



Vocational
and Technical

Education in Québec



A system integrating educational and management engineering

Québec 

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and Technical
Education
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FOREWORD

In Québec, vocational and technical education is an integral part of the education system. Its two aims are to enable students to acquire the competencies necessary to ensure personal and professional autonomy, and to meet the need for skilled labour, thereby contributing to socioeconomic development.

Access to skilled labour is key to economic and social development. This holds true particularly today, as competence, innovation and information play a fundamental role in social development. In this context, the importance of education and training is a given.

Québec has adopted an original approach to the development and management of vocational and technical education. Since the mid-1980s, the system has undergone a reorganization based on educational and management engineering, consistent with the province's particular social and economic characteristics. Although programs of study are based on competencies required by the labour market, the development and management of learning activities are just as important in offering universal access to quality education.

While remaining true to the basic principles adopted during the reform of vocational and technical education begun in 1986, the system has continued to evolve thanks to, among other things, broader and more active partnerships and the desire for continuous improvement of every partner in vocational and technical education.

This document presents the results of the vocational and technical education reform in Québec, and describes the Québec model as it exists today. In addition to giving an overview of the vocational and technical education system in Québec, it outlines the educational and management engineering system developed and used here. This integrated system has made it possible to develop and implement the Québec model of vocational and technical education. Produced by the Ministère de l'Éducation du Québec, this document is intended to provide educational institutions, businesses and private sector organizations in Québec with support in their international development activities, more precisely as concerns the educational and management engineering of vocational and technical education.

We hope that it will help fuel the thought processes of all those involved in the revitalization and reform of their countries' education and training systems in order to make them more effective and better adapted to their own sociocultural context.

In order to support its partners in their efforts toward international cooperation, the Ministère de l'Éducation is making this publication available in English, French and Spanish.

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INTRODUCTION

In Québec, the Ministère de l'Éducation (MEQ—ministry of education) is responsible for vocational and technical education (VTE). It provides guidelines and support for its development and supplies almost all of its funding. Although the government plays an important role in the orientation and development of vocational and technical education, program implementation is decentralized. School boards, CEGEPs (general and vocational colleges) and private schools are responsible for offering vocational and technical education programs throughout the province.

This implies very open communication and close cooperation among the different partners and requires a clear division of responsibilities. The Québec VTE model has become an example of the integrated management of systems in which government ministries and agencies, education networks and representatives from the labour market (employers and unions) work together for a common cause. What is now referred to as the Québec VTE model is inseparable from the educational and management engineering process that made it all possible.

This document describes the engineering process developed and used in Québec since the mid-1980s. The process has made it possible to develop and implement a VTE system recognized far beyond Québec's boundaries for its effectiveness, originality and vitality.

In this document, the engineering of vocational and technical education is defined as the body of policies, tools and methods required for the coordinated and rigorous design, organization, implementation and evaluation of educational activities in vocational and technical education.

In Québec, the engineering of VTE is part of a rigorous and dynamic methodology uniting different participants from the education community and the labour market around a social issue.

The engineering process comprises four major components, which are constantly interacting. First, it involves the implementation of a simple and effective political and administrative framework established by the government in close partnership with all the public authorities, education networks, representatives from the labour market and agencies concerned with VTE. The government must also implement the necessary administrative structures to ensure direction of the system. This framework is made up of laws and regulations intended to create government or paragonmental agencies, determine the mission of each and define the administrative and budgetary rules for VTE.

Once this framework has been established, the system must effectively and precisely determine training needs, set priorities and plan program implementation and resource management. This requires the development of a centralized education management process.

At the same time, relevant, cohesive and realistic programs of study are designed by teams of specialists using a rigorous approach to meet the needs expressed by the labour market. This is referred to as the competency-based approach.

Finally, the engineering process involves the complete decentralization of responsibility for the implementation of programs of study in educational institutions. These institutions and their governing bodies, if applicable, are responsible for planning the resources necessary for program implementation and teaching. This must be done within the framework of the pedagogical, administrative and financial rules and standards set by the Minister of Education.

The Québec VTE model is presented in three chapters. Chapter 1 describes the context in which vocational and technical education has evolved, establishes its rationale and gives an overview of its development. It also describes the concept on which the model is based.

Chapter 2 presents the rationale of educational and management engineering, which is the cornerstone of the vocational and technical education reform. It touches on all the components, along with the functions, stages, methods and constituent elements of each, as applicable. The competency-based approach is also explained.

Finally, Chapter 3 presents the system's development prospects, which experimentation, research and implementation teams are currently studying. The glossary at the back defines the main terms used, and a list of abbreviations is also provided.

1

The Québec vocational and technical education system



Photo: Photomédia, François Nadeau

Every education system is understood and interpreted within a given context, culture and history. Today, at the beginning of the 21st century, every education system is also affected by geopolitical and economic conditions, the explosion of technological knowledge and the accelerated globalization of human communication.

In Québec, the government has complete jurisdiction over the education system. The following sections contain brief descriptions of the Québec context, followed by a more detailed account of the education system and the organization and rationale of vocational and technical education. Finally, the chapter ends with a history of the development of VTE in Québec.

1.1 Today's Québec

A vast and fascinating territory, Québec conjures up visions of wide open spaces, wilderness and a modern North American lifestyle, as well as a certain European cachet due to its French and British roots.

With an area of 1.7 million km², Québec is three times larger than France and five times larger than Japan. It has more than a million lakes and waterways. From its source in the Great Lakes, the St. Lawrence River flows through Québec from west to east for some 1200 km before draining into the Atlantic Ocean, and is some 64 km wide at its mouth. Leading straight into the heart of North America, the St. Lawrence is the continent's major waterway. Approximately 80 per cent of the population of

Québec lives in the St. Lawrence Valley, which enjoys a temperate climate and has some of the most fertile land in the province.

Along the great river that helped shape Québec's history and population are the city of Montréal, a cosmopolitan metropolis whose skyline is distinguished by its office towers and commercial buildings, and Québec City, the provincial capital and cradle of French civilization in America, as well as many small coastal towns on the Gaspé Peninsula and the North Shore.

Its geography North American, its origins and culture for the most part French, and its parliamentary system British, Québec is a modern and dynamic society whose standard of living is among the highest in the world. The majority of its seven million inhabitants are French-speaking.

Originally inhabited by Native peoples, Québec opened its doors to immigrants, first from France and the British Isles, then increasing numbers from other countries. Québec welcomes more than 25 000 immigrants every year. A hundred or so cultural communities, mostly in Montréal, make up about nine per cent of the population.

French is the official language of Québec. Eighty-three per cent of the population speak French at home, while 11 per cent speak English and 6 per cent, another language. Half of the labour force speak both French and English and 16 per cent are fluent in a third language, usually Italian, Spanish or Greek. Most of the 11 Native nations speak their own language, and French or English as a second language.

Québec enjoys a modern and open economy, whose growth is based on leading



sectors such as aerospace, biotechnology and information technologies. Because of its wealth of waterways, forests and other natural resources, its economy relies heavily on the hydroelectric, forestry and mining sectors.

The structure of the labour market in Québec demonstrates the importance of vocational and technical education. Some 54 per cent of jobs require vocational or technical skills, 24 per cent are semiskilled, requiring limited qualifications, 13 per cent require a university education and 8 per cent are management positions.

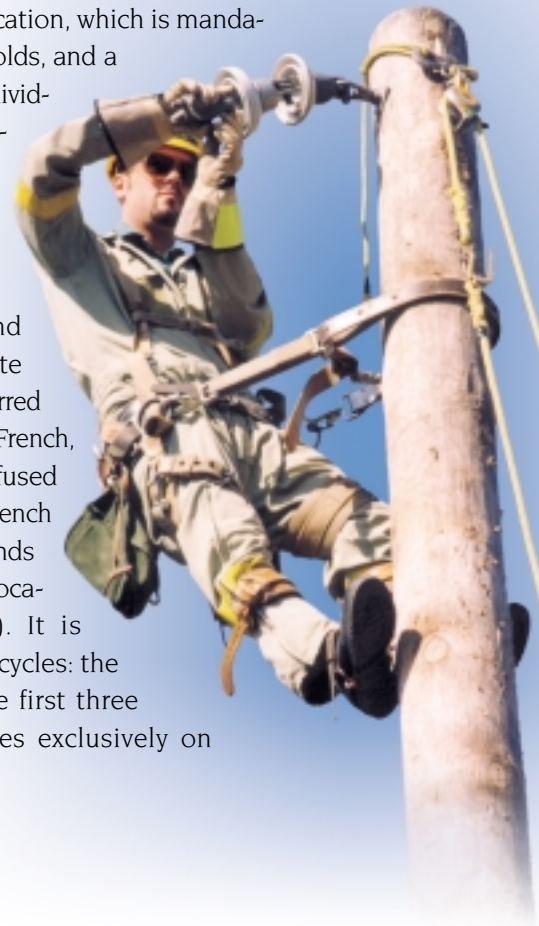
More than 45 per cent of the Québec labour force have a postsecondary diploma or university degree,¹ compared with the Canadian average of 39.2 per cent. Whatever their sector of economic activity, businesses can rely on a skilled work force, thanks to a highly developed education and initial training system, accessible to everyone and free up until the university level. They also have access to a number of financial support measures and relevant continuing education and training programs for their employees' professional development.

1.2 The Québec education system

There are four levels of education in Québec:² elementary, secondary, college and university. Elementary and secondary school are mandatory, while college- and university-level studies (higher education)

are optional. Attendance is mandatory for all children starting the school year in which they turn 6 until the end of the school year in which they turn 16. Vocational and technical education is an integral part of the education system and it serves both young people and adults. Figure 1 illustrates the Québec education system and the relationships between basic general education (elementary and secondary school), vocational and technical education, and university education.

- **Elementary education** is offered in public schools governed by school boards, and in private schools. It includes one year of preschool education, which is mandatory for five-year-olds, and a further six years divided into three two-year cycles.
- **Secondary education** is also provided by school boards and a number of private schools often referred to as “collèges” in French, but not to be confused with CEGEPs (a French acronym that stands for general and vocational colleges). It is divided into two cycles: the first includes the first three years and focuses exclusively on



¹ See <<http://www.stat.gouv.qc.ca/donstat/education/scolarisation/tableau1.htm>>.

² See <<http://www.meq.gouv.qc.ca>>.

Photo: Photomédia, François Nadeau

basic general education. The second cycle allows students to pursue their general education for a further two years before entering college, while providing the opportunity to explore a range of possibilities through optional courses, or to obtain a vocational diploma leading to the practice of a trade. There are 72 school boards: 60 French, 9 English and 3 with special status; 70 of them offer vocational education. The Québec education system also includes 2 schools under government jurisdiction and 23 private schools.

- **College education** is provided by CEGEPs, private colleges and a few schools under government jurisdiction. Colleges are one of the areas in which the Québec system differs from other systems. Two options, both of which lead to the Diploma of College Studies (DCS), are available. One of them, preuniversity education, consists of two-year programs to prepare students to enter university. The other, technical education, consists of three-year programs that lead, like secondary-level vocational education, to the labour market. Under certain conditions, some branches of technical education also render students eligible for university studies. All CEGEPs offer preuniversity education and some technical education programs. Private colleges can offer only preuniversity education, only technical education, or a combination of both. There are 48

CEGEPs, 4 colleges under government jurisdiction and more than 70 private colleges offering technical education in Québec.

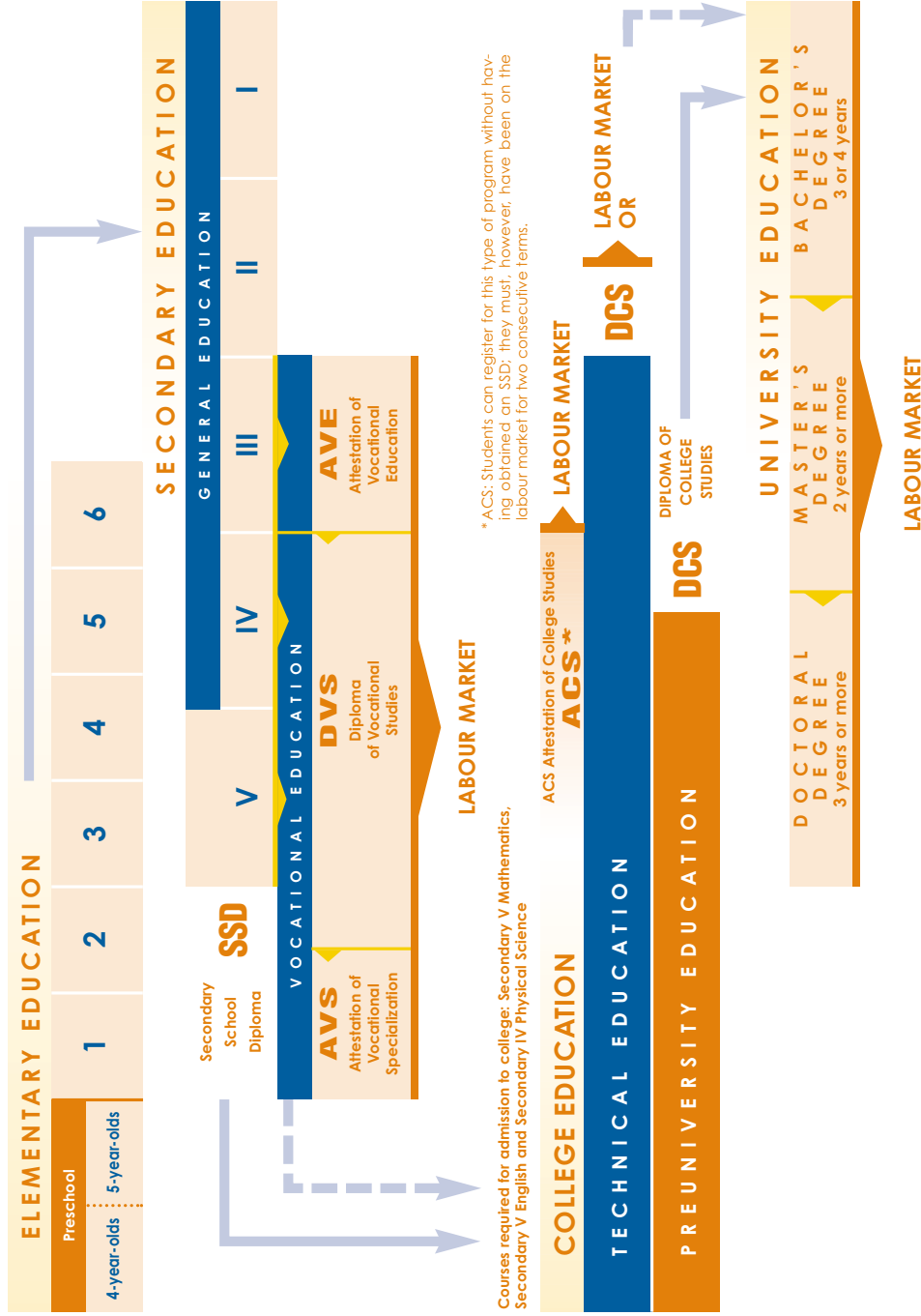
- **University education** is divided into three cycles: undergraduate studies leading to a bachelor's degree, graduate studies leading to a master's degree and postgraduate studies leading to a doctorate. There are 22 universities in Québec, 12 of which are part of the Université du Québec network.

Continuing education and training is provided at the secondary, college and university levels. This is another area in which the Québec education system differs from other systems; with the exception of elementary school, every level of education is responsible for providing adults with education and training in order to meet the needs of individuals and businesses. Most school boards and CEGEPs have a Services to Business and Industry department that organizes existing or customized training activities.

1.3 Vocational and technical education

As mentioned earlier, vocational education in Québec is offered at the secondary level, and technical education, at the college level. Every educational institution at these two levels serves both young people and adults, who, for the most part, learn their trades and occupations side by side.

Figure 1 The Québec education system



1.3.1 Secondary-Level Vocational Education

The aim of vocational education programs³ is to train students for skilled or semiskilled trades.⁴ These trades rely on practical skills; they involve the performance of concrete activities and the systematic handling of tools, instruments and machinery; they require knowledge and precise techniques.

The programs are divided into three distinct branches, each of which leads to a diploma awarded by the government.

- The Diploma of Vocational Studies (DVS) certifies studies in the main branch of vocational education, which leads to the practice of a skilled trade. Programs vary from 600 to 1800 hours over one to two years. Depending on the trade and the program, students must have successfully completed either Secondary III or Secondary IV to be eligible.
- The Attestation of Vocational Specialization (AVS) certifies studies leading to further education or specialization in a given trade. To be eligible for a program leading to an AVS, students must have already obtained a DVS or have acquired the equivalent experience. Programs leading to an AVS vary from 450 to 1200 hours.
- The Attestation of Vocational Education (AVE) certifies training that allows the student to practise a semiskilled trade. It is intended for young people



Photo: Photoméda, François Nadeau

who want to enter the labour market as soon as possible. The program uses a work-study approach or the buddy system to help students learn a semi-skilled trade while getting a basic general education.

The AVE was introduced in 1996 as a means of encouraging students to stay in school at least until they have learned a trade. It is intended for students who are 15 or older and who have successfully completed Secondary II. The program must meet a local employment need and requires that a contract be signed by the student, the school and the business.

1.3.2 College-Level Technical Education

Technical education programs⁵ prepare students to practise a technical trade. They help them master practical scientific applications in production and work organization, in a wide variety of fields including health, the arts, the humanities and social sciences, and physics technology.

³ See <<http://inforoutefpt.org>>.

⁴ See <http://www2.inforoutefpt.org/guide/anglo/programmes_sec.asp>.

⁵ See <http://inforoutefpt.org/site_map>.

The Diploma of College Studies (DCS) is issued by the government and certifies a three-year technical program. All technical education programs include an extensive general education component, including language of instruction, second language, humanities and physical education. This component is equivalent to about one year of studies and is also

offered to students enrolled in preuniversity programs.

Colleges can develop their own programs, which may vary in duration, in order to meet specific training needs. These programs are certified by a diploma issued by the college, that is, an Attestation of College Studies (ACS).⁶

EXAMPLES OF STUDIES IN DIFFERENT BRANCHES IN A GIVEN VTE SECTOR

In the Mechanical Manufacturing sector, a student may earn an Attestation of Vocational Education (AVE) in order to practise a semiskilled trade, such as preparer of material for machining.

In the same sector, to practise the skilled trade of machinist, an individual must obtain a Diploma of Vocational Studies (DVS), which will qualify him or her to use the different conventional or numerically controlled machine tools needed to manufacture the machined parts of a mechanical assembly, in accordance with drawings and specifications.

After obtaining a DVS, an individual who wants to specialize and

become a tool and die maker must obtain an Attestation of Vocational Specialization (AVS).

To become a mechanical engineering technician, an individual must obtain a Diploma of College Studies (DCS), which will qualify him or her, among other things, to participate in design activities, plan the manufacturing of parts and ensure quality control.

Finally, to become an engineer and assume responsibility for an entire design and manufacturing project, an individual must have a bachelor's, master's or doctoral degree in mechanical engineering, awarded by a university.

⁶ See <http://www2.inforoutefpt.org/guide/anglo/programmes_coll.asp>.

