based training. The contents of such training are determined for every occupation by federal regulations, which are jointly developed by government, employers, and union representatives. Union involvement, in fact, has been crucial to the success of the apprenticeship system in Germany. The dual system is exceptional because almost all other aspects of the education

framework are regulated by the *Länder* (states), including legislation, regulations, curricula, standards, assessment procedures, and quality control.

Funding

The large cost of apprenticeship training incurred by an enterprise could be lost if the workers trained in such slots leave the firm upon completing their apprenticeships. Low labor costs and appropriate cofunding by the public and private sectors are therefore essential for making the dual apprenticeship system work. The salaries of apprentices are relatively low—in the range of 25 to 45 percent of the average wage of a qualified worker in the same occupation. Apprentice wages and working conditions vary by occupation, with collective bargaining agreements specifying the (minimum) apprentice wage (EC 2005).

Overall, the costs of vocational training within the dual system have shifted from being company funded to being publicly funded.⁹ Originally, the cost of on-site training was mainly financed by companies, the expenditures of which were typically almost double those of the *Länder* on the *Berufsschule*. This cost is now fully publicly funded by redistributed federal and local tax revenues. State funding formulas guarantee that schools within each state receive approximately equal funding, which covers personnel, material expenses, and infrastructure investments (EC 2003b). In the last 25 years, however, as a result of the decline of in-company training, the amount of public funding for vocational training outside the school sector has increased from €4.1 billion in 1980 to €11.2 billion in 2005. At the same time, however, the share of public funding available for vocational schools has fallen substantially: from 84.4 percent of total funding in 1980 to 68.2 percent in 2005 (EC 2005).

The provision of vocational education, both in the dual system and full-time vocational schools, is increasingly perceived as costly and potentially unsustainable. This is especially true because of the growing importance of small and medium enterprises in the German economy, which are unable to invest heavily in the provision of lengthy apprenticeship opportunities for youth.

Access and equity

The number of apprenticeship places within the dual system depends significantly on the prevailing economic outlook, the ongoing specialization of enterprises, and the fast pace of technological change in the knowledge economy. The increasing specialization needed in emerging segments of the economy has resulted in smaller specialized and medium-sized companies finding it more difficult to provide youth with adequate training. There is now evidence of a structural mismatch between the educational requirements of apprenticeship education and the broader work-related skills needed in the workplace, which an increasing number of companies cannot provide. An apprenticeship lasting three or more years is, moreover, often seen as too long by such companies. As a result, many employers are coming to prefer recruiting skilled workers on the labor market than training them through an apprenticeship program.

Although the Social Code III (Sozialgesetzbuch III) of Germany ensures that public funds are available to support the training of young people who are socially disadvantaged due to learning difficulties, or of foreigners who, because of insufficient proficiency in German, require special help to start and successfully complete a course of training, these equity provisions are overshadowed by the larger structural challenges to the dual system (EC 2003b).

Students and apprentices

The dual system provides the education of choice for a large proportion of young people between the ages of 16 and 22 because it offers good job prospects and generous training wages (averaging at least €650 a month in 2006). All young Germans 16 years or older are eligible to participate in the system. Traditionally, candidates for apprenticeships in the manufacturing and service trades were students who completed the *Realschulen* (a vocational lower-secondary school). However, high unemployment among youth and the extension of the dual system to occupations in the service sector, especially financial services, banking, and hospitality and tourism, have made apprenticeships more attractive to students who have typically followed a more academic-type track in secondary education in *Gymansia* or *Hauptschulen*. (The former are traditional general “academic” upper-secondary schools, while the latter are comprehensive upper-secondary schools that offer both academic and vocational subjects.)

Links to employers

In 2000, the average net cost to companies for one training place was estimated at €8,700 per annum, a cost that included both trainee wages, employer contributions to social insurance, and other expenditures (World Bank 2006). In spite of its costly nature, employers have traditionally regarded in-house training as a long-term investment, greatly valuing the problem solving and teamwork that trainees acquire. Apprentices became future employees with the desired skills and work habits and companies were able to secure their future labor pool, “cherry pick” the best trainees, and avoid wrong hiring decisions that proved costly to undo. Enterprises also took pride in a reputation for training and contributing to society.

While the regulated structure of the system might seem to hinder changes in training curricula, it does not hinder the ability of individual firms to adapt training to changing skill requirements, largely because regulations only relate to minimum standards. Individual firms can thus choose their own training methods and improve training quality as they see fit.

Articulation with universities

The dual system in Germany is not part of the tertiary education system and articulation between its programs and the university sector is quite limited. In fact, there is increasing concern in the country that early vocational choices restrict individual and economic growth. A worker who gets his or her certification from the dual system does not usually receive credit towards a university degree for the work and skills acquired in an apprenticeship program. However, another form of work-based apprenticeship model has been introduced in the tertiary sector, which now includes 35 Cooperative Universities (*Berufsakademien*) that are either publicly or privately maintained.¹⁰ These universities combine academic training with practical professional training in the workplace and thus constitute a second dual learning system. Like the original dual system, companies are active partners in the *Berufsakademien*.

Applicants for programs at these institutions require a general or subject-restricted higher education entrance qualification (e.g., Hochschulreife or Fachhochschulreife), depending on the regulations in force in the particular Länder, and a training contract with a suitable training enterprise. Depending on local legislation, applicants with professional qualifications, but

¹⁰ These institutions are found in the Länder of Baden-Württemberg, Berlin, Hessen, Niedersachsen, Sachsen, Schleswig-Holstein, Saarland, and Thüringen.

without a higher-education entrance qualification, can take an entrance examination. Once a training contract has been concluded, applicants are registered at the study institution by the company responsible for training them.

Education at the *Berufsakademie* is generally divided into two years of basic studies, followed by one year of advanced studies. Each semester is between ten and twelve weeks and divided into an on-the-job training component and a theoretical component at the educational institution. No provision is made for holidays within study plans, but students receive an annual holiday of approximately four weeks as part of their training contract. Students who successfully complete their *Diplom* examination are awarded a qualification for entry into a profession (e.g., *Diplom-Ingenieur* in engineering, *Diplom-Sozialpädagoge* in education, or *Diplom-Betriebswirt* in business). Graduates are often taken on at the end of their professional training by the company that trained them.

Quality assurance

As noted earlier, at the end of the apprenticeship period, qualifications are awarded on the basis of written and practical examinations, which are written and marked by external examiners. All parties to the system—the government, unions, and employers—participate in this final stage of the apprenticeship process. So-called competent bodies (mostly Chambers of Commerce) issue certificates for the dual system, which are recognized throughout Germany. After graduation, workers can apply for a skilled worker’s job with their current employer or look for a job with another employer. (There are clear links between skilled worker status (“*Facharbeiter*”) and the contents and status of such jobs on the German labor market.) Skilled workers may also participate in adult education.

The Junior Colleges in Korea

Following the Second World War, the Korean government in 1951 introduced new institutions of tertiary education (Kim 2007). Previously, junior colleges did not have distinctive characteristics as short-term vocational educational institutes, but were structured similarly to four-year colleges and universities. The predecessor to the junior college, the five-year “technology institute” that combined three years of senior secondary vocational studies with two years of tertiary education,

supplied the technicians needed for national industrialization during the 1960s. Following that decade, however, these institutions experienced an increasing dropout rate because the five-year program was too long for most students. In 1969, the Korean government asked the World Bank for a loan to expand and upgrade equipment and facilities in these five-year technical institutes. The Bank granted the loan on the condition that the institutes be restructured into two-year vocational colleges at the tertiary level. Ten years later, in 1979, the government merged its vocational junior colleges and regular two-year junior colleges because of their similarity and upgraded the quality of vocational education in these institutions.

