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HUMAN RESOURCES DEVELOPMENT AND A COMPETITIVE ECONOMY

Weaknesses and Strengths
in the Canadian System

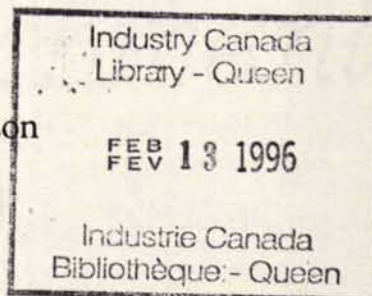
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HUMAN RESOURCES DEVELOPMENT IN A COMPETITIVE ECONOMY

Weaknesses and Strengths in the Canadian System

by

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The views expressed in this report are the responsibility of the authors, rather than the National Advisory Board on Science and Technology. Ian Morrison is Executive Director of the Canadian Association for Adult Education. Kjell Rubenson is Director of the Centre for Policy Studies in Education at the University of British Columbia.

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1. Background

Education is important first and foremost as the thread that gives form to the fabric of our society. It provides the basis for individual development, both affective and cognitive. It also embodies, and passes on from one generation to the next, the common values, traditions and culture upon which the coherence of societies depends, while providing a source of social and scientific progress.

Organization for Economic Co-operation and Development
(1989c, 47)

Education's importance to society transcends its economic dimensions; but it does have important economic effects. Its impact on productivity takes two principal forms:

- expansion of scientific knowledge
- raising the competencies and skills of workers

In recent years, education and training have once again become a top priority in industrialized countries. This was also the case in the 1960s, which witnessed an explosion in financial support for, and enrolment in, post-secondary education. There are, however, fundamental differences between these two reform efforts. The pressure for an expansion of educational opportunities in the 1960s had both economic and social roots. Developments at that time within the discipline of economics, especially human capital theory, had far reaching effects on educational policy making.

Proponents of human capital theory maintained that there exists a strong link between investments in education and economic growth (Denison, 1962; Schultz, 1960). The most attractive and important element of this theory is the claim that a more even distribution of investment in education will equalize individual earnings (Schultz, 1960). In the 1960s, this assumption was important because it linked the economic justification for the reform of education with social demands for equality

of opportunity. Greater equity in educational opportunity was seen as a major leveling force in society.

The focus during the 1960s was on increasing the percentage of the youth cohort continuing on to post-secondary education. Reforms were aimed at increasing the number of students admitted to the traditional higher education system as well as the creation of new institutions such as community colleges. In short, the arena was the formal system and the target group was the youth population. With the exception of a few lonely voices talking about recurrent and lifelong education, there was no serious questioning of the use of a *front-end* model for educational policy.

While today, as in the 1960s, much of the concern over education is economically rooted, the dynamics are fundamentally different from those which drove the 1960s wave of reform. Put briefly, the combined effects of recent technological breakthroughs in micro-electronics and telecommunications are having a profound structural impact on the economy, pushing it towards what has popularly come to be known as a *global information economy*. Consequently, human resource investments are being viewed as critical to the entire process of economic development. A nation's competitiveness in the world market is, to a large degree, expected to depend on the quality of its human resources – knowledge, learning, information and skilled intelligence.

In its recent study *Education and the Economy in a Changing Society*, OECD (1989a) has referred to "converging functions of education and the economy" and identifies four trends:

- The 'human factor' is assuming pre-eminence as a factor of production. The skills and qualifications of workers are coming to be viewed as critical determinants of effective performance of enterprises and economies.
- The development, application, dissemination and mastery of advanced technologies are necessary ingredients of economic success in technologically advanced societies. In addition to a workforce capable of applying advanced technologies, this also requires technologically literate consumers.
- The very notion of what it means to be 'active' in society is changing. Employment is no longer the *sine qua non*. This means that educational

preparation for an active society needs to be much more than simple preparation for working life.

- That which is 'education' is becoming less clearly distinct from that which is 'the economy'. This is in response to heightened sensitivity to educational deficiencies. The implication is that education is less synonymous than ever with schooling. Moreover, the cost of failure in initial education is going up insofar as it inhibits further learning; even for the majority that succeed, initial education is no longer enough.

Today, the argument for human resources development rests on several inter-related elements. The point of departure is the changing nature of work, which is altering the structure of the labour market as well as work processes and job content. This is seen as taking place in a market which is becoming increasingly internationalized and where a nation's standard of living will be determined by how well it can compete at the international level. The key word is *flexibility*: how effectively can the labour force adjust to and take advantage of the new context?