1.4 The rationale of vocational and technical education

Having examined the branches of vocational and technical education and the diplomas to which they lead, let us consider the rationale underlying the programs and their implementation. This section presents this rationale, which is the same for both levels of education (secondary and college). Vocational education and technical education are a cohesive unit with the same aims, orientations and general goals.

1.4.1 The Aims of Vocational and Technical Education

Vocational and technical education is a learning process designed for young people and adults who have selected a trade or occupation. Its aims are related to the personal and professional development of the individual, as well as to the improvement of society as a whole. Here, “aim” means the general orientation of concepts and values underlying the organization of a system. The aims of vocational and technical information are:

- to prepare students to assume responsibility in a given area of occupational activity
- to ensure the qualitative and quantitative development of the competencies required to meet current and future labour market needs
- to contribute to social, economic and cultural development
- to contribute to the personal and professional development of the individual

1.4.2 The Orientations of Vocational and Technical Education

Here, “orientations” means the general direction the system is to take. In VTE, three orientations are particularly important.

Vocational and technical education must:

- be accessible
- foster versatility
- be consistent with lifelong learning

Access

Access to education is one way of ensuring a democratic education system. Such access has pedagogical, geographic and financial implications.

In pedagogical terms, it implies a variety of paths leading to diplomas and training approaches, and gateways between vocational education and technical education. The recognition of prior learning and competencies facilitates admission to programs, for which only the essential prerequisites are considered. It also implies a constant concern for academic success, so that a diploma is obtained following a rigorous but realistic evaluation of the competencies to be acquired in a given program.

In geographic terms, everyone in Québec has access to vocational and technical education, usually in his or her own region, thanks to a fair distribution of more than 300 programs of study at the secondary and college levels.

Finally, in financial terms, vocational and technical education is free, and student aid in the form of loans and bursaries is available to those who would otherwise not have the means to pursue their education.

Versatility

VTE fosters the acquisition of a sufficiently wide range of competencies to allow individuals to practise their trade or occupation in different areas of the same field of activity thanks to the transfer of competencies acquired. It is with this in mind that the programs are grouped together into VTE sectors. The programs of study also promote the development of individuals' ability to adapt and adopt attitudes favouring permanent learning, two essential elements in a socioeconomic context characterized by technological change, rapidly evolving job descriptions and competencies, and job mobility.

Lifelong learning

By definition, lifelong learning is not limited to a specific period and may take place regardless of the age of the individual; it is not necessarily acquired in school, and it can involve learning acquired through a variety of means and paths in different places and from different sources. Program offerings in vocational and technical education must therefore be flexible and adaptable to different groups, work situations and socioeconomic needs. Thus, a variety of practices and approaches to learning and organization are used. Programs of study based on the acquisition of competencies favour lifelong learning because they allow educational institutions to focus their pedagogical and educational organization on the student rather than on teaching—a variety of means of accessing education, recognition of prior scholastic and experiential learning, harmonization of programs of study, individualized teaching, and full-time or part-time education—in short, a range of paths to lifelong learning.

1.4.3 The General Goals of Vocational and Technical Education

The four general goals of vocational and technical education are consistent with the MEQ's aims and orientations and are based on competence, integration into the work force, personal and professional development and job mobility. They are as follows:

To develop effectiveness in the practice of a trade or occupation.

That is, to prepare students to:

- take on the roles and duties and perform the tasks and activities inherent in a trade or occupation at an acceptable level of competence for entry into the labour market
- progress satisfactorily on the job thanks to their knowledge and skills in the following areas: technique, communications, problem solving, decision making, ethics, occupational health and safety, and environmental protection



Photo: Photomédia, François Nadeau

To ensure integration into the work force.

That is, to familiarize students with:

- the labour market in general and the specific context of the trade or occupation selected in particular
- their rights and responsibilities as workers

To foster personal and professional development.

That is, to help students:

- develop autonomy and the ability to learn and acquire work methods
- understand the principles underlying the techniques and technologies used
- develop the ability to express themselves, as well as creativity, initiative and a spirit of enterprise
- acquire the attitudes necessary for a successful working life and develop a sense of responsibility and a concern for excellence

To ensure job mobility.

That is, to help students:

- develop a positive attitude toward change
- learn career management techniques, in particular through an awareness of entrepreneurial possibilities and dynamic job search techniques

1.5 Programs of study

Right now, there are 170 vocational education programs leading to a Diploma of Vocational Studies (DVS) or an Attestation of Vocational Specialization (AVS) and more than 110 technical education programs leading to a Diploma of College Studies (DCS). These programs have been designed according to the competency-based approach, which is one of the aspects that characterizes vocational and technical education in Québec.

The MEQ is responsible for developing vocational education programs, while responsibility for developing technical education programs leading to the DCS is shared by the MEQ and the educational institutions.

Vocational and technical education programs are divided into 21 sectors based on the similarity of their competencies and not on the socioeconomic sectors of activity defined in the Québec formal classification of economic activities (CAEQ). The table on the following page lists the different VTE sectors in Québec for which there are programs of study at the secondary and college levels.

Table 1 Vocational and technical education sectors

Sector	
01	Administration, Commerce and Computer Technology
02	Agriculture and Fisheries
03	Food Services and Tourism
04	Arts
05	Woodworking and Furniture Making
06	Chemistry and Biology
07	Buildings and Public Works
08	Land Use Planning and the Environment
09	Electrotechnology
10	Motorized Equipment Maintenance
11	Mechanical Manufacturing
12	Forestry and Pulp and Paper
13	Communications and Documentation
14	Maintenance Mechanics
15	Mining and Site Operations
16	Metallurgical Technology
17	Transportation
18	Fashion, Leather and Textiles
19	Health Services
20	Social, Educational and Legal Services
21	Beauty Care

1.6 Advisory bodies and partners

The MEQ is the architect of vocational and technical education in Québec. It ensures the integrated management of programs of study, as well as the organization and funding of services. It establishes eligibility criteria for access to VTE and awards diplomas. Its responsibilities include:

- defining orientations
- proposing amendments to laws and regulations
- cooperating with other ministries and organizations
- assessing training needs and planning, developing, organizing and evaluating programs of study
- ensuring the geographical distribution of programs of study and setting quotas if necessary
- establishing budgetary and financial rules
- establishing standards for the initial training of vocational education teachers
- awarding diplomas
- measuring the internal and external effectiveness of the system

At the MEQ, the Secteur de la formation professionnelle et technique et de la formation continue (SFPTFC—vocational and technical education and continuing education and training sector)⁷ assumes these responsibilities. It reports directly to the Assistant Deputy Minister for Vocational and Technical Education.

The MEQ is not, however, the only organization responsible for managing vocational and technical education services. It is assisted in this task by its various partners: the Conseil supérieur de l'éducation (CSE—superior council of education), the Comité national des programmes d'études professionnelles et techniques (CNPEPT—provincial vocational and technical education program committee), the Commission d'évaluation de l'enseignement collégial (CEEC—commission for the evaluation of college education), government agencies, businesses and, in a more direct fashion, the school boards, vocational education centres and colleges entrusted with the implementation of the programs of study.

The Conseil supérieur de l'éducation

“Responsibility to keep the educational system in contact with the evolution of society, to point out what changes should be made and to encourage long-term planning will rest above all with the Superior Council of Education.”⁸ (*Report of the Royal Commission of Inquiry on Education*, 1963, Vol. 1, no. 176.)

The CSE was created at the same time as the MEQ under separate legislation that gave it autonomous status. Publicly funded, it is an essential component in preserving the balance of the education system as a whole. Its mandate addresses all aspects of the government's educational mission. This mainly covers formal education, from kindergarten to postsecondary education and adult education, but may also extend to informal education.

The CSE comprises a number of bodies: the CSE itself, five commissions that assist it in its work on matters related to a level or sector of education, and an advisory committee to the Minister of Education on the financial accessibility of studies.

The CSE's mission is to advise the government and to act as a bridge between the public and the government on all matters concerning education, from preschool to adult education.

Under its mandate, set forth in the incorporating Act, the CSE has specific duties and powers. It:

- gives its opinion to the Minister of Education on draft regulations on the following matters related to preschool, elementary and secondary education:
 - the classification and nomenclature of schools and other educational institutions, and of the diplomas conferred by them
 - curricula, examinations, diplomas, teaching licences and teacher qualifications for all subjects

⁷ See <<http://inforoutefpt.org/dgfpt/dgfpt.asp>>.

⁸ See <http://www.cse.gouv.qc.ca/index_e.htm>.

- the coordination of education in all grades
- the standards for territorial division and the equipment of educational institutions
- gives its opinion to the Minister of Education on any matter within its competence that the Minister submits to it, in particular the creation of any new general and vocational college or any new university-level educational institution (the *General and Vocational Colleges Act* provides that any draft regulation on college studies must be examined by the CSE)
- submits to the Minister of Education (who must table it before the National Assembly) an annual report on the state and needs of education, as well as a report on its activities

To summarize, the CSE is an arm's length organization separate from the MEQ. It can choose the topics of its briefs and the themes of its annual reports and, under its internal regulations, determine the time and manner of their release. It provides a forum for consultation and critical reflection, within the province's democratic institutions, which is not subject to pressure from special interest groups.

The CSE is composed of 22 members drawn from the education community and

other branches of Québec society. These members are appointed by the government, after consultation with the associations or bodies most representative of the parents, teachers, school board members and socioeconomic groups. The Deputy Minister of Education is ex officio associate member of the CSE, but does not have the right to vote.

The Comité national des programmes d'études professionnelles et techniques

The CNPEPT⁹ is an advisory body that plays an important role in the joint management of the vocational and technical education system. Chaired by the Assistant Deputy Minister for Vocational and Technical Education, the CNPEPT's mandate is to advise the Minister, in particular on:

- the relevance of the objectives of programs of study in the planning stage
- plans for the development or revision of programs of study
- the geographical distribution of programs

It is made up of representatives of employers, unions, public and private educational institutions, universities, Emploi-Québec (EQ—employment Québec)¹⁰ and the Conseil interprofessionnel du Québec (Québec interprofessional council),¹¹ an agency representing all of the professional orders that accept graduates of a certain number of technical education programs.

⁹ See <<http://inforoutefpt.org/dgfpt/com-nat/comite.asp>>.

¹⁰ See <<http://emploi Quebec.net/indexang.htm>>.

¹¹ See Chapter III of the *Professional Code* at <<http://www.professions-quebec.org>>.

The Commission d'évaluation de l'enseignement collégial

Given the greater autonomy of post-secondary institutions in Québec, the CEEC¹² was created in 1993 to examine the quality of college programs, particularly technical education programs. Its mandate consists in evaluating the quality of the implementation of programs offered in Québec colleges, and the institutional policies on evaluation of student learning and program evaluation, as well as their application. The CEEC also has the power to recommend that the Minister of Education authorize a college to award the Diploma of College Studies, and this, in the CEEC's opinion, must be supported by an institutional evaluation process. The CEEC's evaluation reports, which are public documents, are forwarded to the institutions in question and to the Minister of Education.

Other government agencies

The relevance of vocational and technical education programs is measured according to how well they meet labour market needs. To ensure that these needs are met, it is essential that the architect of these programs have access to the most accurate data possible on the employment situation. This is why the MEQ works closely with the government agency responsible for work force planning, EQ, which reports to the Ministère de l'Emploi et de la Solidarité sociale (MESS—ministry of employment and social solidarity).¹³

For similar reasons, the MEQ has established ties with sectoral ministries, such as the Ministère de la Culture et des Communications (ministry of culture and communications), the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation (ministry of agriculture, fisheries and food) and the Ministère de la Santé et des Services sociaux (ministry of health and social services). Note that two of these ministries run government schools, that is, the Québec institutes of music and performing arts and the institutes of agricultural technology. These schools belong to the two ministries, but the programs of study offered, which lead to the Diploma of College Studies, are developed by the MEQ.

The labour market

Again in order to ensure the relevance of vocational and technical education, the MEQ and its education networks work closely with partners from the labour market to ensure that their needs and expectations are met. Representatives of businesses are called upon to collaborate in the different phases of program development and implementation. These representatives participate, for example, in the quantitative and qualitative assessment of labour market needs, the analysis of trades and occupations, the acceptance of trainees in work-study programs, the adaptation of programs made necessary by technological change, and the loan of human or material resources. Workers,

¹² See <http://www.ceec.gouv.qc.ca/default_en.htm>.

¹³ See <<http://mess.gouv.qc.ca/indexang.htm>>.

employers, ministries and employment agencies participate in these different tasks.

Over the years, the partnership between the MEQ and representatives of the labour market has intensified, partly as a result of the close cooperation between the MEQ and the MESS. The MEQ and representatives of its two networks of institutions participate actively in the duties of the Commission des partenaires du marché du travail (CPMT—commission of labour market partners). The CPMT requests input from employers, unions, communities and the education community regarding the establishment of employment policies, orientations, programs and measures, as well as the management of services.

The MEQ also cooperates closely with EQ, the agency mandated by the MESS to coordinate work force training development activities in Québec and the work force sectoral committees¹⁴ it supports. These sectoral committees, as their name implies, represent economic sectors, for example, industrial metal fabrication, tourism, plastics and the textile industry. The 26 committees are made up of representatives of employer associations, businesses, unions and employee associations that are well aware of the situation and problems of their industry or sector of activity. Created and funded by EQ, their mandate is to define the needs for their own sector, propose measures to stabilize employment and reduce unemployment, and develop continuing

education and training. To this end, the sectoral committees are called upon to analyze the work force. These sectoral analyses make it possible to understand the situation of the work force and employment in a given sector of activity and to propose solutions. Although their mission essentially involves the continuing education and training of the work force, their knowledge of their economic sector is invaluable to the MEQ in the planning of initial training.

Other agencies also participate in the process of determining needs and developing programs of study. These include the Commission de la santé et de la sécurité du travail (CSST—occupational health and safety commission),¹⁵ the Commission de la construction du Québec (CCQ—Québec construction commission),¹⁶ the various professional orders that accept graduates of technical education programs and the agencies that certify programs of study leading to trades or occupations subject to official recognition (competency cards).

Educational institutions

In Québec, management of vocational and technical education is both centralized and decentralized. While the MEQ defines the programs to be offered, educational institutions ensure the implementation of programs and the management of resources, in particular:

- the construction or renovation of facilities

¹⁴ See <<http://www.mess.gouv.qc.ca/indexang.htm>>.

¹⁵ See <<http://www.csst.qc.ca>>.

¹⁶ See <<http://www.ccq.org/eng/index.htm>>.

- the purchase of equipment, materials and other resources necessary to teach the programs
- the recruitment and in-service training of personnel
- the registration and admission of applicants
- initial training and continuing education and training in the various trades
- the development of continuing education and training programs, in particular through services to business and industry
- the evaluation of learning
- the recognition of prior scholastic and experiential learning

The prerogatives of secondary and postsecondary institutions are different. Chapter 2 of this document discusses their respective responsibilities, in particular as concerns the management of programs of study.



Photo: Photoméda, François Nadeau

SUMMARY

Québec is a vast territory in North America. Since the 1960s, it has opted for a universal, free, accessible and quality education system to which it devotes more than 25 per cent of its annual budget. This system includes four levels of education: elementary, secondary, college and university.

Vocational and technical education is an integral part of the education system and serves both young people and adults. Vocational education is offered at the secondary level by school boards and private schools. Its programs lead to the Diploma of Vocational Studies (DVS), which qualifies graduates to practise a skilled trade; the Attestation of Vocational Specialization (AVS) for students wishing to specialize in a given trade; and the Attestation of Vocational Education (AVE), which qualifies graduates to practise a semiskilled trade.

Technical education is provided by CEGEPs, postsecondary educational institutions that also offer general, pre-university programs, and private colleges. Technical education programs are certified by a government diploma, the Diploma of College Studies (DCS), and qualify graduates to practise a technical trade. CEGEPs can also offer their own programs to meet specific training needs. These programs are certified by a diploma issued by the institution, the Attestation of College Studies (ACS).

Vocational and technical education focuses on the overall development of the individual and his or her ability to

acquire and maintain occupational competencies, as well as on the economic, social and cultural growth of the community.

To achieve these aims, and to ensure a democratic system, vocational and technical education is organized so as to:

- be accessible
- foster versatility
- be consistent with lifelong learning

The general goals of vocational and technical education are consistent with the aims and orientations of the system. They are:

- to develop effectiveness in the practice of a trade or occupation
- to ensure integration into the work force
- to foster personal and professional development
- to ensure job mobility

Québec set up the vocational and technical education system to train individuals and facilitate their integration into the labour market. It is a powerful tool for economic development, providing businesses with a qualified work force in every sector of economic and social activity. The Québec VTE model is unique in many ways, including:

- its accessibility despite the expanse of the territory and the small population outside the major metropolitan areas
- its place in the education system and in two levels of education: secondary-level vocational education and college-level technical education

- the integration of a solid general education component in college-level programs
- the integrated management of programs by VTE sector at both levels
- the active participation of partners in all aspects of the program management cycle
- a constant quest for greater consistency between training and jobs
- the use of an approach based on the acquisition of competencies in the development of programs of study
- the delegation of responsibility, to varying degrees and sometimes to a great extent, to education networks in terms of program and resource management
- the integration of young people and adults in initial training

The MEQ requires the collaboration of a number of agencies and partners to ensure the quality of vocational and technical education. Independent agencies, such as the CSE and the CEEC, are mandated to advise the Minister on planned regulations and any question that lies within their field of competence. The MEQ also works in close cooperation with a number of partners in order to fulfill its mission, including the CNPEPT; EQ, the agency responsible for work force planning; the labour market and its representatives, including employers, unions and other employee associations; and, of course, education networks and personnel at educational institutions.

1.7 The history of vocational and technical education

Vocational and technical education has existed in Québec in one form or another for many years. The current system, however, has its roots in the 1960s. Long considered a type of specialized education, vocational and technical education was at first the responsibility of postsecondary institutions. This led to the creation of the École polytechnique de Montréal (EPM—Montréal polytechnic school), technical schools, trade schools and apprenticeship training centres. This section provides an overview of the development of VTE.

In the beginning

In the 19th century, workers took evening courses, which were first offered in 1828 with the creation of the mechanical institutes. Drafting courses were offered to men, while women were eligible for sewing courses.

In the 1880s, the EPM was already providing higher vocational education, but there was little in the way of training for technicians or skilled workers. The first technical schools opened in 1911, and their evening classes quickly became popular.

Then, in 1934, the *Collective Agreement Act* favoured the creation of employer-union parity committees mandated to award classification and qualification certificates. A number of schools opened in the 1930s, including the École du meuble (school of furniture making) and the École des textiles (textile school) in 1935 and the École privée des métiers féminins (private trade school for women) in 1936.

In the 1940s, private vocational schools proliferated. The 1940 Act was passed to regulate the situation, and the Conseil supérieur de l'enseignement technique (superior council of technical education) was formed. The war years witnessed the opening of many arts and technical schools offering short programs, which allowed women access to training traditionally reserved for men.

In 1958, the technical schools became institutes of technology and the arts and technical schools, trade schools. Most often, vocational and technical education was governed by different ministries, such as the Ministère de l'Agriculture (ministry of agriculture), the Ministère de la Jeunesse et du Bien-être social (ministry of youth and social welfare) and the Ministère de la Santé (ministry of health).