Today, many universities in Korea are making inroads into the junior college market: 21 recently opened or tried to expand vocationally related departments in such topics as cosmetics, dental hygiene, optometry, and pet care. The Korean preference for four-year colleges and universities over junior colleges, together with the stigma associated with vocational education, is making the situation of junior colleges in the tertiary education system increasingly difficult. More than 90 percent of these colleges in Korea are private and depend on student tuition fees for their operating budgets. The recent decrease in the age cohort for these institutions, together with the weak support of industry for these colleges, could result in low-quality training. Government subsidies to junior colleges are moreover, very low compared to those offered to universities (these colleges received only 14 percent of total university subsidies in 2005). All these factors indicate many junior colleges in Korea now lack viable, sustainable funding.

Korean universities, on the other hand, are expected to attract new students in the future by developing various types of lifelong vocational education programs. They may find it worthwhile, for example, to provide vocational competency development programs for workers in regions where junior colleges are located. One option for junior colleges may be to use these institutions for “work-to-school” as well as “school-to-work” initiatives, such as creating short-term training programs that would link students to small- and medium-sized enterprises using funds from the Employment Insurance Fund.

Organization of the sector

The growth of the junior college system in Korea in the period 1965–2005, outlined in table 13, was characterized by the rapid expansion of private institutions, a shift from high-cost technology programs towards low-cost social sciences, and weak school-industry cooperation.

The number of colleges increased from 48 in 1965 to 158 in 2005. Over the past 20 years (1985 to 2005), the number of students has increased from 165,051 to 850,089, respectively, and the number of professors, from 5,488 to 12,027. Although this rapid quantitative expansion satisfied the increasing social demand for tertiary education, overall conditions within these institutions have not improved sufficiently to improve the quality of teaching and learning. Nevertheless, some of these colleges make substantial use of labs and workshops and claim to provide more internships and work experience than do universities. Most junior college programs last two years, although about 10 percent of students are enrolled in three-year programs, especially in engineering, the sciences, and other technical fields.

Table 13. Growth of tertiary education and the junior college system in Korea, 1965–2005

<i>Year</i>	<i>Universities</i>				<i>Junior Colleges</i>			
	<i>National</i>	<i>Public</i>	<i>Private</i>	<i>Total</i>	<i>National</i>	<i>Public</i>	<i>Private</i>	<i>Total</i>
1965	12	2	56	70	1	11	36	48
1975	14	1	57	72	30	20	64	114
1985	24	1	81	106	17	-	103	120
1995	33	2	113	148	7	1	145	137
2005	32	2	157	191	6	8	144	158

Source: Kim (2007).

The junior college system now comprises 30 percent of tertiary institution enrolments. Because these colleges are more reliant on tuition fees and less on government funding, private colleges are both more likely to set up partnerships with local firms and small- and medium-sized enterprises and to offer customized corporate training on a fee basis (Grubb et al 2006). Over the past four decades, the colleges have been a major source of mid-level professionals in various fields of industry, including mechanical and civil engineering, which indicates the relative importance of these institutions in the tertiary education system in Korea.

Autonomy and accountability

Against the background of rapid expansion in the sector, governance and regulation have revolved around two dichotomies: public vs. private control and government priorities vs. market mechanisms. In general, Korea has developed a top-down system of control of universities and colleges, which tends to limit opportunities for flexibility and innovation in private and public institutions alike. The college system is dominated by private institutions that are regulated in a

variety of ways. For example, one form of regulation is a policy designed to promote equity and fairness in the admissions process, but which ends up limiting the range of options available to students.

The Ministry of Education has a system of enrolment quotas for colleges in the Seoul area that it uses in order to redistribute the student population to outlying areas. Paradoxically, the quota system has intensified competition for places in Seoul and limited the flexibility and responsiveness of the institutions in this sector. Other regulations set limits on student-teacher ratios, depending on the field of study; the duration and characteristics of educational programs; and the type of credential. Unlike universities, the junior colleges have a more autonomous self-governance model. Each college has its own board, which determines the overall priorities of the institution and chooses its president.

Funding

The government plays a major role in funding public tertiary education institutions. Although the structure of funding varies depending on the founders of an institution (e.g., the national or local government or the private sector), the country's 44 public universities and 7 public junior colleges are funded by regular national allocations that cover tuition and grants. Overall, government funding represents 62.1 percent of the public resources of tertiary educational institutions.

The funds for these institutions are distributed based on enrolment and faculty statistics, but there is no formula for allocation of government funds to private institutions. Funding for special projects (such as cooperative projects of industry and academia) is based solely on merit. Overall, government funds are disbursed and supervised by many agencies, including the Ministry of Education. Several OECD reports suggest that there is a lack of coordination in government funding; the lack of a not clearly established funding structure or division of roles leads to inefficiencies. Reforms in government funding and budgetary restructuring are accordingly being carried out to make more effective use of this funding in the future (OECE 2006b).

With respect to private colleges and universities, tuition accounted for 69 percent of their total revenue in 2005, highlighting their significant reliance on student fees. Another 10 percent of their income is comprised of direct (4 percent) and indirect (6.7 percent) public expenditures

on education that are transferred to private institutions. Private colleges are, however, subsidized through the tax system, making tuition costs fully deductible. Firms can also deduct the costs of training their employees from corporate income tax, which applies to tuition paid to subsidize employee enrolment in colleges, as well as corporations' own training centers.

Access and equity

Since the mid-1990s, junior colleges in Korea have faced several challenges. A drop in the birth rate in the country has caused enrolment to drop and universities that provide similar vocational programs are providing increased competition. The ratio of actual enrolment to places available has accordingly dropped sharply in recent years, from 98.5 percent in 2001 to 81.3 percent in 2004. In 2005, 17.4 percent of the places available in junior colleges were unfilled. Efforts of these colleges to respond to this challenge by merging with one another and/or restructuring departments and reducing admission quotas have been ineffective.

The expansion of tertiary education in the country occurred with little thought for socioeconomic conditions and equity concerns among income groups. Although certain governmental equity mechanisms have been put in place to enhance access, including fee waivers, loans, and special programs, such mechanisms are available mostly to universities and post-graduate schools, not colleges. The government is presently encouraging colleges to base admissions on less selective admissions criteria, rather than relying exclusively on entrance examinations and/or academic performance. Overall, however, equity mechanisms are far from coordinated and it is hence difficult to pinpoint whether issues of inequity are better addressed through admissions mechanisms, financial aid, or the removal of other systemic and/or institutional barriers (Grubb et al. 2006).

The government has now instituted minimum restructuring requirements that junior colleges must meet if they wish to receive government subsidies. These requirements involve downsizing and the development of specialized programs that will allow the colleges to compete for market share. At the same time, the colleges have embarked on initiatives to expand the provision of educational services to other segments of society, including housewives, unemployed workers, the handicapped, and foreign students via part-time registration or special short-term training programs. Such initiatives allow the colleges to reach potential students who cannot afford full-time registration.

Students

The number of students per professor in junior colleges has steadily increased over time, from 30 to 1 in 1980 to 71 to 1 in 2005—an unacceptably high ratio for occupational education. The qualifications required for a junior college faculty position are a Master's degree, relevant work experience, and two published research papers. By 2005, however, 58 percent of junior college professors had doctoral degrees and 39 percent had Master's degrees, but only 60 percent had industry work experience. The large percentage of faculty with Ph.D.s is incongruent with the occupational specializations followed by most students.

The employment rate of junior college graduates has steadily improved over the last 25 years, from 50.3 percent in 1980 to 83.9 percent in 2005. The latter rate is now well above those of graduates of four-year colleges and universities, which was 65 percent in 2005. However, this positive employment rate can be explained by the fact that a large number of junior college graduates have recently taken jobs in the low-paid service sector, such as restaurants and hotels, regardless of their majors, and that university graduates tend to spend more time finding their first job.