As a result, the focus of attention is no longer restricted to the education of children and adolescents, but also includes adults to the same extent if not more than education for the young; this because of economic imperatives pushing for investments which will impact present, not just long term future productivity.

In addition to perceptions and policy statements on the importance of adult training, empirical evidence is also accumulating. According to Carnevale and Gainer, education prior to work and on-the-job training accounted for 81% of the expansion of the U.S. productive capacity between 1929 and 1982; on-the-job training accounted for 55% of this growth alone. They also estimated that 75% of American workers will require re-training by the year 2000 (1989).

The Massachusetts Institute of Technology Commission on Industrial Productivity concluded in its recent report, *Made in America: Regaining the Productive Edge*:

Without major changes in the ways schools and firms train workers over the course of a lifetime, no amount of macro-economic fine-tuning or technological innovation will be able to produce significantly improved economic performance and a rising standard of living (Dertouzos, M., Lester, R. and Solow, R., 1989, 81).

Instead of a *front-end model* of education, where a person receives all his or her schooling as a youth, the concern has shifted to developing *lifelong learners*.

In order to maintain and increase economic competitiveness, OECD countries are currently placing their systems of education and training under mounting scrutiny. In many cases, this attention is being led by Ministers of Finance. This pressure on education is motivated not solely by economic, but also by equity interests. Active citizenship requires the same reasoning, literacy and social skills as economic participation. The 'functionally illiterate' risk being marginalized, unemployed, or having access to little more than unstable, low-paying jobs. As credentials measuring educational attainment and competencies are used more in the labour market as measures of qualifications, they are likely to be used as tools for selecting workers for employment, promotion and access to further education opportunities as well. Hence, those who lack initial skills and qualifications may find themselves cut off from the further education and training by which they could acquire additional skills and qualifications.

The changing relationship between education and the economy has recently become a major issue on the Canadian policy agenda. Every recent major policy review has concluded that initial and higher education, as well as worker training and re-training, are among the most important factors for securing international competitiveness and maximizing the potential of all segments of the Canadian labour force. The Economic Council of Canada (1988), the de Grandpré Advisory Council on Adjustment (1989), the Canadian Labour Market and Productivity Centre (1989a) and Employment and Immigration Canada (1989a) have all published reports which proclaim the critical importance of workforce training.

Canadian workers, themselves, perceive the importance of adult training. In a recent poll, 67% of all full-time employees considered that training and re-training are very important to the success of their organizations; 70% believed that training would become even more important in the future (CLMPC, 1989b).

In Canada, the increasing need for access to training in the workforce is reflected in the following trends:

- increasing globalization of production and markets, and accelerated technological change;

- growing long-term unemployment, particularly among disadvantaged groups and older workers;
- increasing labour market mismatches, including skill shortages;
- increased prevalence of upskilling and multiskilling of jobs;
- declining birth rates and aging of the workforce; and
- economic restructuring which continues to shift employment from goods-producing to service industries.

The latter two deserve special comment.

Analysis of factors affecting economic growth shows that Canada's economic performance in the 1980s appears to have been reduced by education's lower contribution to economic growth (CLMPC, 1990). This can be explained by the decline in the youth population resulting in new entrants into the labour market not increasing the overall quality of the workforce to the same extent as previously. The Canadian Labour Market and Productivity Centre (CLMPC) concludes that human resources and their impact on the economy will depend increasingly in future on what kind of education and training the existing labour force receives.

Skill shortages reflect structural changes in the labour market. Since 1967 the service sector has increased at an average annual rate of 3.2%, which compares to 0.9% in the goods producing sector. Almost 90% of the increase in jobs since 1967 has occurred in the service sector, which now employs 71% of the Canadian labour force (Economic Council, 1990).

These major changes suggest that more emphasis should be placed on upgrading the basic and technical skills of existing blue collar workers and on providing more opportunities for recurrent education throughout workers' lives. They also require that training systems more effectively develop skills in under-employed workers including disadvantaged adults (such as persons with disabilities, visible minorities, immigrants and the working poor).

* * *

Taking this discussion as a point of departure, this report offers a critical overview analysis of Canadian education and training in a comparative perspective under the following headings:

- a changing concept of education;
- a financial and structural overview of Canadian education;
- educational levels in the Canadian population: a comparative perspective;
- initial education and the preparation of young people for active life;
- post-secondary education;
- adult education and training;
- recurrent education in Canada: a score card; and
- gaps in the data base.