The 1960s

The major education reforms, including the reform of vocational and technical education, took place in the 1960s. In 1961, the Royal Commission of Inquiry on Education, chaired by Alphonse-Marie Parent, undertook a gargantuan task: a five-volume report was published between 1963 and 1966. The Commission proposed orientations that are still valid today—democratization, accessibility and versatility—as well as major changes that form the basis of the structure of Québec's education system, including the creation of the MEQ in 1963. Introduced in 1967, CEGEPs and comprehensive high schools were also a result of this reform. General education and vocational or technical education would now coexist in these educational institutions belonging to two

different levels of education. In 1964, the MEQ took over the Direction de l'enseignement spécialisé (specialized education branch). The democratization of education also applied to adults; this was an attempt to solve the problem of access to education and, at the same time, to ensure work force development.

The 1970s and 1980s

After more than a decade of reforms, the education system still had its weaknesses. A series of studies and publications followed, establishing an initial overview

of the situation and recommending corrective measures: a green paper entitled *Primary and Secondary Education in Québec* (1978), *The Schools of Québec: Policy Statement and Plan of Action* (1979) and *The Québec School: A Responsible Force in the Community* (1982). College education had already been reviewed and the Nadeau Report, requested by the CSE, appeared in 1975.

During the same period, a distinct lack of interest in vocational education was observed among young people. For this reason, in 1980, the MEQ undertook a vast consultation process on vocational



Photo: Photomédia, François Nadeau

education in Québec. The resulting policy statement appeared in 1982 in *Technical and Vocational Education for Young People: Proposals for Revival and Renewal*. Vocational education was the subject of two waves of reform in the 1980s. First, short programs disappeared and only programs leading to the Secondary School Vocational Diploma (SSVD), as the Diploma of Vocational Studies was then known, remained. Then, in 1986, the MEQ published a plan of action on vocational education at the secondary level, which gave rise to a major reform in 1987-1988. The aim of this reform was to improve the quality of vocational education and to ensure greater consistency between program offerings and work force needs. In particular, it resulted in the implementation of Services to Business and Industry departments in school boards.¹⁷

Within the context of this reform, the MEQ reengineered its program development process to a significant extent and generalized the application of a methodology based on the acquisition of competencies, a methodology originally developed by the Direction de l'éducation des adultes (adult education branch). Program development now relied on the qualitative and quantitative analysis of work force needs by sector and the detailed analysis of the employment situation in the trade in question.

Also in 1982, the *Jean Report* was tabled by the adult education commission. This report dealt with, among other things, the training needs of adults in relation to the labour market. The government's

response, in 1984, in a document entitled *Continuing Education Program: Policy Statement and Plan of Action*, came in the middle of a recession and, although the adult education community was unhappy with it, it integrated the vocational education systems for young people and adults enrolled in initial training; made vocational education more consistent with work force needs, taking into account the situation outside the major metropolitan areas; and established the recognition of prior learning.

In a manner of speaking, the engineering of today's vocational and technical education system had begun.

The 1990s

During the 1990s, Québec continued to analyze and reform its education system. In 1993, it began trying to solve the problem of young people's lack of interest in vocational education, the drop-out rate and the absence of gateways between secondary school and college. In its document entitled *Investing in Competence*, the MEQ focused on improving the accessibility and complementary nature of programs and on forming ongoing partnerships with all the socioeconomic players.

In 1993, the merger of the MEQ with the Ministère de l'Enseignement supérieur et de la Science (ministry of higher education and science) led to the creation of the Direction générale de la formation professionnelle et technique (DGFPT—vocational and technical education branch). For the first time, management of the

¹⁷ For up-to-date information on Services to Business and Industry, see <<http://inforoutefpt.org/sae>>.

development of both systems, secondary-level vocational education and college-level technical education, was truly integrated. The cohesiveness and effectiveness of the system depended on the harmonization of programs of study offered at the two levels of education and the establishment of an integrated map of options. It was at this time that the vocational and technical education programs were divided into 21 sectors and that planning studies were conducted in order to define priorities on a five-year basis. That same year also saw the creation of the CNPEPT, an important political and administrative advisory body, to ensure joint management of vocational and technical education in both qualitative (program development) and quantitative terms (the regional distribution of teaching authorizations).

In April 1993, in its document entitled *Colleges for the 21st Century*, the government enhanced the role of colleges in the education system and increased their level of responsibility, particularly with respect to the development and evaluation of programs of study. All programs now had to be designed according to the competency-based approach. Colleges were also encouraged to adopt policies for the evaluation of learning and the evaluation of programs of study. To ensure the quality of these policies and their application, the government created the CEEC.

Also in the 1990s, it was time to evaluate Québec's education system. It was now more than thirty years old; ad hoc

reforms had changed much of it, but it had never been reviewed in its entirety. In 1995 and 1996, the Québec government undertook a series of consultations to evaluate its education system: the Estates General on Education.¹⁸ This review led to the ministerial plan of action for the reform of the education system in 1997 entitled *A New Direction for Success*.¹⁹ A major aim of this plan was to “intensify the reform of vocational and technical education.”

A number of changes ensued, including the implementation of incentives for academic success; the diversification of training approaches; the joint planning of program offerings in accordance with the economic structure of the regions; the more intensive use of information and communications technologies (ICTs); the establishment of gateways between vocational education and technical education; and a new series of consultations concerning the adoption of a government policy on continuing education and training.

In addition, the experimental program aimed at diversifying the vocational education paths open to young people, launched in 1995, which initially contained five options, led to the creation of a new vocational education branch certified by the Attestation of Vocational Education (AVE), leading to the practice of a semiskilled trade. This program also provided an opportunity to test the viability of admitting students to a vocational education program leading to the DVS immediately after successful completion of Secondary III

¹⁸ See <<http://www.meq.gouv.qc.ca/etat-gen/finalrep/tmat.htm>>.

¹⁹ Available at <<http://www.meq.gouv.qc.ca/reforme/reform.htm>>.

and teaching Secondary IV and V general education subjects concurrently with vocational education courses.

On July 1, 2000, the Québec government adopted the *Basic Vocational Training Regulation*. Provided for by an amendment to the *Education Act* in 1997, this basic regulation now applied to both young people and adults; until then, young people and adults enrolled in vocational education had been governed by two separate basic regulations. Admission to vocational education immediately after Secondary III and the AVE are recognized in the new regulation.

During this same period, a series of changes in the management process profoundly modified the educational and management engineering of VTE. These changes included:

- increased control over VTE throughout the territory
- a raising of the threshold for admission to vocational education
- the implementation of a management approach by VTE sector
- the revision of programs of study according to the competency-based approach
- the creation of an integrated map of options
- the establishment of a funding method for vocational education related to the certification of studies
- the enhancement of vocational education
- better teacher training
- the consistency of VTE with lifelong learning

On the whole, over a 15-year period, the entire rationale for vocational and technical education in Québec changed. Today, it boasts a sound architecture, solid partnerships, adapted places of learning, well-trained personnel and innovative programs.

The two levels of education are now managed by the same government branch, and programs are designed according to the competency-based approach. In addition, there is significant interaction with the different agencies concerned by VTE. The educational and management engineering of the vocational and technical education system in Québec are now in place.

In 2001, following an administrative reorganization of the MEQ, the DGFPT became the Secteur de la formation professionnelle et technique (SFPT—vocational and technical education sector). In 2002, the Direction de la formation générale des adultes (adult general education branch) joined the SFPT, which then became the Secteur de la formation professionnelle et technique et de la formation continue (SFPTFC—vocational and technical education and continuing education and training). The SFPTFC reports to the Assistant Deputy Minister. This reorganization should help ensure consistency between program offerings and the changing needs of the labour market, through the development of an observation process in real time referred to as “sector watch.”

The need to clarify the orientations of Québec society in terms of adult education and training, and the need to firmly establish a culture of lifelong learning in

Québec are the key concepts that led to the development of the *Government Policy on Adult Education and Continuing Education and Training*.²⁰ This policy was launched in May 2002, along with its accompanying plan of action, under the responsibility of the Minister of State for Education and Employment and the Minister for Employment.

SUMMARY

Vocational and technical education has evolved considerably over the years. For all intents and purposes, it did not exist at the beginning of the 19th century. At first limited to evening courses, it began to evolve into its present state in the 1960s, with the first major reforms of the education system. The MEQ was created in 1963. The creation of CEGEPs in 1967 broadened access to technical education by increasing the number of programs and the institutions authorized to offer them; vocational education was integrated into the new network of comprehensive high schools.

In the 1980s, students' disinterest in vocational education brought to light certain weaknesses of the system, which led to the adoption of corrective measures. A major reform took place in 1987-1988. Its aim was to increase the quality of vocational education and to ensure greater consistency with work force needs. Short programs disappeared; only programs leading to the Secondary School Vocational Diploma (SSVD), as the Diploma of Vocational Studies was

then known, remained. All vocational education programs were now designed according to the competency-based approach. The government's orientations in terms of adult education favoured the integration of young people and adults enrolled in initial training.

In a manner of speaking, the engineering of today's vocational and technical education had begun. Its structure was enhanced in the 1990s, as Québec undertook a major evaluation of its education system, now thirty years old. The role of colleges was confirmed, and technical education programs were now developed according to the competency-based approach. The Estates General on Education were a series of major consultations in 1995 and 1996, and some aspects of vocational education were improved in order to promote access to the labour market and ensure greater consistency between program offerings and work force needs.

Finally, in 2002, the *Government Policy on Adult Education and Continuing Education and Training* and its accompanying plan of action were published.

In 2002, vocational and technical education programs:

- are managed by the same department, the MEQ's Secteur de la formation professionnelle et technique et de la formation continue (SFPTFC)
- are offered by secondary schools (vocational education) and colleges (technical education)

²⁰ Available at <http://www.meq.gouv.qc.ca/reforme/formation_con/Politique/politique_a.pdf>.

- are designed according to the competency-based approach and are accessible to both young people and adults
- are harmonized, so that they enable students to move from vocational education to technical education and from technical education to university education

2

Educational and management engineering



Photo: Photomédia, François Nadeau

The engineering of vocational and technical education is the body of policies, tools and methods required for the coordinated and rigorous design, organization, implementation and evaluation of educational activities in vocational and technical education. Two types of engineering are involved, one arising from the general orientation of the system in accordance with government education and training policies and the establishment of management processes, and the other related to the processes and methods involved in the design and development of programs of study.

The Québec VTE system and its engineering are based on certain fundamental premises corresponding to political choices made by Québec society.

- VTE is fully integrated into the education system and is intended for both young people and adults.
- The government plays an important role in the development and implementation of the system (centralization).
- VTE is defined in close cooperation with the labour market. The program development process focuses on the competencies required to practise a trade or occupation (demand-driven system).
- The system is implemented and managed in close partnership with all interested parties, in particular, representatives of the labour market.
- Educational institutions, which enjoy significant autonomy, are responsible for program implementation (decentralization).

The Québec engineering model is made up of four major components, each of which is related to a different area of responsibility. They are:

- government orientations, policies and structures
- the central management of education
- program development
- program implementation at the local level

These components, which are in part the responsibility of distinct bodies, involve a number of partners, and they are applied at different levels. The underlying organizational model is based on a dynamic balance between centralization and decentralization, and between direction and architecture on the one hand, and adaptation and program implementation at the local level on the other.

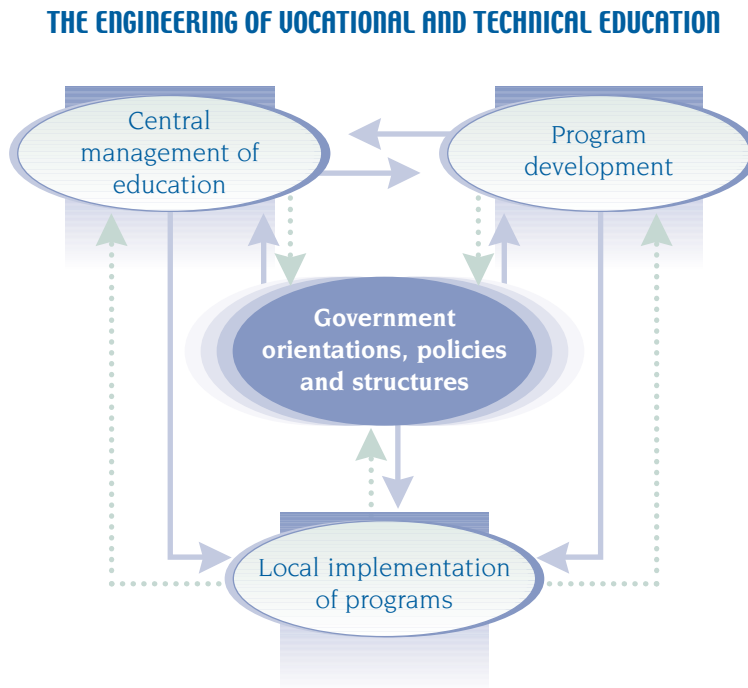
These four components interact systematically within a clearly established process. Figure 2 illustrates the close interaction among the four components: government policies have a direct impact on the central management of education, program development and program implementation in educational institutions.

Conversely, the final three components may result in the need to modify or adapt government policy. Thus, each component must constantly take into account changes in the others and the relationships among them in terms of educational and management engineering.



Photo: Photomédia, François Nadeau

Figure 2 The components of the Québec model



Government orientations, policies and structures involve the major educational and training objectives of the government and its ministries, as well as the legislative and administrative framework. The definition of the roles and responsibilities of the partners is an important component, as is the definition of the management structures ensuring administrative direction.

The **central management of education** applies to the planning and organization of education at the ministry level. This involves the assessment of needs in order to ensure that program offerings are consistent with work force needs; the funding of human, physical and material resources; the planning of the map of options; the management of capital projects and the

purchase of new equipment; the establishment of funding methods; the determination of performance indicators for the system; and other factors.

Program development involves the qualitative analysis of training needs and management of the design, development or revision of programs. Program development is based on the acquisition of the competencies required to practise a trade or occupation (competency-based approach).

Program implementation at the local level is the purview of the educational institutions, that is, vocational education centres under the jurisdiction of school boards, and colleges. Guided by the major ministry orientations, these institutions are responsible for the implementation of programs and the evaluation of learning.

They must therefore coordinate the tasks involved in program implementation.

All four components involve dimensions of management engineering and educational engineering, although the first two are more closely related to management and the latter two, to education. This classification provides the structure for this chapter of the document, which deals with each of the major components of the engineering of vocational and technical education in Québec.

2.1 Government orientations, policies and structures

The provinces of Canada are fully responsible for the development of education and training in their territory.²¹ The Québec government²² has entrusted the MEQ²³ with the architecture and central management of vocational and technical education throughout its territory. Within the MEQ, the SFPTFC²⁴ is responsible for providing the expertise and clarification necessary to develop policies and ensure the central management of education.

The major reform of VTE begun in Québec 16 years ago in 1986 is based first and foremost on the government's firm political will to better meet the needs of the public and of businesses. Since then, VTE has been considered an important contributor to economic development

in a knowledge-based society in which human capital is the greatest resource.

The implementation of a political and administrative framework conducive to the development of vocational and technical education was the first component of the model. The aim of this framework was to help determine the major orientations of the system and to ensure its application at the legislative and administrative levels.

The architecture of the process was entrusted to a government agency responsible for VTE as a whole. This situation was more conducive to the integrated and harmonious development of education and training throughout the province and it enabled the central agency to ensure the fair distribution of resources on the basis of the specific needs of each region.

The MEQ must ensure that its strategic orientations for VTE are kept up to date with respect to the development of work force needs. To this end, it regularly consults the different partners in question and solicits their help in the development of policies and plans of action. The CSE plays an important role in this regard by providing the Minister of Education with opinions on all draft regulations concerning the education system.

New ministry orientations can lead to changes in laws and regulations and in the management structure of the MEQ

²¹ The Council of Ministers of Education, Canada, is responsible for coordinating education policies among the different provinces. See <<http://www.cmec.ca/indexe.stm>>.

²² See <<http://www.gouv.qc.ca>>.

²³ See <<http://www.meq.gouv.qc.ca>>.

²⁴ See <<http://inforoutefpt.org>>.

itself or of educational institutions. They can also alter the sharing of roles and responsibilities between the MEQ and its partners in the education networks or entail new administrative measures. Finally, they may result in changes to the program development process, at both the pedagogical and management levels. Figure 3 is a good illustration of how this component of the engineering system constitutes a point of departure and a focus for the other three components, which apply ministry orientations and political and administrative decisions regarding vocational and technical education.

The main phases of this component of the engineering of VTE are:

- the establishment of priorities and sociopolitical commitments

- the definition of the roles, powers and responsibilities of local and regional authorities
- the revision of the legislative framework
- the establishment of an administrative apparatus

The next section begins with the definition of government orientations and policies related to vocational and technical education, all of which are the result of social consensus. It then describes the sharing of responsibilities with partners and associated agencies and the need to adapt current laws and regulations to comply with the new orientations and the new social contract on the sharing of responsibilities. It ends with the definition of the administrative framework for the management of the system.

Figure 3 Implementation of the political and administrative framework



2.1.1 Establishment of Priorities and Sociopolitical Commitments

The establishment of priorities and sociopolitical commitments affects all orientations and policies related to the development of vocational and technical education defined by the government and the MEQ. It is aimed at ensuring an appropriate response to the training needs created by changes in economic activity and demand for competencies as effectively as possible. Therefore, the planning of activities and the definition of programs and evaluation components are based on a policy statement.

In recent decades, the MEQ has adopted a variety of policies to ensure that vocational and technical education meets society's expectations and that graduates have acquired the competencies necessary to enable them to contribute to the growth of their community. These policies were developed as a result of consultations, sometimes of the entire population—the Estates General on Education, for example—and they correspond to the government's political commitments.

Each of these policies has been translated into a plan of action that serves as a common thread for the promotion and improvement of VTE and for the gradual creation and mastery of the engineering process, in terms of both management and education. The establishment of these policies sometimes required that the legislative and administrative frameworks governing vocational and technical education be revised.

2.1.2 Definition of Roles, Powers and Responsibilities

Roles, powers and responsibilities are shared among different partners and are generally defined by legislation. That is why it is necessary to review the distribution of roles, powers and responsibilities every time a new policy is adopted. Two types of analyses are involved:

- a political analysis to determine the desired outcome, given society's objectives and the government's orientations
- an administrative analysis to determine the ability and jurisdiction of each partner in light of the new orientations

As mentioned in Chapter 1, the implementation of the VTE system in Québec is a collective effort. It involves a number of partners at the government, ministry, regional and local levels. These partners participate in the definition of strategic orientations, the management of program offerings, the evaluation of the system or the implementation and teaching of programs, as the case may be.

This joint management of VTE requires, however, that the roles, powers and responsibilities of each partner be clearly defined and that they complement each other, otherwise coordination might become extremely difficult and the system, ineffective. This definition of the roles, powers and responsibilities of each partner involved in the management process must appear in the statute granting legal constitution and recognition. The nature of the desired contribution and the point in time at which it is expected should,

however, be planned and recognized in a cohesive and universally accessible management process.

2.1.3 Revision of the Legislative Framework

The legislative framework governing vocational and technical education consists of laws enacted by the Québec National Assembly, containing provisions concerning, in particular, the main administrative aspects of vocational and technical education. Regulations specify the ways in which these laws are to be applied. Each level of education providing vocational education and technical education is governed by its own legislative framework.