Academic programs

Academic majors in junior colleges are grouped into programs in the humanities, social sciences, natural sciences, engineering technology, arts, physical education and health science that typically require two years to complete. Only nine majors, including nursing and fishery, are permitted to offer three-year programs. As of 2005, 36.2 percent of junior college students were enrolled in engineering technology programs; 21.6 percent, in social science programs; 16.9 percent, in the arts and physical education; 10.4 percent, in medical health and nursing; 5.1 percent, in agriculture, forestry, fishery, and marine sciences; 3.9 percent in humanities; 3.8 percent, in teaching; and 2.2 percent, in the natural sciences. Since 1980, the relative number of students in engineering, natural sciences, agriculture, forestry, and marine sciences has decreased, while those in the social sciences, arts, and physical education have increased (Kim 2007). As of 1995, junior college graduates began to receive an Associate B.A. degree (instead of the previously awarded Diploma), in addition to a national vocational qualification degree. There are 694 such national qualifications in various areas in Korea. It is considered better for graduates to have a national qualification certificate when they apply for a job, although it is not

mandatory to take a national qualification examination. In 2005, a greater percentage of junior college graduates (27.3 percent) than four-year college graduates (16 percent) had earned national vocational certificates.

Link to employers

Industry cooperation with junior colleges centers around joint research and development efforts, field practices, personnel exchanges, technology transfer, employee enrolments, and contracted training programs. In 2005, 29,416 firms had contracts with junior colleges (6.5 firms per college), although their level of financial commitment was very low—the average expenditure per firm under such contracts was only US\$150. In the same year, approximately 73,623 firms offered work-study opportunities to 145,030 students, an average of 1.97 students per firm. With respect to employee training, 24,008 firms sent 45,249 workers to 116 junior colleges in 2005, representing 8.7 percent of total college enrolment that year.

Of note, junior colleges operate a number of school-based enterprises (39 in 2005) in such fields as auto mechanics, the food and beverage industry, biotechnology, baking, computer software, jewelry making, and civil and environmental engineering. Some even operate E-business technology centers in conjunction with small and medium enterprises. Many junior colleges have also established specific education departments by contract with local industries, such as military studies, helicopter maintenance, automobile mechanics, the construction trades, and jewelry making. In 2005, 100 junior colleges provided customized training programs to 43,000 employee-students under contracts with about 16,000 firms. Changes in labor market demands have brought new challenges for junior colleges. Since the 1996 foreign currency crisis, for example, industry partners have increasingly sought technicians with greater cognitive and creative skills, that is, higher-quality professional manpower.

Articulation with universities

The junior colleges articulation with universities is not systemic but institutional and subject specific. Individual colleges negotiate their own agreements with universities for the transfer of credits from a college to a university program. The number of credits transferred depends on the affinity between the two programs, as well as the reputation and credibility of the institutions involved.

Quality assurance

At a national level, quality assurance of junior colleges falls under the purvey of the Korean Council for College Education (KCCE). Accreditation is, however, voluntary. The process includes a self-evaluation and a peer review that assesses various criteria, such as management and finance, vision and strategy, research, and cooperation with industry. Results of such reviews are given to junior college administrators, but not made public. The lower status and esteem of the junior colleges in the Korean higher education system are critical issues in the existing quality assurance system and have prompted the development of new legislation, currently under review, authorizing an independent accrediting body. Alternatively, institutions may adopt specific efforts to enhance educational quality by, for example, using job analyses conducted with the participation of industry representatives when developing course and program curricula (Grubb et al. 2006).

The Ministry of Education and Human Resources Development is presently considering the demand of junior colleges to transform “advanced courses for graduates” into B.A. degree programs, provided that the colleges meet certain government standards. This change could be a meaningful step toward creating vocational degree programs and thus enhancing the status of junior colleges. Before authorizing the new degree, however, the Korean government will need to conduct careful policy analysis to judge the effectiveness of the proposed change, as well as potential societal acceptance of junior college degrees.

Universities of Technology in Mexico

In 1990, the Ministry of Public Education (*Secretaría de Educación Pública*, SEP) of Mexico commissioned a review of tertiary education in the country. The result was a recommendation to

increase and diversify education and training opportunities, with a focus on short-term programs geared towards giving graduates access to the job market. The review included an analysis of tertiary education models in such countries as the United States, Japan, Germany, and France, among others. Following the study, the government decided to adopt the French IUT (*Institut universitaire de technologie*) educational model in Mexico. The first three Universities of Technology were established in 1990, and over the next 15 years, the sector has grown to become a major element of the tertiary education system in Mexico.

The tertiary education system is characterized by its large size and complexity: it is composed of 1,892 institutions, 713 of which are public and 1,179 of which are private. In 2005, the institutions were attended by over 2.5 million students, 67.3 percent of whom went to public institutions and 32.7 percent, to private institutions. According to the international UNESCO classification (ISCED 97), the system offers various university qualifications, including higher technician (5B2), a technical degree (5A3), bachelor's (5A4), master's (5A), and doctorate (6) programs, as outlined in figure 15 and table 14.

Organization and distribution of institutions

The *Universidad tecnológica* (university of technology, or UT) sector was introduced in 1990 and is managed cooperatively by provincial governments and the productive sectors of the economy in a given region. The UT system has three main objectives: (i) to decentralize public higher education services with the aim of improving opportunities for marginalized regions and groups; (ii) to encourage closer links to the employers ; and (iii) to diversify educational opportunities. Today, the sector includes 60 universities in 26 provinces, admitting over 62,000 students annually to two-year programs that award the qualification of *Técnico superior universitario* (higher university technician), or TSU.

Autonomy, accountability, and governance

The UTs are decentralized organizations under the control of provincial authorities. They are managed by a Board of Governors, which includes three representatives from the provincial authorities, three from the federal government, one from the local town or city council, and three from the region's business sector. The Board is responsible for setting a given institution's regulations and policies, as well as approving its development plan, course outlines, syllabi,

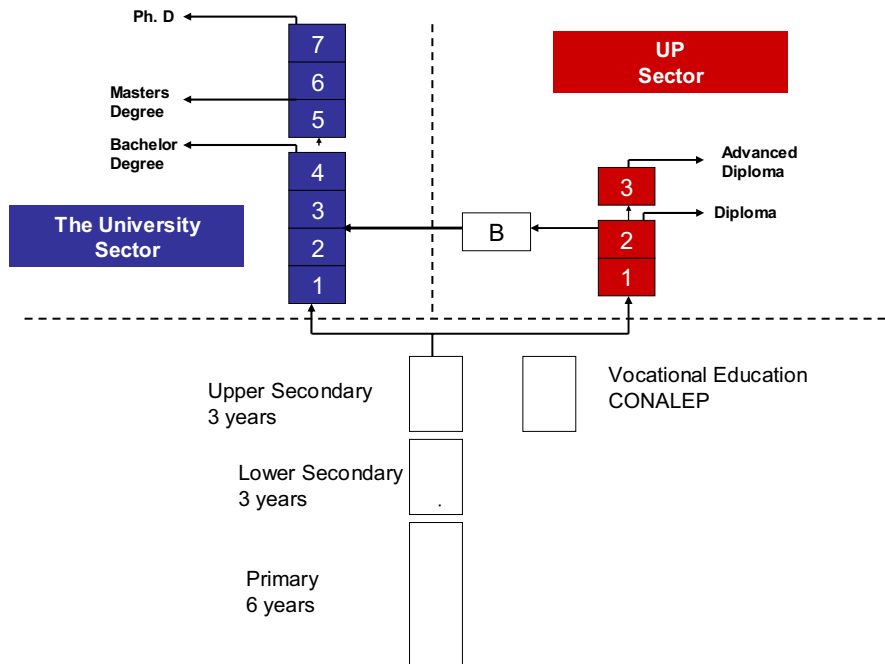
annual budget, annual report, and organizational structure. The major role of a Board is to define policies that govern the development of a UT and promote participatory planning and management in its operation, as well as internal and external evaluation of the courses that it offers. The goal of Board policies is to ensure the quality of UT education and services, including the provision of training for teaching staff and appropriate application of knowledge.