2. A Changing Concept of Education

From the early years of the twentieth century, educational reforms have extended the average duration of initial education in western countries by approximately one year per decade – to the point where it now includes pre-elementary, elementary, secondary and post-secondary stages. This model of educational provision can be described as a *front-end* model, which results over time in increasing segments of a cohort participating in the youth-oriented education system.

In both national and international discussions of education, a radical departure from this traditional front-end organizational model of education has recently occurred. Taking the principle of lifelong learning as a point of departure, several new strategies have emerged, based on a judgment that this front-end model is obsolete in the modern world on grounds of both efficiency and equity. The front-end model's continued prevalence results from momentum. Instead, in accordance with the lifelong principle, education and training are now being seen as having to be organized in ways that make them available throughout a person's lifetime.

The OECD's contribution to this discussion is the concept of *recurrent education*, which has become a cornerstone of OECD's educational philosophy, and has been presented as a strategy to implement the principle of lifelong learning. Recurrent education can be distinguished from similar concepts by its emphasis on the interaction between education and the other principal activities and phases that make up an individual's life – mainly, but not exclusively – work. Its definition, as presented in the first OECD report on recurrent education, states:

Recurrent education is a comprehensive education strategy for all post-compulsory or post basic education, the essential characteristic of which is the distribution of education over the total life-span of the individual in a recurring way, i.e. in alternation with other activities, principally with work but also with leisure and retirement (OECD, 1973, 16).

Since then, recurrent education has developed into a comprehensive strategy for four separate, but inter-related elements of education and training:

- secondary education
- post-secondary education

- adult education
- employer-sponsored education and training

Since the concept was first introduced in the 1970s, little progress has thus far been evident to implement it in policy and practice, despite the rapid pace of social and economic change (OECD 1989a, 25). Thus the question of strategies for change is important, and as OECD states, it is obvious that today the question is a *political* one. The free-wheeling, unrestricted quantitative growth of the 1960s and 1970s is no longer the answer in a world where the key to growth is quality of economic performance and competitiveness.

Replacement of a front-end model with an educational strategy based on the concept of recurrent education in Canada brings to the fore a series of issues such as:

- The quality of the front-end part of a recurrent education strategy: i.e., to what extent do elementary and secondary education prepare young people to become lifelong learners and how well do they prepare them for the future world of work?
- The quality of the post-secondary system: how well has it adjusted to the new demands from a changing world of work, not only with regard to its traditional front-end role of preparation and research but also as a provider of adult and continuing education and research and development in cooperation with industry.
- How well developed is the system of industry-based education and training?
- With respect to the above issues, how far developed is the overall planning for recurrent education, e.g., budgetary procedures? Are they still mainly based on a front-end model or do governmental budgetary procedures recognize the shift in educational philosophy?

Before addressing such issues, summary information will be provided on the topics of finance and structure of Canadian education, as well as on levels of attainment and literacy in the Canadian population.

3. A Financial and Structural Overview of Canadian Education

Public Policy Context

Education and training policies in Canada can best be understood in the context of the historical development of Canadian federalism. Education is a provincial matter and the *Constitution Act, 1982* (formerly the *British North America Act, 1867*) grants to the provinces the right to make legislation in relation to education. Due to the authority of each province over education, there is no national policy-making process for education. While obvious and fundamental commonalities exist among provinces and territories, Canada is basically made up of ten education systems (not to mention the northern territories, which, though under overall federal jurisdiction, operate autonomously in education).

Parliament has legislative authority in education only through its jurisdiction over the two Territories, as well as over matters regarding aboriginal people, armed forces personnel and families, and inmates of federal correctional institutions. Parliament's legislative authority over official languages and its responsibility to manage the economy and the labour market provide the principal justification for federal involvement in education and training. Over the past three decades a *de-facto* federal role has developed including substantial fiscal transfers for post-secondary education, grants related to official languages education, and the financing of labour market training through provincially controlled institutions.