LAWS

The five main laws governing vocational and technical education in Québec are:

- *An Act respecting the Ministère de l'Éducation*
- *the Education Act*
- *the General and Vocational Colleges Act*
- *An Act respecting private education*
- *An Act respecting the Commission d'évaluation de l'enseignement collégial*

An Act respecting the Ministère de l'Éducation

This law specifies the duties of the Minister, the Deputy Minister, the public servants and other employees of the MEQ. It specifically states that the MEQ is ultimately responsible for the direction and architecture of education throughout the province.

²⁵ See <<http://www.meq.gouv.qc.ca>>.

The Education Act

This law governs the organization of basic education, secondary education, vocational education, adult education and continuing education and training. It specifies the respective jurisdictions of the government, the Minister of Education as well as the school boards and their educational institutions. The power to provide educational services in a given territory is delegated and attributed to school boards, which are managed by a council of commissioners made up of citizens elected by universal suffrage by and from the population of the territory.

The *Education Act* clearly defines the functions and powers of the different authorities.²⁵ The MEQ is responsible for the architecture of the education system, its major orientations, the design of programs of study, the allotment of resources and the evaluation of the system. School



Photo: Photomédia, François Nadeau

boards are responsible for providing educational services in their territory and adapting the MEQ's orientations to the characteristics of the population. Schools and vocational education centres have a certain amount of autonomy with respect to program implementation at the local level.

The *Education Act* defines:

- the functions and powers of the Québec government and the MEQ in matters related to preschool, elementary, secondary and vocational education, as well as continuing education and training
- the establishment, functions and powers of school boards and educational institutions, including vocational education centres
- the composition, functions and powers of the board of governors
- the selection, functions and powers of the director of a vocational education centre
- the rights and obligations of young people and adults with respect to their own education, including vocational education

The General and Vocational Colleges Act

This law defines the functions and powers of the Québec government and the MEQ with respect to college education, as well as the establishment, functions and powers of colleges. In particular, it relates to:

- the *College Education Regulations*

- tuition fees
- budgetary and financial rules

This law defines the establishment and management of CEGEPs. Created upon the government's recommendation, these educational institutions are managed by a board of governors appointed by the government after consultation with the communities concerned. The board must represent the different partners from university education, college education (administration, teachers and students) and secondary education, the business community, the labour market, the corporate community and parents. In addition, an academic council, instituted by the board of governors, is responsible for providing opinions on all questions concerning programs, evaluation of student learning and the certification of studies.

An Act respecting private education

Québec also has a private education system. Some institutions in this system are partially subsidized, while others receive no money from the government. Private schools hold permits granted under the *Act respecting private education*. They can offer vocational education and technical education programs in addition to general education programs. When they offer programs leading to a government diploma, they are subject to the same basic regulations as public schools, in particular as concerns the content of programs, the admission and registration of students, school attendance and the school calendar.

An Act respecting the Commission d'évaluation de l'enseignement collégial

The CEEC²⁶ was created to implement far-reaching college education renewal proposed by the Minister of Education to ensure that “all Quebecers... have access to a high-calibre, top-quality college education that enables them to attain the highest possible skills standards.”

The establishment, composition, mission, powers and responsibilities of the CEEC are defined in the Act. The mission of the CEEC, formed of three commissioners appointed by the government, consists in evaluating, for each educational institution:

- the institution's policy on the evaluation of student learning and the procedures for the certification of studies, and their implementation
- the institution's policy on the evaluation of programs of study, and their implementation
- the implementation of the programs of study established by the Minister of Education, taking into account the objectives and standards assigned to them
- the objectives, standards and implementation of the programs of study established by the institution, taking into account the needs these programs are designed to meet

REGULATIONS

The government, that is, the cabinet, adopts regulations by decree, in accordance with legislative provisions. Two

regulations govern vocational and technical education and dictate the rules for organizing education at each level. They are:

- the *Basic Vocational Training Regulation*
- the *College Education Regulations*

These regulations address:

- the nature of educational services
- the administration of programs or the organization of educational services
- the general, vocational and technical education branches
- the programs of study
- the admission of candidates
- the evaluation of learning, the certification of studies and the diplomas or attestations awarded by the MEQ and the educational institutions
- other provisions specific to each level of education

In addition, every year, the MEQ publishes its *Vocational Education Directives* to inform school boards of the decisions made by the Minister concerning the *Education Act* and the *Basic Vocational Training Regulation*. This document, which takes into account amendments to the Act, addresses the distribution of programs of study, admission requirements, learning profiles, free learning services, the evaluation of learning, the certification of studies and other relevant topics. The document also contains the list of programs of study recognized by the Minister and the list of educational institutions

²⁶ See <http://www.ceec.gouv.qc.ca/default_en.htm>.

authorized to offer each vocational education program.

The MEQ also publishes annual budgetary rules defining subsidy standards. Each year, the Minister submits these rules to the Treasury Board for approval. The rules determine, among other things, operating and capital expenditures and the portion of debt eligible for subsidies.

2.1.4 Establishment of an Administrative Apparatus

In order to ensure quality education, the MEQ has chosen to entrust the responsibility of orienting and supporting the development of vocational and technical education to the Direction générale des programmes et du développement (DGPD—programs and development branch) of the SFPTFC, which has two major responsibilities: the development of initial training programs and the planning of program offerings.

The first responsibility focuses on meeting general and specific training needs consistent with continuing education and training. It is a question of ensuring consistency among vocational and technical education programs, the initial training needs of young people and adults, and labour market needs, by:

- determining the competencies required by the labour market and workers (quantitative matching)
- defining programs of study specifying training objectives and standards and the distribution of these programs between the two levels of education

- establishing means of organizing education in order to achieve program objectives while respecting limitations, particularly with respect to resources
- establishing learning paths facilitating movement from one level of education to another

The second responsibility involves the central management of education. It is a question of ensuring:

- the greatest access possible to vocational and technical education, while maintaining a certain balance between the number of enrollments and labour market needs (quantitative matching)
- the optimization and rationalization of the use of resources so as to offer quality education throughout the province
- the creation of different partnerships likely to favour the development of vocational and technical education at the regional, provincial and international levels

The DGPD could not fulfill its responsibilities without the constant collaboration of other branches of the SFPTFC, particularly the Direction de la gestion des ressources (resource management branch) and the Direction de la formation continue et du soutien (continuing education and training and support branch).

For the creation and maintenance of quality programs, the distribution of program offerings throughout the province and support for education networks, the SFPTFC focuses on the following:

- access to initial and continuing vocational and technical education

- the complementarity of programs offered at the secondary and college levels
- continued cooperation with socio-economic partners

SUMMARY

The engineering of vocational and technical education is defined as the body of policies, tools and methods required for the coordinated and rigorous design, organization, implementation and evaluation of educational activities in vocational and technical education.

In Québec, management engineering and educational engineering combine four major components of the system, each one of which applies to a distinct area of responsibility. These components are:

- government orientations, policies and structures
- the central management of education
- program development
- program implementation at the local level

The Québec government played an important role in the implementation of the vocational and technical education system. At every juncture, it did political and administrative analyses in order to meet the requirements of our constantly changing modern society. The government defined clear political orientations and ensured the constant cooperation of its various partners, while frequently consulting the public and the different regional and local political authorities.

The roles, powers and responsibilities of the different authorities and levels of

education concerned were clarified. The legislative framework comprises five major laws:

- *An Act respecting the Ministère de l'Éducation*
- the *Education Act*
- the *General and Vocational Colleges Act*
- *An Act respecting the Commission d'évaluation de l'enseignement collégial*
- *An Act respecting private education*

These laws define the functions, powers and responsibilities of the different ministries and agencies that contribute to VTE. The direction or architecture of the system is the responsibility of the MEQ, while secondary- and college-level educational institutions are responsible for providing services to the population.

The *Basic Vocational Training Regulation* and the *College Education Regulations* include indicators regarding the nature of services, the programs of study themselves, the administration of programs, the branches of VTE and the admission and evaluation of students. Every year, the MEQ publishes the provisions and budgetary rules applicable to vocational and technical education.

In order to ensure the relevance and quality of VTE throughout the province, the MEQ has chosen to entrust the *Secteur de la formation professionnelle et technique et de la formation continue (SFPTFC)* with the responsibility of orienting and supporting its development. The SFPTFC administers the system by developing programs of study and coordinating the planning and development of program offerings throughout the province.

2.2 The central management of education

Management of program offerings at the ministry level ensures the cohesive and efficient implementation of the vocational and technical education system throughout the province. In a manner of speaking, it is the operating arm of the government orientations, policies and structures on which it is based. It groups together all the management functions of the system. Successive reforms have ensured its gradual implementation and, today, thanks

to the development of effective tools, it constitutes the greater part of the management engineering of the VTE system.

The steps taken toward the central management of education are consistent with a path that includes the following four steps:

- labour market analysis
- planning of program offerings
- organization of program offerings
- monitoring and evaluation of program offerings

Figure 4 The central management of education



2.2.1 Labour Market Analysis

Labour market analysis comprises three steps:

- the assessment of qualitative needs
- the assessment of quantitative needs
- the definition of program development priorities

The assessment of qualitative needs

In order to provide vocational and technical education that meets current and future labour market needs, it is necessary to have a good grasp of its structure and evolution, as well as of the distribution of jobs among the different sectors of economic activity. It is then possible to

compare the actual situation with the ideal situation in order to determine training needs. This comparison is done by analyzing the data collected in various works, databanks or business surveys. The data can also come from the ministries or sectoral committees concerned. In Québec, the most common sources of information are:

- the *National Occupational Classification*²⁷ (a list of Canadian occupations)
- the censuses taken every five years by Statistics Canada²⁸
- the North American Industry Classification System (NAICS)²⁹
- sourcebooks on the distribution of businesses and occupational groups within each type of business based on Statistics Canada censuses and surveys
- documents on job prospects with respect to work force needs produced by Emploi-Québec (EQ—employment Québec)³⁰

Analysis of these data provides, among other things, profiles of the different VTE sectors. These profiles, supplemented by qualitative studies of specific trades or occupations, are the first step in the program development process. The objective is to establish an accurate and realistic profile of sector needs. Once the trades and occupations have been listed and their main characteristics described, they can be compared with existing programs of study in order to determine the differences between needs and programs offered and

set priorities. Planning cohesive and effective educational services requires an overall analysis of training needs by sector, although this factor in itself would not be sufficient to warrant the development of a program of study.

The assessment of quantitative needs

Once training needs have been defined, it remains to be determined how many individuals must be trained in order to meet labour market needs for each trade or occupation. To this end, the SFPTFC, in cooperation with EQ, conducts different studies on the consistency of program offerings with work force needs, as well as on the geographical distribution of institutions authorized to teach the different programs of study. These studies have resulted in the development of a training-job matching model, which makes it possible to determine how many individuals should be admitted to each vocational and technical education program in order to meet the work force needs resulting from employment growth and attrition (e.g. retirement, death).

It covers the following aspects:

- the correspondence between the programs of study and the occupational groups
- the number of jobs targeted by each program of study
- targeted enrollments with respect to actual enrollments by sector and by program

²⁷ See <<http://www.statcan.ca/english>>.

²⁸ See <<http://www.statcan.ca/start.html>>.

²⁹ See <<http://www.census.gov/epcd/www/naics.html>>.

³⁰ See <<http://www.emploi.quebec.net/indexang.htm>>.

The results of the comparative analysis between targeted enrollments and actual enrollments help determine whether enrollment is sufficient, excessive or insufficient. Decisions can then be made to correct the situation, if necessary.

Because they assess regional work force needs, the results of the analysis obtained using the training-job matching model also suggest a geographical distribution of programs. The information about work force needs can also be used to promote VTE.

The definition of program development priorities

Once the needs of a given VTE sector or of all sectors combined have been determined, it is important to set program development priorities. Several criteria can be used to establish these priorities. Among the most important are consistency with the government's economic development policies. These policies may favour certain high-growth sectors or sectors experiencing a shortage of skilled labour as a result of major technological or organizational changes. The availability of resources will also significantly influence the establishment of program development priorities. In all cases, it is a matter of determining whether the needs identified are being more or less met or whether program offerings are truly insufficient or even nonexistent. This process may lead to the revision or withdrawal of an existing program or the development of a new program. It is intended to improve the cohesiveness of the system while avoiding overlap between programs leading to the same trade or occupation, either at the same level of education or at different levels.

2.2.2 Planning of Program Offerings

The planning of program offerings as such begins only at a relatively advanced stage in program design. It covers four major dimensions:

- training approaches
- the conditions for implementing the program
- the determination of program offerings
- measures designed to facilitate access

Training approaches

The implementation of new or revised programs of study can be very costly. This is why the various methods of implementation are examined and the necessary choices are made in order to offer quality education within the limits of available resources. To this end, the various training approaches are considered and the most effective and economically viable is chosen. Implementation costs can vary considerably depending on whether training is provided solely at the educational institution, solely in the workplace or in a combination of both, as in work-study programs, for example. The choice of training approaches has a direct impact on investment in terms of human, material and physical resources.

The conditions for implementing the program

Impact analyses help determine which resources will be necessary for the implementation of a program of study. They provide data that make it possible to determine the costs and consequences of the implementation of a program of study at the provincial level, whether in

terms of capital or operating budgets. These costs are related to the need for human, material and support resources, as well as for equipment and physical resources. They are calculated on the basis of analyses that take into account the program of study, its duration, the acceptable number of students per group and the number of educational institutions authorized to offer the program in question, as well as the targeted overall enrollment.

Impact analysis is a two-step approach. A first analysis is done even before the proposed training plan is examined by representatives from business and industry and from the field of education for purposes of validation. This preliminary analysis gives an idea of the amount of resources needed to implement the program as designed. It also confirms the proposed training approach or points to a more promising alternative. Once the program design and the in-depth analysis of the necessary resources have been completed, a definitive impact analysis is done.

The determination of program offerings

Determining program offerings consists in distributing authorizations to offer a given program on a regional basis. This distribution must take into account training needs in every region of Québec and maintain a balance between the programs offered and work force needs. Limited program offerings might lead to a shortage of skilled labour, while excessive offerings could result in a labour surplus and difficulty entering the work force.

Planning studies conducted during the labour market analysis make it possible

to determine with relative precision the number of workers needed for each trade or occupation and in each region. Once these data have been introduced into the training-job matching model, it becomes possible to determine training needs by program and to propose an allocation plan for program offerings.

This plan is the cornerstone of the plan of action for vocational and technical education established for every region of Québec as a result of regional cooperation. The plan of action incorporates data on the consolidation, design and revision of current methods of organizing training, the exploration of new methods of organization, the creation of partnerships and the establishment of regional priorities.

Each region is responsible for choosing its integrated approach. At the request of its partners, and for information purposes, the SFPTFC has drawn up a list of organizations that could be asked to play a role in the integrated approach. They are:

- vocational and technical education centres
- regional representatives of EQ
- the Comité régional de l'emploi (regional employment committee)
- the Conseil régional de concertation et de développement (regional council for cooperation and development)
- the Ministère des Régions (ministry of regions)
- universities (if applicable)
- private schools (in some regions)

Also, the CNPEPT is mandated to provide opinions on the distribution of program offerings.



Photo: Photomédia, François Nadeau

Finally, opinions may be requested of partners at the provincial level, such as:

- EQ's work force sectoral committees
- the CCQ
- the English Language Vocational Educational Council (ELVEC)
- the MSSS
- other socioeconomic ministries

On the basis of the opinions and recommendations of these partners, the Minister may establish or modify the geographical distribution of program offerings, commonly referred to as the *map of options*.

Measures designed to facilitate access

Obviously, not all vocational and technical education programs can be offered in every region of Québec and, for this reason, a large number of Quebecers are forced to pursue their studies elsewhere than at home. In accordance with its own

policy on access to education, the MEQ provides financial assistance³¹ in the form of loans and bursaries for those who would otherwise be unable to pursue their studies. In some cases, the MEQ may also grant subsidies for the construction and maintenance of homes near vocational education centres.

2.2.3 Organization of Program Offerings

The organization of vocational and technical education comprises three essential phases:

- the determination of funding methods
- physical and material resources
- in-service training for human resources

The determination of funding methods

Funding for vocational and technical education activities may come from a variety of sources. For vocational and technical education, the MEQ funds mainly initial training, in accordance with the budgetary rules in effect. For continuing education and training, funding is generally provided by EQ. Some activities can also be funded by the student or a business.

Operating and equipment replacement costs are established for each vocational and technical education program according to need. A cost analysis establishes the financial parameters of each program. All of these data and their methods of calculation constitute the budgetary rules for vocational and technical education.

³¹ See <<http://www.afe.gouv.qc.ca/anglais/index.htm>>.

- **Funding rules for vocational education**

The funding of vocational education involves two types of expenditures, that is, operating costs and capital costs.

Operating costs include:

- costs associated with human resources (mainly teachers)
- the cost of material resources, that is, mainly equipment subject to frequent replacement and raw materials used during instructional activities
- the costs associated with instructional support services, the management of vocational education centres and technical services

Capital costs include:

- the investments necessary for the purchase of durable equipment and the construction and set-up of facilities
- the replacement of worn or obsolete equipment, instruments and tools

Within the limits of the budgetary rules, the MEQ is responsible for operating costs and, since these costs are recurrent, it must make disbursements every year. Finally, funding allocated by the MEQ for vocational education is based on the number of students certified for each module of a program of study.

In terms of capital costs, the MEQ subsidizes the greater part of new equipment purchases and the set-up of the facilities necessary for the implementation of new programs of study. However, school boards, which have the power to levy taxes in order to earn income, are liable for any new investment resulting from the implementation of a new vocational education program. In addition, each

year, the MEQ reviews the funding parameters related to the maintenance of existing equipment. Private schools provide 100 per cent of the funding for the necessary facilities.

- **Funding rules for technical education**

Colleges enjoy considerable autonomy in determining which learning activities are necessary to help students acquire the competencies targeted by a program of study. They therefore participate actively in the analysis of training approaches and themselves determine the most appropriate means of carrying out learning activities.

Given the greater leeway enjoyed by CEGEPs, the MEQ does a predictive analysis of the refitting of facilities and upgrading of equipment required by the implementation of new technical programs and produces an implementation cost estimate. It then asks the CEGEPs to validate the results of the analyses in accordance with their own vision of the implementation of the program before releasing them.

The MEQ provides all the funds necessary for facilities for public colleges. The amounts are based on the number of full-time enrollments per program.

- **The participation of partners**

Sometimes socioeconomic partners are called upon to contribute to the organization and financing of resources in return for certain advantages, which allows the government to reduce implementation costs. These contributions include:

- the implementation of work-study programs
- the loan or donation of equipment

- the sharing of facilities
- the loan of teachers
- financial contributions supported by legislative or fiscal measures
- the acceptance of trainees

Physical and material organization

The physical organization of the equipment and facilities necessary to achieve the program's objectives is the responsibility of the technical education centre or college. The MEQ is responsible for setting standards for equipment, materials and facilities and, consequently, for determining the investments necessary for the implementation of programs of study. These data are included in instructional and material organization guides for vocational education and in implementation cost estimates for technical education. Produced by the program development team, these documents are used to perform impact analyses and to determine funding parameters.