Table 14. Tertiary education enrolment in Mexico by type of institution, 2006

<i>Institution Type</i>	<i>Number</i>	<i>Enrolment</i>	<i>% of total enrolment</i>
Public federal institutions	4	307,788	12.1%
Public state universities	46	785,917	31.0%
Public technology institutes	211	325,081	12.8%
Public technology universities	60	62,726	2.5%
Public polytechnic universities	18	5,190	0.2%
Public intercultural universities	4	1,281	0.1%
Public teacher training institutions	249	92,041	3.6%
Private teacher training institutions	184	54,267	2.1%
Private institutions	995	776,555	30.6%
Public research centers	27	2,801	0.1%
Other institutions	94	124,609	4.0%
Total	1,892	2,538,256	100%

Source: Secretaría de Educación Pública (SEP [http://: www.sep.gob.mx/index.jsp](http://www.sep.gob.mx/index.jsp)) (Accessed May, 2006).

Figure 15. Organization of the Mexican tertiary education system



Source: Mikhail (2006). Reprinted with permission.

UT system policies are defined by a collegiate body of elected UT directors who are confirmed by a National Committee for Academic Institutions of the Secretaría de Educación Pública (SEP). A national association of universities of technology (ANUT) was created in 2005 to provide support for the consolidation of UT educational programs; approve management processes and audits; and improve the quality of the courses offered by its members. The association also serves as a point of contact for federal and provincial education authorities, as well as social and business organizations.

Funding

In general, there are two types of government subsidies in tertiary education in Mexico: federal and state. The federal subsidy has three funding components: (i) an ordinary component allocated to all public universities based on their operating costs; (ii) an extraordinary component allocated to programs intended to improve tertiary education offerings; and (iii) a targeted component allocated to institutions that are diversifying the education that they provide. State subsidies match the first and third components of the federal subsidy, that is, they lack the extraordinary component. In 2005, federal subsidies constituted 65 percent and state subsidies,

35 percent, of total funding for tertiary education in Mexico (SEP 2005). However, the distribution of federal and state contributions to each institution's ordinary subsidy varies by institution and is formalized in a three-party agreement signed by the federal and state governments and the relevant institution. For instance, the ordinary subsidy received by technology universities is comprised of equal contributions by the federal and state governments a result of the federal government's policy to encourage state investment in higher education (SEP 2006).

Access and equity

The total number of students in tertiary education in Mexico in 2004–2005 was approximately 2.5 million. Of this total, women accounted for 50.1 percent; students enrolled in UTs or similar institutions, 3.3 percent; students enrolled in degree programs in universities, 90.2 percent; and students enrolled in graduate programs, 6.5 percent. Over the five-year period 2000–2004 (see table 15), the total number of students in tertiary education increased by 340,554 (or 15.5 percent) at all levels, with UTs showing the largest percentage growth. At 50.6 percent, their growth far exceeded that of undergraduate degree education programs (18.9 percent). At the same time, enrolment in teacher training colleges (*escuelas normales*) experienced an enrolment drop of 27.2 percent, following the introduction of new regulatory rules.

Despite their combined efforts to improve equity, academic results, graduate employment rates, as well as their contribution to regional economic development, UTs still face resistance from students who prefer the degree route. Certain segments of the population also feel that these institutions are a result of national public policies that favor a market-based approach toward tertiary education. The significant expansion of tertiary education has not, moreover, broadly benefited low-income social groups because public education investments for the 18–24-year-old age group are not yet fairly distributed.

Table 15. Enrolment trends in tertiary education in Mexico, 2000–2004

	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	% change, 2000–2005
Teacher Training Colleges	200,931	184,100	166,873	155,548	146,308	–27.2%
UTs	55,448	63,550	69,024	76,065	83,494	50.6%
Universities (undergraduate)	1,800,870	1,894,698	2,002,667	2,086,197	2,141,951	18.9%
Universities (graduate)	140,453	146,022	152,694	158,793	166,503	18.6%
Total	2,197,702	2,288,370	2,391,258	2,476,603	2,538,256	15.5%

Source: SEP statistics on the UP sector of tertiary education.

http://: www.sep.gob.mx/index.jsp (Accessed May, 2006)

Students

Significantly, 90 percent of UT students are the first generation in their family to attend tertiary education. This finding supports the government’s argument that establishing the UT sector has successfully improved equity in tertiary education. Among all UT students, 30 percent would not have had access to tertiary education had there not been a UT institution in their own town or city. The majority of UT students (93.8 percent) are single and their average age is 19.4 years. Approximately 95 percent of them receive grants through the national tertiary education grants program,¹¹ and 27.9 percent work while attending university, of which almost half (49 percent) work to fund their studies

Links to the labor market

In 2005, the UT sector graduated 21,854 students, or 5.9 percent of total tertiary graduates. These graduates received assistance from the Mexican Employment Information Center,¹² which provides such services as national-level information and indicators on the behavior, trends, and characteristics of the job market for 53 occupational groups. (The Information Center was recently established by the Ministry of Employment and Social Security and also serves four-year university degree graduates.)

¹¹ Created in 2001, the national grant fund (FONABEC) had provided 10,200 grants to UT students as of year-end 2006.

¹² See its Web site, www.observatoriolaboral.gob.mx (Accessed June 2006).

A study of graduates leaving the UT system (Adolfo et al. 2005) that covered the cohort of 1997–2001 reported that 87 percent had found a job one year prior to completing their studies, 18.9 percent were immediately employed by the company in which they had done their work placement, 24.9 percent found a job within three months after graduation, 9.3 percent within between six months and one year, and 5.7 percent took over a year to find a job. Of graduates that had jobs, 72 percent were employed in the private sector and 28 percent, in the public sector. Among those that found a job in the private sector, 39 percent were working in companies with more than 250 employees and 58 percent, in companies with 100 to 250 employees. Employment by sector was 52 percent in the service and business sectors, and 32 percent, the industrial sector. In terms of type of job, 54 percent were working as supervisors, technicians, or skilled employees; 25 percent had executive-level jobs in the production or service sector; 12.6 percent were middle-managers; 2.1 percent were senior managers; and 6.7 percent were owners or associates.

Over the last 10 years, the number of job openings in Mexico has increased in the fields of marketing; electronics and automation; industrial maintenance; production processes and telematics; and industrial electronics (the latter has provided the most jobs for UT graduates). Former UT students who were working in 2005 included 2,381 self-employed company directors, 16 percent of which had completed marketing programs, followed by those who completed programs in IT (14 percent) and production processes (12 percent).

Academic cooperation with employers

The UT curricula is 70 percent practical training and 30 percent theory, with the aim of facilitating the rapid entry of graduates into the labor market. The content of UT programs is designed to contribute to regional economic development, given that they are decentralized institutions under the control of provincial authorities. Their role includes teaching, knowledge application, development, and the provision of technology services to local industry and enterprises.

The programs of study in UTs is updated and approved every three years by national committees, one for academic program standards and another for industrial relations—which meet three or four times a year. The specific content of UT programs is defined locally by relevant committees, according to regional demand. The involvement of company directors is

compulsory in both bodies and fundamental to the integrity of the UT system as a whole. In 1994, the system offered only 22 programs related to the industrial and service sectors, which focused on the needs of the production sector (goods and services). By 2005, 365 programs were available, covering a wide spectrum of fields, including electro-mechanical engineering, textile technology, environmental technologies, chemistry, economic-administrative techniques, information and communication technologies, agro-industry, and health.

Most UTs have set up liaison councils, institutional units for industrial relations, technological enterprise centers, and programs for entrepreneurship and consultancy. As a result of these partnerships with local companies, the UTs have run projects with major corporations and developed customized corporate educational programs. The UTs are located in areas with good levels of industrial and economic development, as well as in regions with limited industrial activity, where they act as drivers for regional development. In 2003, a group of 18 UTs created an organization to promote regional development. The body implements programs and projects to support the economic development of different regions and has 9 enterprise centers for innovation in production, industrial processing, and marketing of natural resources.

Quality assurance and accreditation

As of 2005 the TSU examination created by the National Center for the Evaluation of Higher Education (CENEVAL) was being used by 57 UTs (only 6 were using it in 2000).¹³ The number of candidates for the TSU award has increased from 553 (in 10 programs) in 2000 to 21,274 (in 30 programs) in 2005. Nearly all students leaving UTs in 2005 sat for the CENEVAL examination and the percentage of students achieving a “satisfactory to excellent” level on the exam has increased steadily in the past 5 years, from 47 percent in 2000 to 68.5 percent in 2005.