Jurisdictional tensions within Canadian federalism are basic to an understanding of barriers to inter-governmental collaboration in education and training policy. In its 1976 *Review of National Policies for Education: Canada*, the OECD referred to this tension as follows:

Officially, there is no federal presence in the area of educational policy, and the federal government behaves (at least in public) as if there were none. Not only is there no federal authority with the word "education" in its title, but the federal Parliament eschews all debates that might bear on educational policy. Even reflection on educational policy happens at the federal level only behind closed doors. In reality though, the educational policies of the federal government, and the financial concomitants of that policy, cannot be overlooked. A considerable federal presence in educational policy is indeed tolerated

by the provinces and arouses no hostility, as long as nobody calls it educational policy, and as long as there are no overt strings attached to money coming from Ottawa (OECD, 1976, 89).

In the same Review, the OECD advocated stronger mechanisms for inter-provincial co-operation in educational policy and called for "a Council of Ministers of Education that (is) more able to function effectively, with a staff that must be greatly strengthened in numbers" instead of confining "its functions to virtually that of a private meeting place for Ministers and their representatives" (*op.cit.*, 97). *

A diagram of Canadian education prepared by the OECD is reproduced in appendix A.

Funding and Expenditure

As a result of a consensus in Canadian society that education brings broad social, political and economic benefits, governments have allocated large sums for public education in recent years. As Table 3:1 indicates, Canada has one of the largest expenditures on education expressed as a percentage of the gross domestic product in the industrialized world.

* In this report, the OECD's external examiners commented that "this 'do-one-thing-as-if-it-were-something-else' attitude does not please all Canadians, some of whom describe it as 'intolerable' and 'almost schizophrenic'. But to some extent, behaviour that strikes outsiders as elaborate make-believe may, in fact, be a necessary price, willingly paid to hold together a political confederation of disparate provinces – and therefore understandable and even functional. Certainly no change can come from the federal side".

Table 3:1
Educational Expenditure as a percent of GDP
in Selected OECD Countries 1986*
(OECD, 1989b, 99)

| | <i>Public Sources</i> | <i>Private Sources</i> | <i>Total</i> |
|----------------|---------------------------|----------------------------|--------------|
| Australia | 5.3 | 0.4 | 5.7 |
| Canada | 6.6 | 0.6 | 7.2 |
| Denmark | 7.2 | 0.1 | 7.3 |
| France | 5.6 | 1.0 | 6.6 |
| Germany** | 4.3 | 0.2 | 4.5 |
| Japan | 5.1 | 1.4 | 6.5 |
| Netherlands | 6.6 | 0.2 | 6.8 |
| Norway | 6.6 | 0.2 | 6.7 |
| Sweden | 7.5 | n.a | n.a |
| Switzerland | 5.1 | 0.1 | 5.2 |
| United Kingdom | 5.0 | n.a | n.a |
| United States | 5.0 | 1.8 | 6.8 |

n.a. = not available

* The data for Japan, the Netherlands and the United States are for 1985.

** Throughout this report "Germany" refers to the Federal German Republic.

Sweden spends more on education than any other OECD country, while Canada ranks third, just below Denmark, but above the United States, Japan and West Germany.

Despite the relatively high expenditure on education in Canada, the gradual decline in educational expenditure expressed as a percentage of GDP has caused concern. Table 3:2 indicates that educational expenditure has declined from 8.6% to 6.8% between 1971 and 1989.

Table 3:2
Canadian Educational Expenditure
expressed as a percent of GDP, selected years
[StatsCan, 1989a, b]

| | |
|---------|-----|
| 1970/71 | 8.6 |
| 1982/83 | 7.6 |
| 1985/86 | 7.2 |
| 1988/89 | 6.8 |

The decreasing share of GDP being spent on education has to be interpreted in the larger perspective of total government expenditure. The share that the various levels of government have allocated to respective functions can be seen as an expression of their priorities. Considering the period 1970–1988, Table 3:3 demonstrates that the relative share of aggregate governmental expenditure on education in Canada declined by 40%. After transport and foreign affairs, the education function witnessed the largest relative decrease in spending effort. This should be compared to an increase in the share of social services of 14% and a decrease in health expenditures of 9%. The serious dilemma posed by government debt is indicated by the 83% increase in that category, thereby reducing substantially resources available for other functions.