In-service training for human resources

In-service training for human resources is the joint responsibility of the MEQ and the educational institutions. The MEQ subsidizes part of the in-service training of vocational education teachers. Colleges are entirely responsible for the in-service training of technical education teachers.

Socioeconomic partners can also contribute to updating the training of teachers. Businesses may, for example, lend or provide access to state-of-the-art equipment. They can provide specialists to present technological innovations, explain new

manufacturing processes or describe the new competencies required in the labour market. They can also provide training for teachers in the form of practicums.

- **Pedagogical training**

When implementing new or revised programs of study, the MEQ covers the cost of activities intended to acquaint teachers with the programs and with the guides and tools made available to them. These activities help teachers appropriate the new programs. Training packages intended to help them understand the programs are also distributed. Ideally, all teachers of new programs should benefit from such in-service training.

- **Technological training**

Generally speaking, updating training for vocational and technical education teachers is the responsibility of educational institutions, but the MEQ may provide partial funding when significant changes have been made to the program in question.

2.2.4 Monitoring and Evaluation of Program Offerings

The evaluation of a vocational and technical education system involves a critical examination of its development or effectiveness. The evaluations are intended to determine the necessary corrective measures or modifications.

To support the ongoing evaluation of the system, the MEQ regularly publishes documents containing indicators on

education and training.³² In them it provides information on the evolution of enrollments, the government's financial contribution to education and access to programs of study. Most of these publications include a section on vocational and technical education.

In order to fulfill its mandate and ensure the monitoring and evaluation of education, however, the SFPTFC has its own indicators, which are divided into three categories:

- the evolution of program offerings
- the integration of graduates into the labour market
- the effectiveness of the vocational and technical education system

The evolution of program offerings

Analysis of the evolution of program offerings is essential for making informed decisions and disseminating relevant information. Indicators regarding the evolution of program offerings include information about enrollments and graduates according to age, gender, VTE sector and administrative region. The analysis also provides specific data for the greater Montréal area and establishes comparisons between the situation in Québec and that in the rest of Canada.

Particular attention is paid to female enrollments, women being clearly under-represented in most VTE sectors. The MEQ is using special activities and financial measures to encourage women to open up to a greater variety of career choices

and to promote their sociovocational integration into profitable sectors of the Québec economy. Increasing the presence of women in every VTE sector is a commitment the government made in its policy on the status of women entitled *Action Plan 2000-2003: Equality for All Women of Québec*.³³

The integration of graduates into the labour market

Two types of indicators reveal whether program offerings meet labour market needs. The first type, found in the training-job matching model, are used to determine the ideal number of annual enrollments for each program of study and region in order to ensure consistency between program offerings and work force needs.

The second type of indicator reveals the conditions for the integration of graduates into the labour market and the level



³² See <http://www.meq.gouv.qc.ca/m_stat.htm>.

³³ See <http://www.mfe.gouv.qc.ca/ministere/ministre/scf/scf_prog_action_00_03.asp>.

of employer satisfaction. These indicators are the result of an annual survey carried out among all vocational and technical education graduates and the businesses that hire them, known as *Relance*.³⁴

- **Consistency between program offerings and work force needs**

The training-job matching model includes data that are excellent indicators for evaluating the system. Indeed, by comparing the actual and targeted enrollments for all programs of study, it is possible to determine which ones have a surplus of enrollments, and which have a shortage, revealing whether training needs had been correctly evaluated.

- **Relance surveys**

Two types of surveys are done: one with graduates and one with employers.

The aim of the survey of graduates is to describe the situation of vocational and technical education graduates a few months after graduation. This provides a source of first-hand information about the integration of new graduates into the labour market by program, VTE sector and region, as well as overall. These surveys are conducted annually among all new graduates.

The survey of employer satisfaction is intended to obtain businesses' assessment of recent graduates hired during the reference year. This survey is conducted among

a random sample of businesses that have hired recent graduates. The information it provides is that much more reliable since employers are surveyed directly.

The two types of surveys are complementary. Indeed, any demand-driven education system must, on the one hand, adopt a model for predicting needs in order to plan program offerings and, on the other, have a relatively accurate idea of the rate of integration of graduates from each program into the labour market in order to be able to adjust program offerings. This feedback can result in various measures such as quotas, the reduction or increase of program offerings or the promotion of programs of study with better job prospects. It may also be necessary to improve the quality of education, given the observations regarding the satisfaction of graduates and employers.

The effectiveness of the vocational and technical education system

In Québec, the measurement of the overall effectiveness of the vocational and technical education system is based on four main elements: performance, adaptability and flexibility, the cost of education and the ability to meet labour market needs. The MEQ makes an effort to determine the indicators to be favoured in order to improve the measurement of the effectiveness of the current system.

³⁴ See <<http://www.meq.gouv.qc.ca/relance/relance.htm>>.

SUMMARY

The central management of vocational and technical education includes four major dimensions: labour market analysis, the planning of program offerings, the organization of program offerings and

the monitoring and evaluation of program offerings. The table below illustrates the results sought and the means used for each step in the central management process.

Table 2 Steps in the process for the central management of education

Steps	Results sought	Means and tools
Labour market analysis	The assessment of qualitative needs The assessment of quantitative needs The definition of program development priorities	Training-job matching model Strategic watch Regional vocational and technical education plans Regional monitoring
Planning of program offerings	Training approaches The conditions for implementing the program (funding parameters) The determination of program offerings Measures designed to facilitate access	Impact analysis Map of options Student financial assistance
Organization of program offerings	The determination of funding methods Physical and material organization In-service training for human resources	Instructional and material organization guide Implementation cost estimate Budgetary rules Provincial in-service training program
Monitoring and evaluation of program offerings	The evolution of program offerings The integration of graduates into the labour market The effectiveness of the VTE system	Information about applicants Survey of secondary-level vocational education graduates Survey of college-level technical education graduates Survey of employers Performance indicators (success rate, graduation rate, etc.)

2.3 Program development

2.3.1 The Competency-Based Approach

In terms of program development, the approach based on the acquisition of competencies, commonly referred to as the competency-based approach, was adopted in Québec at the beginning of the 1980s with a view to improving the system and meeting new requirements, including those of lifelong learning and the recognition of prior learning. Inspired by various schools of thought and studies of methods in use in North America and Europe, the competency-based approach to program development as it now exists is the result of several years of research and experimentation conducted by the MEQ's Direction générale de la formation professionnelle et technique (DGFPT).

This method is based on a certain number of principles, which are briefly described below:

- programs are broken down into competencies formulated as objectives
- programs are grouped together and managed by VTE sector
- programs are offered according to demand
- the evaluation of learning is based on a “criterion-referenced” approach

Programs are broken down into competencies formulated as objectives

In program development, the competency-based approach essentially consists in defining the competencies inherent in the practice of a trade or occupation and

formulating them as objectives and performance criteria.

The program is an educational and management reference. It is also a source of information appreciated by partners in the labour market and other ministries and agencies involved in human resources management.

While the concept of competency has evolved over time, it still incorporates the basic principles that define it as an integrated body of knowledge, skills and attitudes expressed as an observable and measurable behaviour in the performance of a work-related task or activity, in accordance with a preestablished minimum performance requirement.

At the MEQ, the definition of competency as it applies to VTE is as follows:

The ability to act successfully and evolve in order to adequately carry out tasks or activities based on an organized body of knowledge, skills from a variety of fields, perceptions, attitudes, operational expectations, etc.

Competencies are based on the information provided by the planning and job analyses. Other elements such as the aims, orientations and general goals of VTE are major determining factors in the definition of competencies. Each competency in a program is described according to its elements, its achievement context and precise and unequivocal performance criteria that meet the requirements for entry into the labour market. These descriptors of the competency ensure that teaching is comparable from one establishment to the next.

In vocational education, programs are divided into modules. Each module refers to a competency in the program of study and each competency is presented in the form of an operational objective. This organization of the program facilitates the harmonization of programs and the recognition of prior learning. It also makes it easier to meet the specific needs of businesses. In technical education, the competencies are presented as objectives and standards. These competencies are not necessarily dealt with in a single module as in vocational education, since each establishment authorized to offer a program of study is responsible for defining the most appropriate learning activities to help students acquire the competency in question.

Programs are grouped together and managed by VTE sector

Vocational and technical education programs are grouped together by VTE sector and by similar competencies. VTE sectors sometimes correspond to traditional socioeconomic sectors, for example Health, or Leather, Textiles and Fashion. In other

cases, the VTE sector groups together programs leading to trades or occupations practised in several socioeconomic sectors, for example, Administration, Commerce and Computer Technology. The programs grouped together in this sector lead to trades or occupations practised in economic sectors as varied as the wood, clothing, plastics processing and automobile industries. The classification of VTE sectors is therefore very different from the usual classification of sectors of economic activity.

Programs are offered according to demand

At the beginning of the engineering process, planning studies are conducted for each VTE sector (sector profile and preliminary study). These systematic studies identify qualitative and quantitative training needs in order to help meet labour market requirements. These studies are followed by job analyses for each trade or occupation that justifies the development of a program of study. This information obtained directly from representatives of the labour market is translated into competencies using the process described



Photo: Photomédia, François Nadeau

below. This is what makes program offerings “demand-driven.” The data gathered on employment and the labour market also serve to establish a three- or five-year program development plan for all VTE sectors and the annual work plan of the Direction générale des programmes et du développement (DGPD—programs and development branch).

The evaluation of learning is based on a “criterion-referenced” approach

The competency-based approach requires that the learning context be as close as possible to the situation in which the trade or occupation is practised since, at the end of the program, the learner will have to demonstrate his or her ability to carry out a task in its entirety. Tests related to the practice of the trade are therefore used to evaluate learning. The evaluation criteria focus on the essential aspects of the competency to be acquired. Evaluation is multidimensional, that is, the indicators measure knowledge, skills, attitudes and perceptions, as the case may be. “Formative” evaluation, which occurs throughout the program, is used to verify the progression of learning, while the “summative” examination, which is given at the end of the program, makes it possible to deter-

mine whether the level of acquisition of the competency is consistent with requirements for entry into the labour market.

Programs of study developed using the competency-based approach are different from traditional programs, particularly in their “criterion-referenced” approach to evaluation. By determining performance criteria and an achievement context representative of the trade or occupation from the outset, each student can be evaluated against a preestablished standard and not by comparison with a group as in the norm-referenced approach.

The program development process

Program development tasks are performed by a team made up of partners from the socioeconomic sector in question and the field of education. Their task is to provide information, give opinions or validate results. The program development process comprises four phases, as illustrated in Figure 5. They are as follows:

- analysis of qualitative training needs
- development of the proposed training plan
- development of the program of study
- production of instructional support documents

Figure 5 The program development process



2.3.2 Analysis of Qualitative Training Needs

The first step of the program development process is a qualitative training needs analysis. This involves planning studies, that is, the sector profile and the preliminary study, if applicable. The results of the studies are submitted for validation to a work group made up of representatives of the main partners from the labour market and the network of educational institutions in question. Two other steps provide the remaining qualitative information required to develop the proposed training plan and the program of study. They are the job analysis and the classification of the trade or occupation at the appropriate level of education (secondary or college).

Sector profile

The sector profile is used mainly to determine qualitative and quantitative

training needs for a given VTE sector. It is the result of extensive data collection from surveys or interviews with socio-economic partners and from literature reviews. It is the main reference material used to plan program offerings for the VTE sector, since it identifies the differences between work force needs and program offerings by program or by trade or occupation. It also helps set development priorities for the VTE sector in question.

In the sector profile, particular attention is paid to the following elements:

- the definition of the field of research
- the socioeconomic profile, in particular the main sectors of economic activity represented, the types of businesses, the context in which they are evolving, their numbers, size and geographical distribution
- the description of the work force and working conditions by trade or occupation

- the description of the tasks and activities associated with the trades or occupations listed
- the actual or ideal training required for entry into the labour market
- the programs of study offered (locations, enrollments and placement rate of graduates by gender)
- the foreseeable development of the sector as well as that of the work force
- recommendations on the harmonization of programs

The sector profiles are a prime source of information for long-term planning (three- or five-year plans) in vocational and technical education. Designed at first as tools to analyze training needs, they soon became important management tools.

Preliminary study

The topics covered in the preliminary study are essentially the same ones that are dealt with in the sector profile. However, the preliminary study focuses on a

single trade or occupation or several trades or occupations with strong resemblances, and, in particular, on:

- the impact of new technologies and new types of work organization on the practice of the trade or occupation
- workers' needs in terms of specialization
- the legal requirements of the trade or occupation

Finally, the preliminary study accurately measures the difference between current and future training needs for a given trade or occupation and existing program offerings. It therefore helps determine which orientations to favour when a program is revised. It could also suggest the creation of a new program of study or the withdrawal of a program whose corresponding trade or occupation no longer exists. The methodology used for the preliminary study is the same as that used to establish the sector profile.

Job analysis

The qualitative training needs assessment is followed by a job analysis workshop for the trade or occupation in question. This is a consultation of a group of 10 to 15 people selected for their expertise or in-depth knowledge of the trade or occupation. People who actually practise the trade or occupation or who are closely associated with it are also invited to participate. The participants must be from businesses representative of the sector because of their size, type of production, location, etc.

The objectives of the exercise are to analyze every facet of the practice of the trade or occupation, to paint as detailed



Photo: Photomédia, François Nadeau

a portrait as possible of it, to determine its foreseeable development and to specify the expected performance of graduates upon entry into the labour market. This information is indispensable in determining the competencies required to practise the trade or occupation. The analysis must therefore be accurate and prepared and guided according to established methods. The information gathered includes:

- a general description of the trade or occupation and its limitations
- the tasks, subtasks and operations associated with the trade or occupation
- the conditions for the performance of tasks and performance criteria
- the necessary knowledge and skills
- the necessary attitudes and behaviours
- suggestions concerning training and the program of studies to be developed or revised

The results of the job analysis are presented in a report, which is the cornerstone of the program development process and an essential influencing factor in the formulation of competencies.

Occupational classification

The results of the job analysis also make it possible to classify the trade or occupation and the related program of study. Will it be a secondary-level vocational education program or a college-level technical program? Although the answer to this question is simple in most cases, it may be more difficult in others. For this

reason the MEO has created an instrument for the analysis and classification of programs based on the complexity of the trade or occupation and the degree of responsibility of the practitioner.

2.3.3 Development of the Proposed Training Plan

This step involves the definition of program goals and the competencies to be acquired. It is based on the data gathered during the training needs analysis (sector profile, preliminary study and job analysis), on the MEO's orientation documents and on all other relevant studies or research, as the case may be. The proposed training plan must always be validated by the MEO's partners.

Definition of program goals and the competencies to be acquired

The proposed training plan is usually designed by a team made up of a teaching specialist and a specialist in program development using the competency-based approach. A third person, a specialist in the trade or occupation, may also be part of the team. The proposed training plan includes:

- the statement of the competencies required to practise the trade or occupation that will be included in the program of study
- a grid of learning focuses³⁵ establishing relationships among the different competencies and ensuring the transfer of learning while avoiding overlap

³⁵ A grid of learning focuses is included in Appendix I.

- a table of correspondence establishing a formal relationship between the proposed competencies and the different influencing factors identified in the planning studies, the job analysis or the ministry orientations on which vocational and technical education is based. This instrument also provides an overview of the elements of each competency and indicates the duration of training deemed necessary for its acquisition
- a brief impact analysis to help in determining the financial feasibility of the proposed training plan

Validation of the proposed training plan

The proposed training plan is validated at a joint meeting of representatives of the labour market and the field of education. The relevance, cohesiveness, applicability and harmonization of the plan are analyzed. The task of the representatives of businesses, sectoral committees and various associations is to study the relevance of the proposed training plan with respect to the trade or occupation in question. Representatives of the field of education—teachers, education consultants and administrators from school boards or colleges—are called upon to judge the cohesiveness, instructional and material applicability, and harmonization of the plan.

The data gathered during the validation meeting are included in a validation report on the proposed training plan, which will serve as the basis for further activities.

2.3.4 Development of the Program of Study

Once the qualitative training needs analysis and the proposed training plan have been completed, program development can begin. At this stage of the process, the competencies in the proposed training plan are translated into objectives and performance criteria. This is done by a team made up of teaching specialists and a specialist in program development using the competency-based approach.

The resulting program of study will be prescribed by the Minister once it has been approved; that is to say that the program must be taught as indicated and that the data it contains are mandatory targets for teaching and learning, evaluation and certification.

A program of study includes:

- a title, a code and a type of certification
- general admission criteria and specific criteria if applicable
- a general introduction
- the goals of vocational or technical education
- a list of targeted competencies
- the objectives and performance criteria for each competency
- a grid of learning focuses (vocational education only)

There are two formats for programs of study in Québec: one for vocational education and one for technical education. The format of vocational education programs was developed first, in 1986. It was designed at a time when the MEO was responsible for the entire curriculum,

including the production of support documents used in instructional planning, instructional and material organization and the evaluation of learning. The introduction of the competency-based approach at the college level in 1993 required a few adaptations to accommodate the greater autonomy of institutions of higher learning. While the terminology and format differ slightly, the concepts are the same.³⁶

2.3.5 Production of Instructional Support Documents

The MEQ produces instructional support documents for vocational education only. The educational institutions are responsible for this task for technical education. The objectives of these documents are to:

- facilitate the planning and implementation of programs of study
- provide teachers with the additional information necessary for lesson planning and the evaluation of learning

Vocational education

Analysis and planning tables include learning and evaluation information for each of the program's competencies. It proposes indicators for the pedagogical content of each phase of acquisition of the competency and provides evaluation indicators and criteria along with their respective weighting. It also suggests evaluation strategies for formative and summative evaluation and gives a description of the examination and evaluation forms for each competency that calls for

a practical examination. Analysis planning tables are not prescriptive, except as regards the data used to evaluate learning.

The instructional and material organization guide provides information essential to the organization of teaching. It contains indicators for human resources, equipment and material resources needs, as well as suggestions on how to set up the workshops. It includes a list and description of the furniture, equipment, tools and other material resources required. It also includes a cost summary. Although it is not prescriptive, it is an indispensable database for the impact analysis in the program management process. The information contained in the guide serves as the basis for setting the funding parameters of educational institutions authorized to offer the program of study.

Technical education

Colleges are responsible for developing the learning activities necessary to help students master the targeted competencies in technical education, on the basis of objectives and standards set by the MEQ. They set the number and duration of learning activities and select the most appropriate training approach (theory or practical courses, practicums in the workplace, project work, etc.).

This design and planning exercise leads to the production of a variety of support documents, including:

- a grid of learning focuses, an instructional logic diagram and a lesson planning grid for each term, revealing the sequence in which the competencies are developed and the course scheduling

³⁶ Sample formats for vocational and technical education programs are included in Appendix 1 and 2, respectively.

- a table of correspondence between the competencies and the courses, if applicable
- a master plan³⁷ for each course associated with the program's competencies
- a comprehensive assessment to evaluate the integration of learning with a view to issuing a diploma and describing the objectives, format, duration, etc. of the evaluation
- a physical and material organization guide

The physical and material organization guide is based on the implementation cost estimate provided by the MEQ with the program of study, taking into account the existing infrastructure of the educational institution. It indicates the main material and physical resources required for the implementation of the program,

in particular with regard to the set-up of facilities, furniture, equipment, tools and the other material resources required to carry out the instructional activities.