The UT sector has undergone a number of external evaluations in addition to those that the Ministry of Education has conducted since its creation.¹⁴ For example, an evaluation has been carried by a group of foreign experts out every three years since 1996, to verify that the UTs are achieving the objectives set out in their respective mission statements (see Pair et al. 2004). The first evaluation (1996) highlighted the rapid growth of UT institutions, students, and courses. The second (1999) confirmed the validity of the model. The third (2002) concluded that the model

¹³ The first TSU examinations were taken as part of UT course offerings in 2000.

¹⁴ The model for evaluating the quality of the UT subsystem includes 23 operational indicators that investigate 5 fundamental values: effectiveness, efficiency, relevance, partnership, and equity.

was working well, offered the education and services it was expected to offer, and was continuing to open up in international terms. This last evaluation also recognized that the standard of education in the oldest UTs was good and met international criteria.

Articulation with universities and internationalization

Cooperation has grown between Mexican UTs and French IUTs, which involves the introduction of mobility programs for UT students in France, allowing students to prepare for their vocational degree (at a level corresponding to the ISCED 5B3) in a French-language environment. Launched in 2003, the program, funded by the Mexican the French governments and Peugeot, encourages enrolment in French institutions by Mexican students from high-quality¹⁵ public universities and UTs in the fields of engineering and technology. Over 200 young people took part in this program in its first four years, the majority of which achieved excellent results. The agreement that established the academic cooperation program also led to the creation of a Peugeot training center at the UT in Querétaro, which trained 198 employees from various company branches in Mexico by 2005.

In the period 2002–2004, SEP has worked to internationalize the UT system by concluding cooperation agreements with institutions offering level 5B2 courses in France, Canada, and the United States. In 2002, for example, the government concluded an agreement with the University of Cantabria in Spain to facilitate student mobility and applied research programs. In addition, the universities of Cantabria and Murcia and the Polytechnic University of Cartagena are currently completing a strategic analysis of potential cooperation with UTs in Nayarit, Aguascalientes, and Cancun to develop the SME sector in the latter areas.

¹⁵ As recognized by the national Mexican system for evaluation and accreditation.

IV. Critical Success Factors for the ASTE Sector and Institutions: Lessons Learned and Best Practices

The ability of the growing ASTE sector and ASTE institutions to achieve the strategic objectives of many low- and middle-income countries is dependent on a number of critical success factors that have been learned from the OECD countries studied in this report. Among the strategic objectives of ASTE are to:

- provide equity in access to tertiary education for the growing youth cohort and young adults who would otherwise have no opportunity to enter traditional, university-dominated systems of tertiary education;
- provide this access in a cost-effective manner, usually at a lower cost-per-student than four-year universities;
- ensure that ASTE education equips graduates with the knowledge, skills, and competencies needed by employers in a fast-changing knowledge economy;
- offer greater flexibility in program design and delivery in order to respond to the complex and diverse needs of students, the labor market, employers, and governments;
- equip students with the learning know-how, abilities, and skills to pursue lifelong learning;
- establish partnerships and bridges to other educational sectors, including general and vocational secondary education, as well as the university sector of tertiary education; and
- play a meaningful role as an agent of regional economic development in remote regions and/or disadvantaged urban communities.

Size and Credibility

The size of the ASTE sector in a given country—in terms of the number of institutions; their distribution within a given country, province or state; and the sector’s enrolment vis-à-vis that of the university sector—is critical to the ability of the sector and its institutions to achieve their stated strategic goals. The size of the sector can be measured by gross enrolment ratio, that is, as a percentage of the overall gross enrolment in tertiary education in a given country or jurisdiction. Such a measure would, of course, yield distorted results in countries that do not have, or no longer have, “alternative” institutions, such as Germany, where the alternative institutions (*Fachhochschulen*) became part of the university sector in the mid-1990s, or in Finland and Norway, where such institutions, even if they clearly have many characteristics and attributes of ASTE institutions, are considered part of the university sector.

In OECD countries such as France, the United Kingdom, Australia, the United States, and Canada, which have strong ASTE systems, gross enrolment in the sector exceeds 35 percent of the total tertiary education enrolment. It can be argued, therefore, that a lower limit of 25 percent is critical for the sector to be considered viable and achieve the needed impact on its social stakeholders. The process of building a critical mass of viable institutions to create a sector of this size takes time—the better part of a half a century in the United States and Canada, with shorter time periods experienced in France and Spain,

Organization: Institutional Diversity

In most countries, ASTE consists of Tier III institutions that mostly offer shorter-term sub-baccalaureate programs. Using the institutional typology outlined in Section II of this paper, these institutions can be defined along three dimensions: purpose, scope, and ownership and affiliation (see figure 3 for an illustration of the first two dimensions). For example, North American community colleges can be described as multipurpose institutions because their missions include providing occupational programs to prepare graduates for employment, academic “transfer” programs as the first phase of education towards degree-level studies in a university, and continuing education and community service programs. This profile differs from that of the Australian TAFEs, where the transfer function is not an explicit part of their mission statements. Similarly, when the scope of program offerings is examined, many community colleges in the United States and Canada can be considered comprehensive large institutions that offer a wide spectrum of academic and occupational disciplines, as opposed to the French IUTs, which tend to be smaller and more specialized. Finally, the third dimension reveals that depending on their funding, Tier III institutions can be public, private not-for-profit, or private-for-profit educational organizations.

It can be argued that a viable ASTE sector should have a diversity of institutions, so as to better respond to the realities of tertiary education and the need for regional economic development in a given country, state, or province. For instance, the Korean junior colleges, which are predominantly multipurpose, semicomprehensive, private institutions, were unable to respond adequately to the labor market demand for specialized personnel in the health care sector because the relative cost of providing relevant programs of good quality in the field are prohibitive for these colleges’ private investors. In Ontario, Canada, by contrast, these colleges

are publicly funded, allowing the education and training of health care workers to be one of their strengths. However, certain Ontario colleges in remote northern regions, the regional economies of which are limited and highly specialized, have had a difficult time rationalizing their program offerings and carving out a more specialized focus to suit regional needs.

Governance: Autonomy and Accountability

Universities and other institutions belonging to the university sector of tertiary education (USTE) are much older, more established, and have a better resource base than their ASTE counterparts. Universities remain the institutions of choice for the majority of secondary-school graduates and their families in most countries. Public acceptance of ASTE institutions as alternative to universities depends, *inter alia*, on the perception of their status and autonomy compared to that of universities. In many countries, the demarcation between the two sectors is very clear: universities are autonomous and steered from a distance by the government through various governance frameworks, whereas alternative colleges and institutions are governed directly and bureaucratically by a ministry responsible for tertiary education. This is usually interpreted by the public that ASTE institutions are simply an extension of the secondary school system, where policies, curricula, and teaching methods are dictated by directives.

A critical success factor for the alternative sector of tertiary education is, therefore, the establishment of an all-inclusive governance framework for tertiary education that includes both sectors, together with a council of tertiary (or higher) education to ensure fairness and transparency in policy development and implementation. This policy action signals to all stakeholders that ASTE institutions are important players in tertiary education, accorded measures of autonomy similar to those granted universities, and that the same rules governing accountability are demanded of both sectors. (See figure 6 for examples of proposed governance structures for the tertiary education sector.) The tertiary education governance framework in California is an interesting example of an over-arching framework, with a single governing body for all tertiary (higher) education in the state and three separate bodies assigned to govern the three tiers of institutions in the system: the University of California, the California State University, and the California Community College.