Table 3:3
Aggregate Governmental Expenditure* by Function
(StatsCan**)

| <i>Function</i> | <i>% of Gov'tal Spending</i> | | <i>% Change</i> |
|---|------------------------------|-------------|-------------------------|
| | <i>1970</i> | <i>1988</i> | <i>1970 to 1988</i> |
| General Services | 6.3 | 5.5 | -13 |
| Protection of Persons and Property | 9.8 | 7.5 | -33 |
| Transportation and Communication | 10.4 | 4.6 | -56 |
| Health | 13.6 | 12.4 | -9 |
| Social Services | 19.3 | 22.4 | +16 |
| Education | 19.1 | 11.4 | -40 |
| Resource Conservation, Individual Development, Environment and Regional Development | 4.9 | 7.1 | +44 |
| Debt Charges | 8.4 | 15.4 | +83 |
| Foreign Affairs and International Assistance | 2.2 | 1.2 | -46 |
| Other Expenditure*** | 6.0 | 5.7 | -5 |
| Total | 100.0 | 100.0 | |

* Includes all governments

** Data obtained from Public Institutions Division

*** Includes recreation and culture

To arrive at a more complete understanding of the decline in educational expenditure over the past two decades it is useful to examine the share allocated to each of the three major sectors of publicly-funded education and training: elementary/secondary, post-secondary and vocational training.* Since the mid-

* Expenditures on vocational training include: (i) training under the Canadian Jobs Strategy (and its predecessors); (ii) federal expenditure on language training courses; (iii) vocational training in federal penitentiaries and provincial reformatory schools; (iv) various training courses

1970s public expenditure on elementary/secondary education has gradually declined as a share of total public expenditure from 67% in 1976/77 to 63% in 1989/90. During the same twelve year period, public expenditure on post-secondary education has increased from 27% to 29% of the total, and on vocational training from 6% to 8% of the total – it reached 9% in 1986/87 (StatsCan, 1989a).

Table 3:4 presents these data in constant dollars using an index where 1976/77 equals 100 in order to obtain an indication of relative spending effort over time since the mid-1970s.

Table 3:4
Changing Patterns of Public Expenditure on
Education and Training
Canada (Index* 1976/77 = 100)

| | <i>Elementary/Secondary</i> | | <i>Post-secondary</i> | | <i>Vocational Training</i> | | <i>Total</i> | |
|-----------|-----------------------------|--------------------|-----------------------|--------------------|----------------------------|--------------------|--------------|--------------------|
| | <i>Index</i> | <i>\$ billions</i> | <i>Index</i> | <i>\$ billions</i> | <i>Index</i> | <i>\$ billions</i> | <i>Index</i> | <i>\$ billions</i> |
| 1976/77 | 100 | 10.0 | 100 | 4.1 | 100 | 1.0 | 100 | 15.0 |
| 1982/83 | 104 | 18.5 | 109 | 7.9 | 111 | 1.9 | 106 | 28.3 |
| 1986/87 | 112 | 23.5 | 122 | 10.4 | 164 | 3.3 | 118 | 37.1 |
| 1989/90** | 116 | 27.6 | 129 | 12.5 | 150 | 3.4 | 121 | 43.5 |

* Indices calculated using the Statistics Canada CPI deflator.

** Estimates

Table 3:4 demonstrates that between 1976/77 and 1986/87 expenditure on vocational training increased by as much as 64%. Over the past three years, which witnessed a decline in unemployment rates, funding for vocational training has effectively been reduced. Public expenditure on post-secondary education has increased gradually and is estimated to be 29% higher in 1989/90 than in 1976/77. During the same period public expenditure on elementary/secondary education rose by 16%. These changes need to be considered in the context of enrolment trends, as outlined in Table 3:5.

set by federal and provincial authorities; and (v) government funding of private trade, art and music schools.

Table 3:5
 Changes in Full-time Elementary/Secondary and
 Post-secondary Enrolment 1977/78 to 1987/88, Canada
 (StatsCan, 1989b, 57)

| | <i>Elementary/ Secondary</i> | <i>Post- Secondary</i> |
|----------|----------------------------------|----------------------------|
| 1976/77 | 5,513,600 | 602,700 |
| 1982/83 | 4,994,100 | 722,000 |
| 1986/87 | 4,938,000 | 796,900 |
| 1989/90* | 5,074,000 | 829,050 |

* Estimates

The increased expenditure on post-secondary education is related to higher enrolment, while the increase for elementary/secondary education has occurred despite decreased enrolment, which results in a higher cost per student. See Table 3:6.