2.3.6 Summary

Program development based on the acquisition of competencies consists in defining these competencies and translating them into training objectives and performance criteria. The following table is a synoptic look at vocational and technical education programs. The boxes in the top half of the table contain the different determining factors that go into the development of programs of study using the competency-based approach, while those in the bottom half contain the results of the process and the main characteristics of the programs.

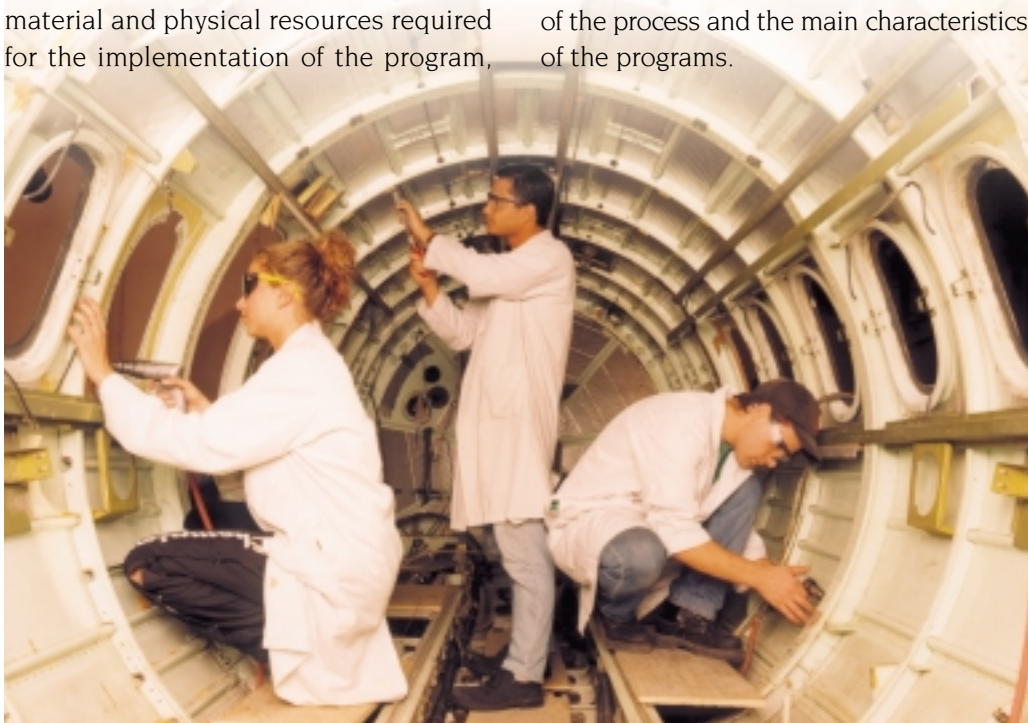
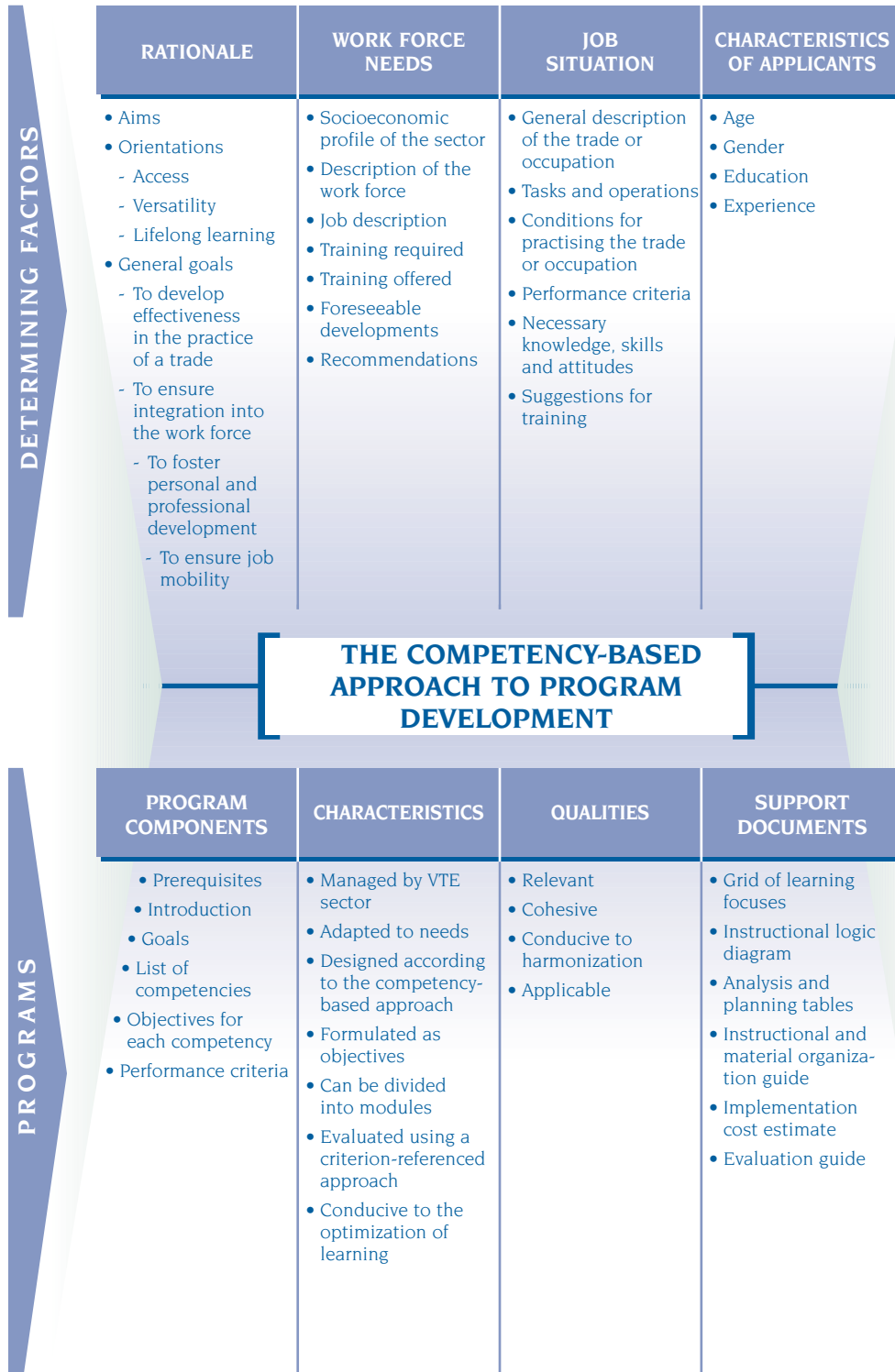


Photo: Photomédia, François Nadeau

³⁷ The master plan is the preferred tool of teachers for lesson planning. It includes essentially the same information as the vocational education analysis and planning tables.

Table 3 Program development



SUMMARY

Program development according to the competency-based approach was implemented in Québec in the early 1980s. This approach is the cornerstone of Québec's VTE engineering model.

Program offerings, based on the analysis of training needs as expressed by representatives of the labour market, are said to be "demand-driven." The programs of study offered are based on information gathered during planning studies and, especially, on the job analysis. The number of students accepted is based on a training-job matching model, which ensures balance between labour market needs and program offerings.

Program development involves the development of a proposed training plan that defines program goals and targeted competencies. Before proceeding with the development of the program as such, that is, the translation of competencies into objectives and performance criteria, the proposed training plan is submitted to the MEQ's main partners from the labour market and educational institutions, for the important step of validation.

Finally, the process ends with the production of instructional support documents aimed at facilitating program implementation.

2.4 Program implementation at the local level

The primary mission of educational institutions is to help students acquire the competencies required to practise a trade or occupation. The administration is there to ensure that all the resources necessary for quality education are available.

In order to implement and manage programs of study, educational institutions follow a local management process comprising four main phases:

- implementation planning
- the organization of resources
- the performance of training activities
- the evaluation of learning and training

The process involves a variety of activities, including:

- creating partnerships
- planning program implementation
- recruiting personnel and providing in-service training and instructional support
- purchasing and managing material resources
- ensuring physical organization of training
- managing fluctuating enrollments
- planning courses and producing instructional materials
- recognizing prior learning
- providing services to businesses and individuals
- evaluating learning and training

Figure 6 Program implementation in educational institutions



2.4.1 Implementation Planning

Once a program of study has been approved and published by the MEQ, the designated educational institutions begin planning its implementation, a process that involves a variety of activities depending on the level of education. In both cases, however, the competency-based approach calls for the establishment of partnerships with the community and involves the creation of a team responsible for implementing and monitoring the program.

Establishing partnerships

The establishment of partnerships is important at every stage of the competency-based approach. When a new program is being implemented, the educational institution establishes or renews partnerships with the labour market. A number of educational institutions have shown considerable

initiative: some establish a business network, create school-business committees or reach services agreements with employers.

Because of the increase in training needs and costs, it is important to optimize the diversity of resources. More frequent practicums, the work-study approach and visits to businesses require a greater commitment from representatives of the labour market.

Businesses derive a number of benefits from their collaboration with educational institutions: information about techniques and processes, a chance to influence the content of programs of study, consulting services and the recruitment of competent workers.

Finally, a number of educational institutions play an active role in their region's economy by participating in issue tables, for example.

Planning program implementation in vocational education

When a new vocational education program is being implemented, a committee made up of teachers, education consultants and management personnel is set up. The role of this team is mainly to plan the implementation of the program in order to ensure quality teaching and the training of competent workers.

Its tasks are to:

- define learning content and instructional strategies
- organize human, material and physical resources
- carry out instructional planning
- design evaluation material

Planning program implementation in technical education

In technical education, educational institutions are responsible for developing the most appropriate learning activities for the acquisition of the competencies defined by the MEQ. The task is therefore more complex, and the committee responsible for the program usually needs a year to plan its implementation and ensure monitoring and evaluation. At the planning stage, the team must pay special attention to the transfer of learning from one competency to the next and to avoiding repetition. The team is usually made up of a few teachers from the department in question and specialists in related subjects, as well as other resource people.

The educational institution is responsible for defining the team's responsibilities, for example, to:

- become familiar with the documents produced by the MEQ, that is, the preliminary study, the job analysis and the program of study
- define the educational context
- analyze the objectives and standards
- specify the educational aims if they are not described in the program of study
- develop or adapt the grid of competencies
- develop the instructional logic diagram
- define the subjects that could contribute to the program
- develop the course schedule for each term
- develop the master plan for each competency
- ensure physical and material organization
- design the comprehensive assessment taking into account the educational institution's evaluation policy

At both the secondary and college levels, each planning activity involves different steps. Once the first step is completed, teachers each develop their own lesson plan.

It is important to note that the scope and complexity of planning activities often justify providing in-service training for the team responsible for implementing a program. The members of the team are then able to better understand their role and responsibilities, identify the work to be done, become proficient in the competency-based approach and become familiar with the new program.

In planning the program implementation, colleges and vocational education

centres must also take into account programs undergoing harmonization between the two levels of education. Furthermore, they must endeavour to facilitate the process of pursuing further studies or changing career paths.

2.4.2 The Organization of Resources

In terms of the organization of resources, the competency-based approach particularly influences the selection and in-service training of personnel and the physical and material organization of training, as well as the management of fluctuating enrollments.

Recruitment, in-service training and instructional support

In the competency-based approach, teachers must be especially proficient in the trade or occupation and have solid psychopedagogical competencies, since they must ensure that the students acquire skills, adopt certain attitudes and enhance both their perceptions and their knowledge.

This means that the educational institutions must recruit teachers who are competent in both pedagogy and the technique in question. Since it is especially difficult to recruit teachers with both types of competence, it is essential that in-service training activities be provided.

Training activities on the competency-based approach should be offered to all interested parties, whether teachers, management personnel or instructional support personnel, for purposes of greater consistency. Field tests in colleges and vocational education centres reveal that, if they are not familiar with the new

instructional methods associated with the competency-based approach, teachers can feel at a loss. The quality of teaching suffers, thereby endangering the very foundation of the system, which is currently undergoing significant changes.

The implementation of a new program of study is a good opportunity to provide the entire staff with in-service training. If they do not speak the same language or have the same understanding of the new approach and its requirements, the different participants may consider themselves at cross purposes rather than as working together to ensure students' success.

The purchase and management of material resources

The effective management of material resources is exceedingly important if the training of individuals is to be valued, especially in the competency-based approach. Material resources include teaching, computer and technical materials, equipment, tools and raw materials.

Teaching must correspond as much as possible to the work situation described in the program of study. The reproduction of an actual work environment, even on a small scale, usually requires considerable material resources, which can be relatively costly. However, it is essential that students have access to the equipment and materials needed to acquire practical learning and produce the goods or services typical of the trade or occupation.

Similarly, the educational institution must ensure that the material resources available meet the requirements for the evaluation of competencies, an exercise

that usually requires a demonstration of the student's ability to carry out a task in its entirety.

To minimize training costs, especially in so-called highly technical programs, the educational institution should show imagination and innovation at the pedagogical level. A number of institutions are ingenious in their approach to acquiring very expensive equipment.

There are many options available for the purchase and management of material resources, for example:

- partnerships between the school and the business involving the loan of equipment, the donation of materials and practicum positions
- equipment rental
- the sharing of resources among various institutions
- visits to businesses or workshops in businesses
- the use of multimedia teaching materials
- work-study programs
- the use of prototypes or simulators
- the use of recovered or recycled materials
- the partial marketing of products manufactured during training

Educational engineering based on the competency-based approach encourages educational institutions to remain on the cutting edge of technology. Teachers must always be on the lookout for innovations in their field, so that they can carry out activities while taking into account the development of labour market practices.

The educational institution must also plan for the periodic maintenance and

replacement of material resources, while finding the new resources required to remain in the vanguard of technology. It must promote the establishment of a true culture of maintenance.

The physical organization of training

The competency-based approach to teaching requires a new physical organization of facilities bearing a greater resemblance to businesses than to conventional schools.

Consider the *Multimedia Integration* program, which involves learning how to work in a team. In this case, the computer workstations should be grouped together in islands so that students can communicate with each other while working at the computer.

Simulating the work situation at the school may be impossible, as is sometimes the case in the mining and forestry sectors. In these cases, work-study programs should be set up with businesses in the sector until new techniques are devised to support innovative strategies, which is almost inevitable.

Management of fluctuating enrollments

To optimize its material resources, the educational institution may choose a variety of methods of organization, for example:

- starting and completing studies at different times, depending on the individual
- starting a program in the middle of the school year or at another time
- extending the business hours of the educational institution

Decisions related to organization may, for example, involve making training available to a greater number of people, making optimal use of equipment or reducing costs. These choices sometimes require strict management of schedules and facilities.

2.4.3 The Performance of Training Activities

The competency-based approach affects how training activities are carried out. As is the case in any rigorous training approach, it requires lesson plans and instructional materials consistent with the program, which facilitates the recognition of prior learning, as well as continuing education and training.

Lesson plans and instructional materials

As mentioned earlier, teachers are responsible for planning learning activities and producing the necessary instructional materials. In the competency-based approach, the ministry program is the basic point of reference for teaching and evaluation. The teacher must therefore:

- be familiar with the program and the support documents provided by the MEQ or the educational institution
- choose the appropriate teaching and learning approaches
- determine methods of evaluation when none are prescribed
- prepare a lesson plan and have it approved
- establish the schedule of activities for the course

- produce relevant learning and evaluation materials taking into account the competency to be acquired by the students

The order in which the elements of the competency are acquired may differ from that established in the program. The logic of learning is not always the same as the logic of applying the competency in the labour market. Therefore, in his or her planning, the teacher must take into account the phases in the acquisition of the competency on which the learning process is based. The process is usually broken down into five phases: exploration, basic learning, practice, transfer and enrichment.

Recognition of prior learning

The aim of the harmonization of programs of study is to encourage and facilitate the recognition of prior learning. Upon admission to a program, a person may request that equivalences be recognized following examination of his or her file. The advisor should act with considerable vigilance in order to help the person pursue or return to his or her studies.



Photo: Photomédia, François Nadeau

Although two programs may have no apparent direct link between them, it may be possible to recognize certain corresponding competencies. In a number of programs of study that have been harmonized, equivalences have already been recognized in order to accelerate the process.

The recognition of prior learning is not limited to training equivalences. The competency-based approach also facilitates the recognition of experiential learning. A person who believes he or she has acquired experiential learning related to a given competency may request that such learning be recognized. He or she must then prove his or her case according to the procedure defined by the educational institution in question.

Services to businesses and individuals

The integration of young people and adults, as well as of the initial training and continuing education and training systems, is one of the major characteristics of Québec's vocational and technical education system. The competency-based approach itself favours this integration, since each program is designed with a trade or occupation in mind and not in accordance with the characteristics of the students.

The integration of initial training and continuing education and training is intended to improve the cohesiveness, effectiveness and efficiency of the system. The public vocational and technical education system devotes its human and material resources to meeting all the vocational and technical education needs of individuals, businesses and the agencies responsible for funding work force training,

such as Emploi-Québec (EQ—employment Québec).

School boards and CEGEPs must therefore assess needs, set priorities, develop programs of study or customized training, coordinate program offerings and award the corresponding certification. Education and training services intended specifically for adults are usually managed by the Services to Business and Industry departments of school boards and CEGEPs.

2.4.4 The Evaluation of Learning and Training

As mentioned earlier, the responsibility of educational institutions in terms of the evaluation of learning is different in vocational education and in technical education. In vocational education, the MEQ defines most of the evaluation methods, while in technical education, the postsecondary educational institution is responsible for establishing its own evaluation policy and submitting it upon request to the Commission d'évaluation de l'enseignement collégial (CEEC—commission for the evaluation of college education).

In a system based on the acquisition of competencies, the cycle is complete only when the educational institution judges the effectiveness of its activities. It must ascertain the quality of learning activities and their consistency with real-life situations and labour market expectations. To this end, increasing numbers of educational institutions are implementing a continuous improvement process, which allows them to evaluate teaching.

SUMMARY

Educational engineering based on a competency-based approach has a profound influence on educational management in educational institutions. Its main characteristics are:

- a more integrated planning of training activities, ensured by the creation of a team assigned to the task, observance of program requirements and the importance given to the transfer of learning
 - more partnerships between educational institutions and businesses
 - better instructional and technical competencies on the part of teachers
 - the need for teachers involved in the process to work as a team
 - greater consistency between the material and physical resources defined in the programs of study and those needed in an actual work situation
 - decisions concerning educational organization based on the organizational requirements of the trade or occupation
 - consideration of scholastic and experiential learning at the time of registration in order to avoid useless repetition in learning
 - evaluation certifying the person's competence, that is, the entire body of knowledge, skills and attitudes needed to accomplish a work-related task or activity
- the availability of continuing education and training for individuals and businesses
 - the periodic evaluation of training in order to verify the consistency of learning activities with labour market expectations

3

Foreseeable developments



If it is to remain effective, the vocational and technical education system must continually adapt to the changing reality in which it is evolving. Today's society is characterized by a so-called new economy based on the intensive use of technology, knowledge that quickly becomes obsolete, an endless progression of new competencies to be acquired, and globalization, which increases competition and forces businesses to become ever more competitive. These are only a few of the new dimensions that must be taken into consideration. The final chapter of this document focuses on a certain number of challenges awaiting the system. These challenges involve lifelong learning, access to education, gender-based analysis, the harmonization of programs of study, the development of competency inventories, the strengthening of partnerships, the adaptation of engineering methods and processes and the evaluation of the effectiveness and efficiency of the vocational and technical education system.