Financial Resources: Government Funding

The success of the alternative tertiary sector and its institutions depends in part on the financial commitment of governments to support the sector at a level comparable to that provided universities. Enrolment-based funding formulas have become the mainstay of university funding mechanisms and arrangements in most OECD countries. These formulas provide a basic grant to universities for each enrolled student, with the size of the grant weighted by the duration of the program and the nature of discipline studied. A similar type of formula should be extended to ASTE institutions with adjusted weights for comparable disciplines, taking into consideration the shorter duration of ASTE programs, the relatively shorter institutions-based component of dual-mode programs, and the relative cost of instruction and support services in ASTE institutions. A per student grant for ASTE programs, however, should also be pegged at a level that represents a fair and acceptable percentage of programs in the same field or discipline offered in the universities.

For example, the annual government funding grant provided to a community college student studying software development in a two-year associate degree or diploma program should be based on a fair and acceptable percentage (typically not less than 60 percent) of the annual government grant provided to students enrolled in a four-year computer science degree in a public university. The definition of “fair and acceptable” is ultimately a policy decision by a government, as implemented by the governance framework that it puts in place. Relative equalization of government funding for all tertiary institutions can be facilitated if, as suggested earlier, a system-wide council of tertiary education is established that has a clear mandate to develop fair, transparent, and evidence-based guidelines for funding the ASTE and USTE sectors.

Another mechanism of government financing is performance-based funding, which has been adopted by states and provinces in the United States and Canada. This type of funding uses a number of composite key performance indicators to assess student, graduate, and employers’ satisfaction with the education provided by individual ASTE institutions, as well as their graduation and graduate employment rates. Finland has also adopted performance-based funding that includes an evaluation of excellence in teaching, regional impact, and general performance, including completion rates. The United Kingdom also has some performance-based funding, in

that a certain portion of payment to further education institutions is paid only when a student completes a program.

Funding Diversification: Non-government Funding

The sustainability and growth of ASTE as a viable alternative sector of tertiary education also depends on the ability of national and/or local governments to diversify sources of funding away from traditional enrolment-based government grants. Alternative sources of funding outlined earlier in the paper include the introduction of tuition fees, income-contingent loans, local and/or municipal funding mechanisms, enterprise training programs funded by payroll taxes, and revenue generation from continuing education programs and the provision of services to enterprises and local governments.

Employer Links: Occupational Relevance of ASTE Programs

The continued occupational relevance of academic programs designed and delivered by ASTE institutions is fundamental to the employability of their graduates. An important success factor in this type of education is therefore ensuring that new programs are created only after they have provided evidence—typically backed by documented market intelligence—that their graduates are and will continue to be needed by the labor market. The design of programs should also be scrutinized carefully by program advisory committees, based on criteria provided by prevailing academic experts and occupational standards established by relevant professional associations. The same rigorous process should also be applied to the renewal and /or upgrading of existing programs.

Occupational relevance is also enhanced by the adoption of a work-based cooperative approach to program delivery, with alternate periods of study and work placements in program design. This approach has proven successful in a number of OECD countries, including the United Kingdom, Ireland, France, the United States, and Canada. Governments should therefore endeavor to introduce policies and tax incentives to encourage private-sector enterprises to hire students from such cooperative programs.

Local and Regional Economic Development Benefits

The effort made by some ASTE institutions to become universities negates the purpose of a differentiated tertiary sector. Policy makers who want to maintain the integrity of a differentiated sector must create incentives to encourage institutions to comply with policy objectives, including enhanced funding, rewards for effective teaching, and support for applied research. They must also implement guidelines and frameworks that enforce compliance with these objectives, including regulations governing accreditation and academic awards, faculty credentials, and performance-based funding. Many ASTE institutions soon realize that they cannot win the battle for university status and begin to look elsewhere in their pursuit of status. One clear alternative to the university route is to develop into local or regional institutions distinct from universities that are more responsive to local labor market conditions, more flexible in providing a wide range of alternative programs (e.g., lifelong learning, training for employers, adult education), better at putting applied research and innovation into practice, and better able to participate in local economic development.

The attempt to develop a comprehensive regional focus is characteristic of the Norwegian state colleges, the Finnish polytechnic institutes, and certain community colleges in the United States and Canada. By identifying themselves as distinct alternatives to universities, these institutions have been able to carve a niche for themselves, establish their own conceptions of institutional excellence, and become distinctive parts of the tertiary education system, rather than remain forever subordinate to universities.

Institutional Culture: A Student-centered Learning Environment

Successful ASTE institutions have become leaders in developing flexible, adaptable, and responsive institutional cultures that reflect their stated mission and values, allowing them to offer:

- **Learning innovations.** Many ASTE institutions support a learner-centered institutional culture that employs a range of learning innovations, including discussion-oriented and student-centered teaching, coteaching, and interdisciplinary teaching, novel uses of computers and distance learning, and the integration of internships and other forms of work-based learning. The differences in outcomes observed among ASTE institutions can often be attributed to the mechanisms that they use to mobilize their institutional resources, including training in effective teaching, availability of faculty development programs, sustained mentoring programs, and funds for experimenting with teaching

methods and technology. These mechanisms are available in most ASTE institutions in OECD countries and can be used to improve the quality of teaching. If there is no systematic process to implement and monitor the effectiveness of such mechanisms, however, the learning process is likely to follow the traditional passive learning patterns of universities.

- **Open and distance learning.** The majority of OECD countries offer ASTE programs in the Open and Distance Learning (ODL) form. In some countries, this format is available only for a limited number of programs. The Open University in the United Kingdom is a leader in ODL provision, allowing students to earn modular ASTE qualifications. Ireland also has a well-developed system of open learning, with numerous course providers of ASTE programs. Legislation is currently being prepared in Spain that provides for the use of ODL and ICT in order to allow ASTE students to earn qualifications in an ODL environment.
- **Work-based learning methodologies.** Virtually all ASTE programs involve some student work placements, as well as the participation of business professionals in curriculum design and teaching, to ensure the integration of theory and practice. Adults are often admitted to ASTE programs and can thus build on experiential learning. Integrating work-based learning methods has also been pioneered by the Foundation Degree programs in the United Kingdom and the *Berufsakademien* in Germany, where academic studies are integrated into work-based and application-oriented learning. In fact, it is argued that the practice-oriented, experience-based, and work-related learning of ASTE programs is a more appropriate methodology for students who have a more deductive than inductive approach to learning.
- **Innovative foundation and applied degrees.** One of the key features of the new Foundation Degrees provided by FE colleges in the United Kingdom is that employers play a key role in program design, so that both they and the students are certain that students will gain the skills that are really needed in the workplace. Major employers like KLM and ROVER, for example, have developed foundation degrees designed to meet their needs as they modernize their respective workforces. In the public sector, both the U.K. Ministry of Defense and Department of Health find the work-based Foundation Degrees valuable. In 2002, the Government of Ontario approved the introduction, on a competitive basis, of employer-supported applied degrees in the college system. The criteria for approval of these degrees includes evidence of: (i) strong support from a meaningful group of employers, professional organizations, and other relevant bodies; (ii) potential employment opportunities for graduates; and (iii) the distinctiveness and uniqueness of a program, as compared to similar programs offered by universities.
- **Faculty qualifications and continued development.** The ability of ASTE institutions to attract well-qualified, successful professionals to faculty positions, as well as to support the continued development of their knowledge, professional competencies, and relevant skills, is essential for achieving their missions as educational institutions. Pay scales, workloads, and institutional culture determine their ability to attract and retain highly qualified professionals. However, building institutional capacity to develop viable programs for the continuous upgrading of faculty skills and competencies in program and course development, teaching and evaluation, and academic counseling, are also key elements in ensuring their success.

Partnerships: Articulation and Co-operation with University Sector

Close cooperation between USTE and ASTE institutions has proven a catalyst for improving the quality of ASTE programs and attracting a better caliber of students, who seek to pursue degree programs at a later date. The best example of such cooperation can be found in the virtual integration of universities and state colleges in Norway, where students from colleges can take courses in universities as part of their studies. Such interaction between the two sectors has definitely had an impact on the quality of education in the colleges, where more faculty members now hold doctoral degrees than was previously the case.