Table 3:6
 Changes in Expenditure per Full-Time Student
 [Index 1976/77 = 100]

| | <i>Elementary/ Secondary</i> | <i>Post- Secondary</i> |
|----------|----------------------------------|----------------------------|
| 1976/77 | 100 | 100 |
| 1982/83 | 116 | 92 |
| 1986/87 | 125 | 92 |
| 1989/90* | 127 | 94 |

* Estimates

Figures on expenditure per student as presented in Table 3:6 give a rough indication of how costs have changed. As can be seen in the Table, expenditure per student in elementary/secondary education has gradually increased and is now about 27% higher than in 1976/77. During the same period, expenditure per student in post-secondary education has decreased somewhat. Note that Table 3:6 is based on full-time enrolment only. As part-time enrolment in post-secondary education has increased rapidly over the past thirteen years, the Table understates the true extent of the decrease in per-student post-secondary spending.

Table 3:7 presents estimates of sources of funding for Canadian education in 1989/90.

Table 3:7
Estimated Sources of Funding for Canadian Education 1989/90
(StatsCan, 1989a, 32)

| | <i>\$ billions</i> | <i>%</i> |
|-----------------------------------|--------------------|----------|
| Provincial governments | 28.5 | 66 |
| Local governments | 7.4 | 17 |
| Federal government | 4.1 | 9 |
| Non-government (private) sources* | 3.5 | 8 |
| Total | 43.5 | 100 |

* Non-government (private) sources include tuition fees, donations, interest on investments, but do not include employers' spending on employee training.

These Canadian data mask substantial differences among the provinces. For example, local governments are not significant sources of funds in Newfoundland, Prince Edward Island, New Brunswick and Quebec.

In addition to its direct funding, the federal government also contributes to education financing under the Official Languages in Education Program and the Federal-Provincial Fiscal Arrangements and Federal Post-secondary Education and Health Contributions Act, 1977. In 1985/86, for example, the federal government transferred \$2.2 billion in cash and \$2.3 in the form of the value of tax points

"vacated by the federal government and raised through provincial income tax" (StatsCan, 1989b, 215; 1989a, 28ff; and 1989c, 29).

While information on public expenditure for education and training is well-developed in Canada, this is not the case for information about education and training spending on the part of employers, which is not collected in the above data base. However, a recent study of employer-sponsored training established that employers spent \$1.4 billion on education and training in 1986. *

The Canadian educational data system has been designed to collect information on the basis of the traditional front-end model, and is not equipped to identify expenditure patterns across the life cycle. It is not currently possible to distinguish youth, or front end, educational expenditures from expenditures on adult education. No reliable means exist to distinguish, for example, the share of spending by the elementary/secondary, the post-secondary, or the vocational training systems on adults who return full-time or part-time to continue their education. This data problem inhibits meaningful policy deliberations on recurrent education in Canada.

* See discussion on page 58.

4. Educational Levels in the Canadian Population: a Comparative Perspective

Educational Attainment

The level and distribution of educational attainment in a society is an important economic variable for at least two reasons:

- its macro-economic impact on the nature, quantity and quality of the goods and services produced by an economy; and
- its impact on the distribution of income among the population.

In addition, educational attainment is a factor which influences labour market adjustment and facilitates structural adjustment, as well as the overall capacity of societies to adapt to changing demands and conditions. The OECD's 1989 *Employment Outlook* refers to education as:

...a necessary, although not a sufficient condition for economic growth. Viewed from this perspective, the educational attainment of the labour force is an important indicator of an economy's potential for economic growth. In turn, the distribution of of this attainment then influences the distribution of the well-being derived from this growth" (OECD, 1989c, 52).

The median years of schooling for the population aged 15 and over is an overall indicator of a society's educational effort spread longitudinally over several decades. In Canada this median has increased from 11.3 to 12.2 years from 1976 to 1986, with no appreciable differences between the genders. Regional variations in the 1986 median range from 10.9 in Newfoundland to 12.4 in Alberta, British Columbia and Ontario. Table 4:1 demonstrates how this median varies by age group.

Table 4:1
Educational Attainment by Age, Canada
(StatsCan, 1989b, 33)

| <i>Age Group</i> | <i>Median Years of Schooling</i> |
|------------------|----------------------------------|
| 15-24 | 12.3 |
| 25-44 | 12.8 |
| 45-64 | 10.9 |
| 65+ | 9.4 |

OECD offers comparative educational attainment data based on the following attainment levels: *

- A. Completed less than upper secondary education
- B. Completed upper secondary education
- C. Qualitative measure of vocationally oriented (overlaps A, B and D)
- D. Completed some post-secondary education but not a university degree
- E. Completed at least one university degree

Direct comparisons between countries using this data base must be undertaken with caution because the various educational systems, and the meaning of various benchmarks within them, differ considerably. Bearing this in mind, the comparative data OECD has generated are nonetheless most interesting, and fill a vacuum in the field of comparative attainment data, particularly with respect to comparisons over time.