3.1 Lifelong learning

The Estates General on Education held in 1995 in Québec were an opportunity for all those involved in the development of the education networks, representatives of social, economic and cultural communities, and parents and young people to discuss their views on education and debate the new orientations to be adopted. A number of lines of action identified during this extensive exercise have since been implemented; based on the reform that is now under way, the last of them involves adult education and continuing education and training.

Two observations about lifelong learning were the subject of consensus at the Estates General on Education: the need for a common vision of adult education and continuing education and training, and the development of a culture of lifelong learning. These two observations led to the development of the *Government Policy on Adult Education and Continuing Education and Training* and its accompanying plan of action.³⁸ The policy involves the participation of many partners, takes into account social changes and proposes orientations for VTE based on the needs and expectations of Quebeckers.

From this point of view, the adoption of a government policy on adult education and continuing education and training is a strategy to maintain and improve Québec's current position as a leader among industrialized countries. The new individual and collective challenges of the knowledge-

based society and current changes demand action. The globalization of markets, the speed and fluidity of communications, the rapid development of knowledge and technology, swift social change, the ability to find or keep a job and the complexification of social life require that all adults have a sufficient basic education and upgraded competencies.

Québec was one of the first in the world to implement various continuing education and training services as part of its education system. The diversification of places of learning led to the emergence of formal and informal, autonomous and independent learning models in recognized educational institutions, including distance education, in-company training, continuing education and training services in public educational institutions, popular education, and training activities made possible by information and communications technologies.



³⁸ Available at <http://www.meq.gouv.qc.ca/reforme/formation_con>.

The purpose and rationale of the government policy consist in an approach that focuses on every dimension of the individual and pays particular attention to certain sectors of the population. The policy is structured around four major orientations:

- to provide basic education for adults
- to maintain and continually upgrade adults' competencies
- to acknowledge prior learning and competencies through official recognition
- to remove obstacles to access and to staying in school

3.2 Gender-based analysis

In 1997, the Québec government began integrating gender-based analysis³⁹ into public policy.

Gender-based analysis is a preventive process applied at the design and development stage of a policy, program or any other measure, whose aim is to identify the different effects such a policy, program or measure will have on the men and women concerned, taking into account the socioeconomic characteristics of each sex.

In order to be able to evaluate the real differences between the situations of men and women and the consequences of initiatives on their respective living conditions, ministries, agencies, universities and all other partners must have access to sufficient data.

Vocational and technical education is directly affected by this situation in two respects. First, fewer women enroll in vocational education, while fewer men enroll in technical education. Also, women choose a limited number of trades or occupations in traditional training sectors such as Administration, Commerce and Computer Technology, Food Services and Tourism, Health, and Beauty Care. Cultural changes are slow, despite incentives. The *Hats Off to You!* contest⁴⁰ is held in vocational education centres, among other places, and encourages students to pursue their studies until graduation. The number of women in traditionally male-dominated fields of study is growing. The successful role models who have won the *Hats Off to You!* contest are a source of inspiration for other young women, and trades in traditionally male-dominated fields are now open to all. In order to achieve the objectives of improved access to education and sociovocational integration, a financial support measure has been implemented for secondary schools and colleges that wish to carry out this type of activity and increase the number of women enrolled in VTE.

3.3 The harmonization of programs of study

The harmonization of vocational and technical education programs⁴¹ consists in identifying the similarities between

³⁹ For more information, see <http://www.stat.gouv.qc.ca/donstat/societe/anal_s_difrn_sex/index_an.htm>.

⁴⁰ See <<http://www.inforoutefpt.org/chapeau/default.asp>>.

⁴¹ Information about harmonization can be downloaded at <<http://inforoutefpt.org/dgfpt/dp/harmonisation.asp>> (in French only).

secondary-level and college-level programs, whether or not they belong to the same VTE sector. The aim of the process is to ensure continuity and to avoid overlap in program offerings. It also involves the recognition of prior competencies, thereby facilitating education.

From the outset of the vocational education reform in 1986, harmonization has been a major concern of the MEQ. Gradually, after experimentation, various measures were implemented, but a model has yet to be developed and the methods and processes to be used to strengthen harmonization have not yet been systematized. One of the expected results of this process is the facilitation of continuing education and training practices through the recognition of prior competencies.

The harmonization of programs of study also favours the development of programs in which both levels of education are integrated. Field tests under way are intended to allow certain young people to enroll in vocational education as early as Secondary III, while continuing their general education, then to pursue their studies in technical education until they obtain a Diploma of College Studies. The project is referred to as “three diplomas in five years” (Secondary School Diploma, Diploma of Vocational Studies and Diploma of College Studies). In addition, changes have been made to the *College Education Regulations* in order to allow holders of certain Diplomas of Vocational Studies direct access to technical programs determined by the Minister.

Harmonization favours the establishment of gateways, not only between

vocational education programs and technical education programs, but also between technical education and university education. A number of projects of this type are currently being field tested.

3.4 The development of competency inventories

The competency-based approach has been the cornerstone of secondary vocational education programs since 1986 and of college technical education programs since 1993. As mentioned in Chapter 2 of this document, the MEQ has developed an accurate method of defining the competencies required to practise a trade or occupation. Students must demonstrate that they have acquired all of these competencies before being awarded the corresponding diploma.

This is an important change: programs of study are no longer based on the acquisition of knowledge, but on the acquisition of competencies. This has affected not only the educational services offered, but also the labour market. Businesses and organizations have abandoned the concept of qualification in favour of the concept of competencies, which is affecting the general structure of employment.

The education community and employers would benefit from adopting a common nomenclature, which is not currently the case in the National Occupational Classification. In an attempt to coordinate their efforts, Emploi-Québec (EQ—employment Québec) and the MEQ are exploring the possibility of developing a common competency inventory. They are now discussing how to proceed, in

particular with respect to job analysis, so that the information gathered meets the needs of both agencies. The aim is to create a common bank of competencies to facilitate, among other things, the recognition of scholastic and experiential learning, which is consistent with one of the orientations of the government policy on adult education and continuing education and training, by establishing interfaces among the different government structures.

3.5 The strengthening of partnerships

All vocational and technical education policies recognize the importance of forging ties with socioeconomic partners in order to adapt training to the needs and situation of the labour market. The ministerial plan of action for the reform of the education system currently in effect, *A New Direction for Success* (1997), is no exception. It recommends strengthening ties with businesses on the one hand and between levels of education on the other. Services in a given territory would then be better coordinated and regional financial and material resources would be used to their fullest.

Joint projects uniting school boards, colleges and businesses in a given region are currently under way. Their success depends on regional cooperation in terms of socioeconomic development. In the Centre-du-Québec region, for example, a vocational education centre and a CEGEP have grouped together their competencies and enrollments to establish an integrated training centre for mechanical manufacturing. In addition to the sharing of physical

and material resources, those responsible for the project are endeavouring to develop an integrated instructional facilitation model based on the sharing of competencies and initiatives. They are looking for new training approaches with a view to implementing the harmonization of programs proposed by the MEQ during program development and to create more effective gateways between vocational and technical education.

With a view to promoting such partnerships, the MEQ has a policy for the decentralization of responsibility, granting greater autonomy to educational institutions. This orientation was adopted as a response to desires expressed at the Estates General on Education concerning increased local involvement and greater openness to the community. As a result, the MEQ could allow the different players to take charge of the organization of educational services and adapt them to the characteristics and needs of different communities.

3.6 The adaptation of engineering methods and processes

Given the new economy and the intensive use of technology, new trades and occupations are being created, while others are changing considerably or disappearing altogether. Workers must therefore constantly upgrade their competencies or acquire new ones. This situation has resulted in a boom in the field of education and, in order to keep up with the rapid changes, the system should:

- respond more quickly to demand and needs expressed at the local and provincial levels

- adapt the program development and revision process to facilitate the updating of competencies

In a context of action research, the Direction générale des programmes et du développement (DGPD—programs and development branch) is currently working toward the development of fewer, more durable initial training programs. For example, the *Industrial Machinery Operation* program has been revised to provide access to the labour market in various sectors of economic activity. This gives the educational institution more latitude to adapt the training to its context or to the evolution of trades and occupations.

Similarly, the DGPD is experimenting with a strategy for observing the labour market in real time. This so-called sector watch is based on a new approach involving the analysis of training needs by sector. Intended to replace conventional planning studies in full or in part, sector watch makes it possible to follow the evolution of the labour market and the resulting training needs using a strategy involving observation and analysis based on the use of new information technologies.

The DGPD's objective is to modify, for curricula that are already defined by competencies, the needs analysis stage by replacing one-time planning studies with ongoing observation and analysis of labour market needs.

Major program revisions could then be replaced by a continuous improvement process. The simplification of program development methods would make it possible to quickly make any corrections warranted by changes observed in the labour market. The updating of programs of study, sector profiles and preliminary studies would also be facilitated.

3.7 Evaluation of the effectiveness and efficiency of the vocational and technical education system

The evaluation of a VTE system is an ongoing process. As soon as the basic criteria and indicators make it possible to judge the quality of training from certain points of view, other dimensions or orientations come into play, requiring that new ones be identified. Of the basic indicators, the following can be used to determine the effectiveness and efficiency of a vocational and technical education system:

- the success rate by level of education and program
- the duration of studies before obtaining a diploma
- the rate of transfer, without interruption, from secondary-level general education to vocational or college-level education
- the consistency of program offerings with work force needs at the regional level
- the rate of employment related to the training received, by region and by program

In the evaluation procedures currently under study, the effectiveness of the Québec system is being compared, for example, to that of other systems, and the structuring effects of the local adaptation of initial training and continuing education and training programs are being assessed.

The adaptability and flexibility of the system are also being assessed. In particular, the study focuses on:

- the quality and effectiveness of partnerships with the labour market

- means offered to teachers to ensure technology watch
- efforts made to maintain equipment and facilities and keep them up to date
- the volume of continuing education and training activities intended for the work force
- the development of a spirit of enterprise
- services to business and industry
- the organization of structured practicums in the workplace or work-study projects

The study also focuses on the system's ability to meet qualitative and quantitative needs. Subjects under study include enrollments, teachers and in-service training, the use of equipment and the range of services offered.

The cost of training per person, per program of study and per educational institution have a direct impact on the efficiency of the system. A number of indicators can be used to measure their scope; for example:

- investments in vocational and technical education with respect to the gross domestic product and the budget devoted to education
- investments in education with respect to private investments and other public investments
- the financial contribution of the private sector to vocational education

Finally, a longitudinal study of career paths conducted jointly by the MEQ and the Ministère de l'Emploi et de la Solidarité sociale (MESS—ministry of employment and social solidarity) will reveal the situation of graduates. The research will help evaluate vocational and technical education in a new light.

SUMMARY

Québec's vocational and technical education system is constantly evolving. The Secteur de la formation professionnelle et technique et de la formation continue (SFPTFC—vocational and technical education and continuing education and training sector) uses its experience and focuses on dimensions requiring adaptation or improvement. Its administration is studying the adjustments to be made given the new vision of adult education and continuing education and training—in particular by taking into account the effect of policies and strategies on men and women—and is endeavouring to improve financial accessibility and ensure access to quality services, even in remote regions. A number of government authorities are also working together to create common competency inventories and to form other partnerships with the different communities involved. The effectiveness and efficiency of the system are of constant concern, especially in terms of reducing the time it takes to meet training needs and promoting ongoing evaluation.

On the whole, while Québec's vocational and technical education model is the result of a reform that has been implemented in several phases, it is still active today in ongoing research and experimentation that allows it to adapt to change.

GLOSSARY

Term	Definition ⁴²
Achievement context	Description of the situation in which a competency is applied upon entering the labour market. Can also help define the conditions for evaluation of the competency.
Adult education	The entire body of ongoing learning processes, formal or otherwise, whereby people regarded as adults by the society to which they belong develop their abilities, enrich their knowledge, and improve their technical or professional qualifications or turn them in a new direction to meet their own needs and those of society. (UNESCO, 1997)
Architect	Denotes the government authority responsible for vocational and technical education.
CEGEP (general and vocational college)	<p>Postsecondary educational institution offering two-year general programs leading to university and three-year technical programs leading to the labour market, but also providing access to university programs. When compared with a number of education systems outside Québec, the education offered in Québec CEGEPs is comparable, in the general sector, to the last year of secondary school and the first year of university; in the technical sector, the education offered corresponds to the last year of vocational education in secondary school and two years in a technical institute. CEGEP education is therefore equivalent, according to UNESCO and ILO classifications, to that of senior technicians and middle managers.</p> <p>Created on the Québec government's recommendation, CEGEPs are administered by a board of governors whose members are appointed by the government after consultation with concerned parties. The board must include representatives of college education,</p>

⁴² The definition of a concept or process is usually the result of the work of a number of people who, according to the situation and as need be, contribute to that process. In addition, in VTE, the process, more often than not, involves teamwork. Consequently, it is difficult to credit all those involved for their respective contribution. Finally, the definitions in this section are as close as possible to those found in the major dictionaries and encyclopedias and to those suggested by major international organizations, such as UNESCO, the ILO, the OECD, etc.

	<p>the business community, the labour market, parents, secondary education and university education.</p> <p>While CEGEPs are funded by government subsidies, they have considerable management autonomy and governance powers.</p>
Centralization/ decentralization	<p>Process involving different ways of distributing and managing powers and responsibilities between a central agency and peripheral or satellite agencies. Three major responsibilities are indicators of the level of centralization or decentralization: jurisdiction (who answers to whom?), responsible posts (who appoints whom?) and sources of funding (who gives to whom?). The types of centralization/decentralization are the result of the balance between management autonomy and governance. (See deconcentration, delegation and devolution.)</p>
Competency	<p>The ability to act successfully and evolve in order to adequately carry out tasks or activities based on an organized body of knowledge, skills from a variety of fields, perceptions, attitudes, operational expectations, etc.</p>
Competency-based approach	<p>Program development process based on the analysis of tasks performed in the practice of a trade or occupation and on their translation into competencies formulated as learning objectives.</p>
Criterion-referenced evaluation	<p>Evaluation method in which a student's performance in the accomplishment of a task is judged against a performance standard or achievement criteria determined at the time the objectives are formulated.</p>
Curricular approach	<p>Overall program development process that consists in defining objectives, learning content, focuses of evaluation, methods, strategies and the necessary resources, and integrating them into a structured, cohesive whole. Results in a program of study and various support documents for material organization, teaching and evaluation.</p>
Deconcentration	<p>Type of decentralization in which the administration of a region or territory is entrusted to agents who answer to the central authority. The weakest type of decentralization. Limited management autonomy and absence of governance.</p>

Delegation	Type of decentralization that consists in entrusting certain management functions to peripheral agencies with slightly more autonomy than deconcentrated units. The unit with delegated powers has more decision-making latitude than the deconcentrated unit, however, it has no true governance powers.
Devolution	Type of decentralization that is more enduring than delegation. Type of political delegation characterized by increased management autonomy and relative governance as in the case of delegation.
Education policy	Series of decisions and orientations related to training and determining its objectives, priorities and actions. (ILO, 1987)
Educational engineering	Body of techniques and methods used in the design, development, implementation, teaching and evaluation of a program of study. In vocational and technical education in Québec, it is characterized in particular by program design and development according to the competency-based approach.
Element of a competency	Precise description of the essential components of the competency in terms of observable and measurable behaviours.
Evaluation	Procedure preparatory to determining whether an objective has been achieved.
Formative evaluation	Analysis of a student's performance for purposes of assistance and guidance rather than certification.
General competency	Involves an occupational activity that goes beyond the specific tasks of the job itself. Can be transferred to a number of occupational activities.
Governance	In a decentralized system, particularly by devolution, a concept that refers to the sources of legitimacy and the method by which powers are exercised in units with considerable autonomy.
Grid of learning focuses	Double-entry table establishing relationships between the general and specific competencies of a program of study for the definition of objectives.
Harmonization of programs of study	Consists in establishing similarities and continuity between secondary-level and college-level programs, whether or not they belong to the same vocational and technical education sector. Its aim is to avoid overlap in program offerings, to recognize prior learning and to facilitate education.

Initial training	Vocational or technical education allowing an individual without previous training or experience in the targeted trade or occupation, regardless of age, to acquire the competencies needed to practise the trade or occupation by meeting the minimal requirements of the industry.
Institution	Generic term referring to a place where vocational or technical education programs are offered.
Instructional engineering	Term used in some countries to denote the program development process.
Instructional logic diagram	Proposal suggesting a sequence of teaching modules and courses while respecting the student's learning process.
Learning activity	Learning situation intended to help students acquire knowledge or skills or adopt an attitude.
Learning focus	Refers to all the learning a student must acquire in order to develop and apply a competency.
Level of competence for entry into the labour market	<p>Degree of mastery of competencies corresponding to the expected performance of a person entering a trade or occupation, when performing work-related tasks and activities.</p> <p>It includes any of the competencies normally required to practise a trade or occupation correctly, regardless of whether such practice is delayed. In addition, it does not involve a specialization in the trade or occupation, or qualifications exceeding usual standards.</p>
Level of education	Administrative and instructional division of an education system. Variations may exist depending on the education system, as is the case with college education in Québec.
Lifelong learning	The objectives of youth and adult education, viewed as a lifelong process, are to develop the autonomy and the sense of responsibility of people and communities, to reinforce the capacity to deal with the transformations taking place in the economy, in culture and in society as a whole, and to promote coexistence, tolerance and the informed and creative participation of citizens in their communities, in short to enable people and communities to take control of their destiny and society in order to face the challenges ahead. It is essential that approaches to adult education be based

	<p>on people's own heritage, culture, values and prior experiences and that the diverse ways in which these approaches are implemented enable and encourage every citizen to be actively involved and to have a voice. (UNESCO, 1997)</p>
Management engineering	<p>Body of policies, tools and methods required for the coordinated and rigorous design, organization, implementation and evaluation of educational activities.</p> <p>In vocational and technical education in Québec, it is characterized by the design, direction and regulation of structures based on a dynamic balance between centralization and decentralization, governance and partnership, monitoring and evaluation.</p>
Material resources	<p>Includes movable furniture, apparatus, machinery, heavy equipment, tools and instruments, accessories, safety equipment, audiovisual and computer equipment and other items such as raw materials, maintenance materials, power sources, etc.</p>
Performance criterion	<p>Description of the requirements for applying the competency and the expected level of performance. May help evaluate the achievement of the objective.</p>
Prevocational training	<p>Training that usually follows the end of the cycle of fundamental studies (9 years) and that constitutes an introduction to the workplace through a range of occupational activities. Essentially organized to prepare young people to select a career or branch of education by familiarizing them with the materials, tools and standards related to a range of occupational activities. (ILO, 1987)</p>
Program of study	<p>Integrated body of training objectives accompanied by predetermined performance criteria or standards.</p>
Recognition of prior learning	<p>Process for the evaluation of the relevant knowledge and skills already acquired by a person upon enrollment in a program of study. It is based on the principle that, throughout his or her lifetime, a person acquires learning that can be consistent with the targeted objectives in a learning program.</p>
School board	<p>Organization benefiting from a type of delegation and devolution of powers for offering educational services at the elementary and secondary levels, as well as in vocational education, in a given territory. Administered by a council of commissioners made up of citizens</p>

	elected by and from among the population of the territory in question (four-year mandate) and representatives of parents (one-year mandate). Has limited taxing power (school tax for property owners) corresponding to about 14.7 per cent of its revenue.
Specific competency	Involves a typical task of the trade or occupation. Enables the person to effectively ensure the production of a quality good or service.
Subsidized private college	Private postsecondary educational institution offering the same preuniversity and technical programs as CEGEPs. Certified for purposes of subsidies, that is, not only recognized as being in the public interest but also qualified for public funding. As specified in the <i>Act respecting private education</i> that governs it, this public funding is considerable, but less than the amount granted to public institutions, hence the tuition fees and financial assistance measures in a number of institutions. Also has considerable management autonomy and governance powers.
Summative evaluation	Analysis performed at the end of a term or program of study to determine the level of knowledge and competency attained by a student for purposes of certification of studies.
Technical and vocational education (outside Québec)	Involves, in addition to general education, technical education and the acquisition of practical knowledge and competencies related to the practice of certain occupations in various economic and social sectors. (UNESCO, 1978)
Technical education	Structured education system designed to provide individuals with the knowledge and competencies needed to practise an occupation with a view to entering the labour market as a senior technician or middle manager. In Québec, technical education is offered at the college level.
Technical education (outside Québec)	Training in the second cycle of secondary school and the first cycle of higher education for intermediate personnel (technicians, middle managers, etc.) (UNESCO, 1978). Intended to prepare the student to practise a trade or occupation.