In France the professional post-secondary STS programs (leading to the BTS Brevet), which are part of the upper-secondary schools (*lycées*), are often linked to a university authorized to grant a vocational degree in the same field (*licence professionnelle*). A number of OECD countries (e.g., Norway, the United Kingdom, and Ireland) have established pathways and a coherent ladder of progressive learning from ASTE to USTE institutions that is supported by a national qualification framework. This ladder of learning enables students to start in a short-cycle program and progress gradually in a coherent fashion to first obtain an ASTE subdegree qualification, followed by a university degree. This sequenced approach to higher education may also integrate periods of work into degree-level education programs. The approach furthermore offers students a network of learning possibilities, enabling them to move to different parts of the tertiary education system in their own and other countries.

Virtually all countries enable students to pursue ASTE programs on an either full- or part-time basis. In most cases, part-time study uses a modular approach, enabling students to spread their studies over several years. In the United Kingdom, over 500,000 students were enrolled in FE programs in the academic year 2003–2004, more than 80 percent of which were registered as part-time students. The existence of many different pathways for students to obtain a bachelor's degree, even possibly through ASTE institutions, should be considered a strength of a given tertiary education system, as multiple learning pathways are a valuable asset from the perspective of lifelong learning. France is a good example of this type of system, a country in which students who do not go to university have a choice between an IUT (leading to the DUT diploma) and an STS (leading to the BTS certificate). The DUT can, however, be obtained in three ways: through a two-year, full-time program; through continuing part-time education; or through an

apprenticeship model. Having acquired the DUT, a student can then either proceed to a vocational degree (*Licence professionnelle*) or continue to a university, where the DUT is recognized as equivalent of the first two years of the three-year DEUG qualification—the first phase of the bachelor's degree.

Quality Assurance and Accreditation

All countries evaluated in this study have some form of quality assurance for ASTE institutions and programs, which is provided either by an independent national or regional quality assurance body or, in many cases, a department of the ministry responsible for tertiary education. Tertiary short-cycle education programs offered by universities and other institutions of tertiary higher education are generally overseen by the same quality assurance systems and agencies as those that oversee university programs.

A national qualification framework, such as those adopted in Ireland, England and Wales, Scotland, and Australia,¹⁶ is intended to provide a comprehensive, consistent framework for all postcompulsory education and training qualifications offered on a national basis. Such a framework aims to encourage lifelong learning by providing individuals with better scope to progress through various levels of education and training by improving their access to qualifications, more clearly defining avenues for achievement, and promoting national and international recognition of qualifications offered in the country. An NQF is usually committed to flexible, transparent, and systematic learning pathways and the removal of boundaries between tertiary educational sectors.

Lifelong learning implies a dynamic view of education and training, one that seeks to facilitate learning at different stages of life in a wide range of settings and partnerships, rather than viewing various forms of education and training in isolation from each other. Many of the goals of a typical NQF promote lifelong learning by: (i) integrating the qualifications issued by schools, vocational education and training providers, and institutions of tertiary education into a single comprehensive system of titles and standards; (ii) supporting flexible education and training pathways between sectors; (iii) encouraging parity of esteem between academic and

¹⁶ With respect to Australia, see OECD (2003).

vocational qualifications; (iv) facilitating the flexibility needed to serve diverse purposes of education and training, as seen in the institutional differences between the ASTE and USTE sectors; (v) encouraging cross-sectoral partnerships, and (vi) underpinning national policies, in particular those concerning quality assurance, articulation, and credit transfer.

In sum, the lifelong learning approach to higher education differs significantly from existing views of education and learning because it recognizes a broad array of learning techniques and approaches, all of which encourage students to learn over their lifetimes. As a result, it champions a variety of pathways to continued learning, unconstrained by rigid notions of formal education and training.

References

- AACC (Association of American Community Colleges). 2008 (January). "Community College Fast Facts." AACC, Washington, DC, <http://www2.aacc.nche.edu/research/index.htm>. Accessed June 2007.
- ACCC (Association of Community Colleges of Canada). N.d. Web site. AACC, Ottawa, Canada. Accessed June 2007.
- ACAATO (Association of Community Colleges of Ontario). 2006. "Funding for Ontario Community Colleges". ACAATO Working Paper, 2006. ACAATO, Ontario, Canada
- Adolfo, Mir Araujo. 2005. *Los egresados de las universidades tecnológicas, formación profesional y situación laboral*. Mexico City: SEP (Secretaría de Educación Pública) y Universidades tecnológicas de campeche y regional del Sur.
- Bailey, T.R., D.T. Leinbach, M. Scott, M. Alfonso, G. Kienzl, and B. Kennedy. 2003. "The Characteristics of Occupational Sub-Baccalaureate Students Entering the New Millennium." Paper prepared for the National Assessment of Vocational Education, U.S. Department of Education, Washington, DC.
- Bailey, T., D.T. Leinbach, M. Scott, and T. Leinba. 2004. "The Characteristics of Occupational Students in Post Secondary Education." CCRC (Community College Research Center) Brief, no. 21. CCRC, Teachers' College, Columbia University, New York, New York.
- Bondal, S., S. Field, and N. Girourad. 2002. *Investment in Human Capital through Upper Secondary and Tertiary Education*. Paris: OECD
- Boyer, E. 1987. *Carnegie Foundation Report*. New York: Carnegie Foundation.
- Byrne, D. 2006. "Relationship between Financial Aid Policies, Practices, and Procedures at Texas Public Colleges and Universities." University of Texas at Austin, Austin, Texas.
- Campbell, G. 1971. "The Community College in Canada." Association of Universities and Colleges of Canada (AUCC), Ottawa, Canada.
- CCCP (Center for Community College Policy). 2005. "State Funding for Community Colleges: A 50-State Survey." Center for Community College Policy, Education Commission of the States, Denver, Colorado. http://www.communitycollegepolicy.org/html/top.asp?page=/html/publications_main.asp. Accessed March 2007.
- CPEC (California Postsecondary Education Commission). 2006. "Back to College: Are University Graduates Returning Back to College?" Working Paper WP/06-01. CPEC, Sacramento, California.

- Dearden, L., S. McIntosh, M. Myack, and A. Vignoles. 2000. "The Return to Academic and Vocational Education in Britain." London School of Economics and Political Science, London, United Kingdom.
- Dennison, J., and P. Gallagher. 1986. *Canada's Community Colleges: A Critical Analysis*. Vancouver: University of British Columbia Press.
- EC (European Commission). 2003a. *Structures of Education, Vocational Training, and Adult Education Systems in Europe: United Kingdom*. Brussels: Eurydice/ CEDEFOP (European Centre for the Development of Vocational Training), <http://www.dedefop.europa.eu/index.asp>. Accessed May 2007.
- . 2003b. *Structures of Education, Vocational Training, and Adult Education Systems in Europe: The Case of Germany*. Brussels: Eurydice/ CDEFOP (European Centre for the Development of Vocational Training), <http://www.dedefop.europa.eu/index.asp>. Accessed May 2007.
- . 2005. "The Education System in Germany." Web site of the education information network of the European Commission (Eurydice), Brussels, Belgium, http://www.eurydice.org/ressources/Eurydice/pdf/eurybase/2006_DNDE_EN.pdf. Accessed April 2007.
- . 2007a. "Focus on the Structure of Higher Education in Europe, 2006/07: National Trends in the Bologna Process." Web site of the education information network of the European Commission (Eurydice), Brussels, Belgium (07/2007).
- . 2007b. "Focus on the Structure of Higher Education in Europe, 2006/07: National Trends in the Bologna Process." Web site of the education information network of the European Commission (Eurydice), Brussels, Belgium, <http://www.eurydice.org>. Accessed July 2007.
- El-Khawas, E., R. DePietro-Jurand, L. Holm-Nielsen. 1998. "Quality Assurance in Higher Education: Recent Progress; Challenges Ahead." Paper presented at UNESCO World Conference on Higher Education, Paris, France, October 5–9, 1998. Available on the Web site of the World Bank, <http://www1.worldbank.org/education/tertiary/documents/ElainEng3.pdf>. Accessed March 2007.
- EC (European Commission). 2005. "The Education System in Germany." Web site of the education information network of the European Commission (Eurydice), Brussels, Belgium, http://www.eurydice.org/ressources/Eurydice/pdf/eurybase/2006_DNDE_EN.pdf. Accessed June 2006.
- Faulkner, J.B. 2002. "Baldrige Educational Quality Criteria as Another Model for Accreditation in American Community Colleges." ERIC Identifier #ED475564. Available on the ERIC (Education Resources Information Center) Web site of the U.S. government, <http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/>

content_storage_01/0000019b/80/1a/f9/63.pdf. Accessed March 2007.