Training approach	In vocational and technical education, refers to the three usual ways of implementing a program, that is, in a school, in the workplace or using a work-study approach.
Training module	Autonomous subdivision of a program of study in itself a cohesive and significant whole. Approach designed to facilitate the recognition of academic learning and to favour the harmonization of programs.
Training objective	Translation of the competency to be acquired into observable and measurable behaviours.
Training resources	Refers to the various methodologies, instructional materials, equipment and different services such as printing, secretarial and computer services.
Transfer of learning	Application of acquired knowledge to a new situation.
Vocational education	Structured education system designed to provide individuals with the knowledge and competencies needed to practise a specialized trade with a view to entering the labour market. In Québec, vocational education is offered at the secondary level.
Vocational education centre	Secondary-level educational institution providing education to students enrolled in programs of study leading to the labour market. Comes under a school board and is managed by a governing board.

LIST OF ABBREVIATIONS

AVS	Attestation of Vocational Specialization
CCQ	<i>Commission de la construction du Québec</i> (Québec construction commission)
CCTT	<i>Centre collégial de transfert de technologie</i> (centre for the transfer of technology)
CEEC	<i>Commission d'évaluation de l'enseignement collégial</i> (commission for the evaluation of college education)
CEGEP	<i>collège d'enseignement général et professionnel</i> (general and vocational college)
CEMIS	<i>Centre d'enrichissement en micro-informatique scolaire</i> (centre for the enhancement of computer technology in schools)
CNPEPT	<i>Comité national des programmes d'études professionnelles et techniques</i> (provincial vocational and technical education program committee)
CPMT	<i>Commission des partenaires du marché du travail</i> (commission of labour market partners)
CSE	<i>Conseil supérieur de l'éducation</i> (superior council of education)
DCS	Diploma of College Studies
DGFPT	<i>Direction générale de la formation professionnelle et technique</i> (vocational and technical education branch)
DGPD	<i>Direction générale des programmes et du développement</i> (programs and development branch)
DVS	Diploma of Vocational Studies
EPM	<i>École polytechnique de Montréal</i> (Montréal polytechnic school)

EQ	.....	<i>Emploi-Québec</i> (employment Québec)
ICTs	.....	information and communications technologies
MEQ	.....	<i>Ministère de l'Éducation du Québec</i> (ministry of education of Québec)
MESS	.....	<i>Ministère de l'Emploi et de la Solidarité sociale</i> (ministry of employment and social solidarity)
MSSS	.....	<i>Ministère de la Santé et des Services sociaux</i> (ministry of health and social services)
RÉCIT	.....	<i>Réseau des personnes-ressources pour le développement des compétences des apprenantes ou apprenants par l'intégration des technologies</i> (network of resource persons for the development of students' competencies through the integration of technologies)
SFPT	.....	<i>Secteur de la formation professionnelle et technique</i> (vocational and technical education sector)
SFPTFC	.....	<i>Secteur de la formation professionnelle et technique et de la formation continue et de la formation continue</i> (vocational and technical education and continuing education and training sector)
SSD	.....	Secondary School Diploma
VTE	.....	vocational and technical education

**Grid of learning focuses and sample vocational education module
(operational objective) from the *Automobile Mechanics* program**

MODULE 2: CHARACTERISTICS OF MOTOR VEHICLES

Code: 841 622

Duration: 30 hours

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE****EXPECTED BEHAVIOUR**

To demonstrate the required competency, the students must list the characteristics of motor vehicles in accordance with the following conditions, criteria and specifications.

CONDITIONS FOR PERFORMANCE EVALUATION

- Working individually
- Given a motor vehicle
- Using:
 - conventional and computerized technical documentation
 - American and import reference manuals

GENERAL PERFORMANCE CRITERIA

- Careful use of reference material
- Proper selection and use of technical documentation
- Proper use of English and French terminology and abbreviations

**FIRST-LEVEL OPERATIONAL OBJECTIVE
BEHAVIOURAL OBJECTIVE**

**SPECIFICATIONS OF THE
EXPECTED BEHAVIOUR**

- A. Identify sources of technical information.

- B. Find technical information with a view to applying it.

- C. Identify the parts, systems and subsystems of a motor vehicle.

- D. Explain the overall operation of motor vehicles.

**SPECIFIC PERFORMANCE
CRITERIA**

- Accurate distinction among the types of conventional and computerized documents available on the market
- Accurate distinction among the types of presentations of information
- Recognition of the relationships between the type of information available and the task to be performed

- Methodical research
- Accurate location of:
 - general information
 - diagrams
 - recommended work methods
 - figures
 - specifications
- Efficient use of research tools

- Accurate explanation of the characteristics of motor vehicles, using the appropriate English or French terminology
- Accurate identification of the parts, systems and subsystems of the vehicle

- Accurate explanation of the function of each part, system and subsystem
- Accurate identification of the functional relationships between the parts, systems and subsystems

SECOND-LEVEL OPERATIONAL OBJECTIVES

IN ORDER TO ACHIEVE THE FIRST-LEVEL OBJECTIVE, THE STUDENTS SHOULD HAVE PREVIOUSLY ATTAINED SECOND-LEVEL OBJECTIVES, SUCH AS:

Before learning how to find technical information with a view to applying it (B):

1. Distinguish between a mechanical, electrical or hydraulic diagram and a location diagram.
2. Distinguish among a table of specifications, the manufacturer's recommended work method and a technical bulletin.
3. Distinguish between the general information and the other sections of a repair manual.
4. Identify the different methods of finding information, according to manufacturer.

Before learning how to identify the parts, systems and subsystems of a motor vehicle (C):

5. Identify the various types of vehicles and their characteristics.
6. Become aware of the technological development of motor vehicles.
7. Explain the composition of a drive train.

**Sample technical education competency (objectives and standards)
from the *Applied Physics Technology* program**

Code 027D

Objective	Standard
<p>Statement of the Competency To analyze the dynamic and fluid dynamic parts of systems.</p>	<p>Achievement Context</p> <ul style="list-style-type: none"> • Using: <ul style="list-style-type: none"> - data acquisition and processing systems - specialized software - technical documentation
<p>Elements of the Competency 1. To diagram the system.</p>	<p>Performance Criteria</p> <ol style="list-style-type: none"> 1.1 Proper description of system elements. 1.2 Correct determination of the system's external limit. 1.3 Proper analysis of contact, frictional and action at a distance forces. 1.4 Proper analysis of translational and rotational movements. 1.5 Choice of a single- or multi-particle system model according to analysis requirements. 1.6 Clear diagram.
<p>2. To measure mechanical values.</p>	<ol style="list-style-type: none"> 2.1 Correct determination of the mechanical values to measure. 2.2 Appropriate choice and use of measuring instruments. 2.3 Correct application of the measurement method. 2.4 Precise measurement of masses, positions, durations, forces, pressures or rates. 2.5 Correct data processing. 2.6 Exact calculation of the value and precision of physical values. 2.7 Appropriate use of a data acquisition and processing system. 2.8 Evaluation of the reasonableness of results obtained.

Objective	Standard
3. To quantify the effects of forces.	3.1 Correct application of Newton's laws as well as energy and motion conservation laws. 3.2 Correct application of Pascal's and Archimedes' principles and Bernoulli's theorem. 3.3 Correct determination of dynamic and fluid dynamic values. 3.4 Correct determination of conditions for oscillation and resonance. 3.5 Exact calculation of linear or circular trajectories. 3.6 Exact calculation of effects of mechanical forces and power. 3.7 Appropriate use of software. 3.8 Evaluation of the reasonableness of results obtained.

Services related to vocational and technical education

Centres for the transfer of technology

In Québec, more than twenty colleges administer centres for the transfer of technology (CCTTs).⁴³

Legally constituted, CCTTs are recognized by the MEQ and administered by CEGEPs. Their mandate is to conduct applied research in a given field and to provide information services and technical assistance to businesses in order to contribute to the design and development of technologically innovative projects, as well as the implementation and dissemination of new technologies. These centres provide small, medium-size and large businesses with assistance at various steps in the process of technological change. Whether related to the transfer of technology, the research and development of new products or manufacturing processes, the technical assistance needed to facilitate the implementation of changes in businesses or one-time assistance, the CCTTs' activities contribute significantly to Québec's technological and economic development and to the close cooperation of businesses and colleges. They have important effects on scientific and technical training, thereby ensuring greater consistency between specialized training and work force needs.

Distance education

A number of large educational institutions in the Québec education system

are recognized for distance education. These establishments offer assistance to applicants, such as reception and information services, the examination and evaluation of school records, instructional support and the recognition of prior learning. In distance education, the potential of telecommunications technologies is used for the acquisition of knowledge. Research and development projects in recent years have relied heavily on the electronic highway; for example, the projects of the Société de formation à distance des commissions scolaires du Québec (SOFAD—Québec school board association for distance education),⁴⁴ the Centre collégial de formation à distance (college distance education centre)⁴⁵ and the Système d'offre de cours par Internet (SOCI—Internet training system) at the college level.

The Inforoute FPT

The Inforoute FPT⁴⁶ is Québec's vocational and technical education telematic network. Organized by VTE sector, this megasite includes a number of dossiers, products and services directly related to the education and business communities. With a view to optimizing the use of information and communications technologies, the Inforoute FPT facilitates access to information and creates a dynamic interaction between the partners in vocational and technical education.

It includes mainly information about the content and characteristics of programs

⁴³ See <<http://www.meq.gouv.qc.ca/ens-sup/ens-coll/etablis-coll/cctt-liste.htm>>.

⁴⁴ See <<http://www.sofad.qc.ca>>.

⁴⁵ See <<http://www.ccfcd.crosemont.qc.ca>>.

⁴⁶ See <<http://www.inforoutefpt.org>>.

of study and conditions for admission, as well as about the educational institutions that offer them. The site also gives access to a system for managing places available. Students can even register using the regional Internet admission system. Virtual tours enable students to learn about certain training programs inside vocational education centres, as well as the workplaces in which graduates may find jobs after receiving their diploma. In addition, it includes all the main VTE sector dossiers, which are kept up to date by project managers.

It includes a vast number of instructional resources, grouped together by program. A VTE directory contains information on how to reach the main players in the field. Finally, a special section provides information for students looking for a practicum for a work-study program, as well as for graduates looking for jobs. This site, which is constantly evolving, is the most valuable reference in the field of vocational and technical education in Québec.

Québec Skills Competition

The Québec Skills Competition⁴⁷ was inspired by the Olympic Games. It allows young Quebecers to test their competencies by competing against others in their field. It was created to promote vocational and technical education among the general population and among young people in particular. After competing in

local heats, winners move up to the regional, provincial and national levels and, finally, to the World Skills Competition. The competition is made possible through the cooperation of a dozen businesses and organizations concerned with young people's success and quest for excellence. Benefiting from financial support from five ministries, including the MEQ, the Secrétariat des Olympiades (Québec Skills Olympics secretariat) oversees the different activities.

Information and communications technologies

The Vocational Education RÉCIT

As the Québec educational community began turning to “technopedagogy,” the Centre d’enrichissement en micro-informatique scolaire (CEMIS—centre for the enhancement of computer technology in schools) became a nerve centre uniting pedagogy and technology. Given the education reform and, in particular, the curriculum reform, which is aimed at better integration of information and communications technologies (ICTs) in education, the CEMIS became a more important player. Now known by the acronym RÉCIT⁴⁸ (a network of resource persons for the development of students' competencies through the integration of technologies), its general mandate is to promote the use of ICTs in order to allow all partners in vocational education to optimize the quality of their teaching. In concrete terms,

⁴⁷ See <<http://www.soquebec.com>>.

⁴⁸ See <<http://www.csdhr.qc.ca/recit/english/default.htm>>.

the RÉCIT acts at the provincial level by VTE sector and by program. Its tasks are to:

- offer educational tools (gather together known tools in a virtual location to make them available to interested parties via the Inforoute FPT, and to favour interaction among users for the continuous updating of information)
- ensure a technological watch
- establish links with relevant Web sites
- lead discussion groups on pedagogy on the Inforoute FPT for each VTE sector
- continually update directories
- implement a structure for the exchange of information and cooperation between French-speaking countries and Québec

The RÉCIT may also act in an ad hoc fashion to:

- provide in-service training on new software or technical support
- support research projects such as the evaluation of software before they are launched, at the request of businesses

Vitrine APO

There are also other initiatives to integrate ICTs into the system, including the Vitrine APO⁴⁹ (pedagogical computer applications) managed by the Cégep de Bois-de-Boulogne. This showcase unites 88 school boards, colleges and universities. It promotes and favours the integration of ICTs in education. It also offers various services, such as an introduction to multimedia, group purchases, a virtual library,

teacher training, automatic monitoring, an index of educational sites and various directories.

Services to business and industry

Today, faced with new situations, the globalization of markets and economic fluctuations, businesses must adapt in order to remain competitive. To guide them in their path toward optimum development, they require the assistance of the Québec public network of services to business and industry.⁵⁰

Services to Business and Industry departments in CEGEPs and school boards offer businesses and organizations continuing education and training and work force development services in 21 sectors of activity.

Thanks to a partnership among the educational, industrial and social communities, Services to Business and Industry departments participate actively in regional socioeconomic growth. They study and support the technological and organizational development of businesses.

Services to Business and Industry departments pool their skills, knowledge and experience, thus creating a strong and versatile network serving individuals, businesses and organizations. In addition, the network covers the entire territory of Québec.

⁴⁹ See <<http://www.collegebdeb.qc.ca>>.

⁵⁰ See <<http://inforoutefpt.org/sae>>.

International development and cooperation

The Québec engineering model for vocational and technical education has served and continues to serve as a point of reference for a number of countries that have begun or intend to begin a reform of their education system in the near future. This model integrates all of the components of reengineering, from policies to the implementation of programs by local institutions. It has the advantage of being a relatively recent concept, while at the same time, it has been around long enough to have proven its effectiveness.

The MEQ, with the cooperation of the Ministère des Relations internationales (ministry of international relations) and the MESS, has endeavoured in recent years to support the international efforts of colleges, school boards and private-sector consulting firms in the field of vocational and technical education. Since 1998, the MEQ has been closely associated with the actions and projects of the Conference of Ministers of Education in French-Speaking Countries (CONFEMEN)⁵¹ and the Agence intergouvernementale de la francophonie (intergovernmental agency of French-speaking nations).⁵² Thus, it participated in the Assises francophones de la formation professionnelle (consultation of French-speaking nations on vocational education) in Bamako, Mali, in 1998, and has contributed at the technical

level to the organization and facilitation of several transnational seminars on the reengineering of vocational and technical education⁵³, including the 1999 seminar in Ivory Coast and the 2001 seminars in Lebanon, Central African Republic, Mauritius, Romania and Cambodia.

Every year, the MEQ welcomes a great number of delegations of specialists from Europe, Francophone Africa, Asia and the Americas interested in its vocational and technical education system.

Because of its desire to make its accomplishments known and because of the initiatives it supports, and despite its modest means, Québec has succeeded in playing an important role in the reinforcement of the structure of the vocational and technical education systems in several countries.

Québec Entrepreneurship Contest

- A solid network

The Québec Entrepreneurship Contest⁵⁴ began in 1998 with the merger of all entrepreneurship contests in educational institutions. It is the result of dynamic cooperation between the education community, the entrepreneurship community⁵⁵ and the business community.

The mission of the contest is to foster the development of entrepreneurship in Québec by rewarding “entrepreneurial initiatives” and “business creation.” The only such contest in Québec, its aim is to

⁵¹ See <<http://www.confemen.org>>.

⁵² See <<http://agence.francophonie.org>>.

⁵³ See <<http://www.inforoutefpt.org/ingenieriefpt>>.

⁵⁴ See <<http://www.concours-entrepreneur.org/english/english.html>>.

⁵⁵ See <<http://www.inforoutefpt.org/entrepreneursh>>.

create a new wave of entrepreneurs of all ages, whose creativity and talent will contribute to the enhancement of Québec's expertise.

The contest is open to everyone in every region of the province. Local and regional finalists move on to the provincial level, where the winners receive prizes awarded at the Grand Prix Gala.

- **Target clientele**

Entrepreneurial initiatives

This category is for young people in public and private schools from elementary school to university. The contest immerses students in entrepreneurship and its attending values: creativity, solidarity, responsibility, autonomy, self-confidence, leadership, etc. Supported by educators, participants are living proof that the spirit of enterprise is ageless.

In order to support and encourage entrepreneurship in schools, the MEQ has implemented a measure awarding financial assistance to schools for each student participating in the contest. This initiative has had a positive impact on participation.

Business creation

This category is for adults who are starting a business or have just acquired a business. It showcases the innovative spirit, creativity and talent of entrepreneurs by offering them much appreciated visibility and recognition.

- **Projects and prizes**

The statistics for 2001-2002 were exceptional: 39 993 participants entered

2 991 projects. The contest awarded 55 provincial prizes for a total of \$263 000. A first!

- **An international component**

Since its inception, the Québec Entrepreneurship Contest has extended beyond the borders of Québec. International prizes are awarded to projects with interesting prospects for international development. These prizes take the form of business trips within North America or to France or South America.

The contest is also associated with the Réseau des Boutiques de gestion de France, which unites small business generalists whose mission is to guide and advise those submitting projects, those starting a business, and administrators.

- **A springboard to better things**

Recognized and acclaimed by all, the Québec Entrepreneurship Contest welcomes more and more participants every year. Increasing numbers of projects are submitted and a spirit of enterprise is growing.

This wonderful adventure would not be possible without the cooperation of regional players, who constitute an extraordinary network of competencies and knowledge. The contest also receives the ongoing support of some 40 partners, including the government of Québec and the government of Canada as major contributors.