FAIT (Foreign Affairs and International Trade Canada, Department of). 2002. "Education in Canada." Web page on the Web site of FAIT, Ottawa, Canada, http://www.dfait-maeci.gc.ca/ics-cki/stu_ces-en.asp. Accessed June 2006.

Gangl M., and W. Muller. 2003. *Transitions from Education to Work in Europe: The Integration of Youth in European Labour Markets*. Oxford, UK: Oxford University Press.

Grubb, W.N. 2003. *The Roles of Tertiary Colleges and Institutes: Trade-offs in Restructuring Postsecondary Education*. Paris: OECD.

Grubb, W.N., and Worthen, H. 1999. *Honored but Invisible: An Inside Look at Teaching Community Colleges*. New York: Routledge.

Grubb, W.N., R. Sweet, M. Gallagher, and O. Tuomi. 2006. "Thematic Review of Tertiary Education: Korea Country Note" (July). OECD, Paris, <http://www.oecd.org/dataoecd/37/21/38092630.pdf>. Accessed August 2006.

Harkin, J. and P. Davis. 1996. "The Communication Styles of Teachers in Post- compulsory Education." *Journal of Further and Higher Education* 20, no. 1: 25–34.

HERO (Higher Education Research in the UK). N.d. Web Site. HERO, Ltd., Newcastle-Upon-Tyne, United Kingdom, www.hero.ac.uk. Accessed March 2007.

Kaiser, F. 2001. "Higher Education in France: Country Report." Center for Higher Education Policy Studies (CHEPS), Universiteit Twente, The Netherlands, <http://www.utwente.nl/cheps/documenten/france.pdf>. Accessed July 2007.

Kasper, H. 2002. "The Changing Role of the Community College." *Occupational Outlook Quarterly* (Winter 2002–03). Office of Occupational Statistics and Employment Projections, U.S. Department of Labor, Washington, DC. <http://www.bls.gov/opub/ooq/2002/winter/art02.pdf>. Accessed March 2006.

Kim, G.K. 2007. *Short-term Vocational Higher Education: A Global Challenge in Education*. Paris: Hachette Education.

Kisker, C. 2005. "Creating and Sustaining Community College-University Transfer Partnerships: A Qualitative Case Study." Paper presented at the 30th Annual Conference of the Association for Studies in Higher Education, Philadelphia, Pennsylvania, November 2005.

League of Women Voters of California. N.d. "California State Guide to Government." Website, www.smartvoter.org/gtg/ca/state/overview. Accessed June 2007.

McPhee, S. 2006. "En Route to the Baccalaureate: Community College Student Outcomes." AACC (American Association of Community Colleges), Washington, DC.

- MENRT (Ministère de l'éducation nationale, de la recherche et de la technologie). 1999. "Repères et références statistiques sur les enseignements." La formation et la recherche, MENRT, Paris, France. As cited in F. Kaiser, 2001, "Higher Education in France," CHEPS, Universiteit Twente, The Netherlands.
- Mikhail, S. 2006. "Systems of Higher Education." TPS 1806. Ontario Institute for Studies in Education, Ontario, Canada.
- . 2007. "Technical and Vocational Education: A North American Perspective." Paper presented at a conference on vocational and technical education, "Name of Conference," organized by the Turkish Council of Higher Education (YOK), January 15–17, 2007, Ankara, Turkey.
- MTCU (Ministry of Training, Colleges, and Universities). 2006. "Workshop on Issues of Governance of Community Colleges in Ontario: Ministry of Training, Colleges and Universities MTCU, June 2006." MTCU, Ontario, Canada.
- Nava, A., and H. Moreno. 2007. *Short-term Vocational Higher Education: A Global Challenge in Education*. Paris: Hachette Education.
- OECD. 1999. *Classifying Educational Programmes: Manual for ISCED-97 Implementation in OECD Countries*. Paris: OECD.
- . 2003. "The Role of National Qualifications Systems in Promoting Lifelong Learning: Background Report for Australia." OECD, Paris.
- . 2004. *Education at a Glance*. OECD: Paris.
- . 2005. *Education at a Glance*. OECD: Paris.
- . 2006a. *Education at a Glance*. OECD: Paris, http://www.oecd.org/document/6/0,3343,en_2649_37455_37344774_1_1_1_37455,00.html. Accessed March 2007.
- . 2006b. "OECD Thematic Review of Tertiary Education: Country Background Report for Korea." OECD, Paris.
- Pair, C., J.R. Mallea, J. Mazeran, P. Piejus, and A. Pleurdeau. 2004. "Informes y recomendaciones: 1996, 1999, and 2002." *La evaluación externa de las Universidades tecnológicas: Un medio eficaz para la rendición de cuentas*. Mexico City: Ed. Limusa and UT de la Sierra Hidalguense.
- Parry, G., and A. Thompson. 2004. "Closer by Degrees: The Past, Present, and Future of Higher Education in Further Education Colleges." The Learning and Skills Development Agency (LSDA), London, United Kingdom.

- Prince, M., and Felder, R. 2006. "Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases." *ASEE Journal of Engineering Education* 5 (April 2006): 6.
- Quintini, S., J. Martin, and S. Martin. 2007. "The Changing Nature of the School to Work Transition Process in OECD Countries." Institute for the Study of Labor, Bonn, Germany.
- Schuetz, Pam. 1999. "Shared Governance in Community Colleges: ERIC Digest." ERIC Identifier: ED433077. Available on ERICDigests.org, a non-U.S. government Web site, <http://www.ericdigests.org/2000-2/shared.htm>. Accessed June 2007.
- SEP (Secretaría de Educación Pública de Mexico/ Ministry of Public Education of Mexico). 2005. "Aspectos financieros del sistema universitario de educación superior" (April). SEP Website, http://www.sep.gob.mx/wb2/sep/sep_Informacion_estadistica_y_financiera_sobre_la_. SEP, Mexico City, Mexico. Accessed July 2007.
- . 2006. OECD Thematic Review of Tertiary Education: Country Background Report for Mexico. Trans. by Claudia Esteve. OCED, Paris, <http://www.oecd.org/dataoecd/22/45/37746065.pdf>. Accessed August 2006.
- Statistics Canada. 2007. "Universities and Colleges Revenue and Expenditures, by Province and Territory." Web page of the Statistics Canada Web site, Ottawa, Canada, <http://www40.statcan.ca/l01/cst01/govt41a.htm>. (04/2007)
- World Bank. N.d. Education Statistics Database. World Bank, Washington, DC, www.worldbank.org/edstats. Accessed June 2006.
- . 2006. "Fiscal Efficiency and Vocational Education in the EU8 Countries." World Bank, Washington, DC.



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Over the past two decades, many low- and middle-income countries have embarked on ambitious plans to increase participation rates in tertiary education to support their economic and social development goals. Invariably, they have considered the development of an alternative sector of tertiary education (ASTE) as a cost-effective strategy for managing growth, following the example of the majority of OECD countries. However, the landscape of that sector can be confusing due to the variety of institutional types, cultures, academic awards, modes of articulation with the university sector, degree of autonomy, and governance models. This comparative study of ASTE in selected OECD countries proposes a framework to facilitate the analysis of this sector, distill the lessons learned, and identify good practices to guide the development of the sector. The study emphasizes the fact that the alternative sector is much more complex than the often-used “non-university” terminology suggests.

The findings, interpretations and conclusions expressed in this paper are entirely those of the authors and should not be attributed in any manner to the World Bank, its affiliated organizations or to the members of its board of executive directors or the countries they represent.

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