On the whole, the OECD analysis shows that the educational attainment of the Canadian working age population compares favourably with most other OECD countries. Only the U.S.A. has a larger share of the population with some form of post-secondary education (levels D & E) than Canada (39% versus 35%). The figure for Japan is only 20%. The OECD data demonstrate that Canadian women

* Canada is one of those countries whose data base did not enable OECD to adduce information for the qualitative measure of vocationally oriented attainment (level C). Canada's data, drawn from the Labour Force Survey, are for 1987. Some other countries' data are presented for 1988.

possess relatively high educational attainments, in comparison to women in other OECD countries, particularly Japan.

Looking only at the share of the working age population with a university degree (level E), 22% of the U.S. male population falls into this category compared to 19% in Japan, 17% in the U.K. and 14% in Canada. Only 6% of German males have a university degree. The figures for women are 16% in the U.S., 15% in the U.K., 10% in Canada, 4% in Japan and 3% in Germany (*op.cit.*, 54).

As Table 4:2 indicates, very substantial differences exist among OECD member countries with respect to the percentage of the population with only level A (less than upper secondary completion) in 1987:

Table 4:2
Percentage of Population with less than Upper Secondary Education
1987 (OECD 1989c, 84)

| | <i>Females</i> % | <i>Males</i> % |
|----------------|---------------------|-------------------|
| Australia* | 55 | 41 |
| Canada | 33 | 34 |
| Germany | 43 | 19 |
| Japan | 37 | 33 |
| Netherlands | 60 | 48 |
| Norway | 64 | 48 |
| Sweden | 50 | 41 |
| Switzerland | 35 | 22 |
| United Kingdom | 72 | 48 |
| United States* | 23 | 23 |

* Data for Australia and the United States are for 1988.

When trying to assess international competitiveness, the comparative measure of changes over time within each educational system is of interest. Table 4:3 indicates

annualized rates of change in selected countries for periods ranging from 5 to 17 years, depending on the available data, as noted.

Table 4:3
Annualized changes in population shares by attainment levels
(OECD, 1989C, 57)

| | <i>Period</i> | <i>Levels of Education</i> | | | | |
|-----------|---------------|----------------------------|----------|----------|----------|----------|
| | | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> |
| Australia | 83-88 | -2.02 | 0.54 | 3.16 | 1.97 | 3.32 |
| Austria | 81-87 | -5.83 | 1.54 | 7.32 | | 12.30 |
| Belgium | 70-87 | -1.28 | 5.77 | | | 3.07 |
| Canada | 75-87 | -2.50 | 1.89 | | 0.55 | 3.97 |
| Germany | 78-87 | -2.16 | -3.75 | 0.90 | 4.20 | 2.75 |
| Italy | 80-87 | -1.32 | -4.91 | | | 3.60 |
| Japan | 74-87 | -2.76 | 1.54 | | | 3.55 |
| Norway | 72-87 | -5.73 | 6.32 | | | 5.80 |
| Sweden | 71-87 | -2.71 | 1.86 | 5.31 | 7.08 | 5.60 |
| USA | 72-88 | -2.83 | 0.51 | | 2.23 | 3.34 |

(Blank spaces indicate that data are not available.)

A chart drawn from this data by OECD illustrates these changes over time (appendix B). From this chart it is worth noting that Canada's relative position of advantage in 1975 had declined substantially by 1987.

The OECD data enable a better analysis of the relationship between educational attainment and unemployment than the Statistics Canada evidence reported above. The ratio of the unemployment rate for Canadians in A level to those in E level in 1987 was 3.6 for men and 2.4 for women. This difference was lower than in most other OECD countries. Comparative ratios for the United States were 5.9 and 4.6 respectively (*op.cit.*, 67). Appendix C contains a chart which enables a comparison of unemployment rates for men and women by educational level in 1975 and 1987 (*op.cit.*, 61). It is important to note that educational attainment is also becoming a more important factor in the Canadian labour market.

Those with the lowest level of educational attainment have experienced an increased share of unemployment. Adjusting for changes in labour force shares, the rate of unemployment among Canadian men with less than complete secondary education rose from 12.4% in 1975 to 30.7% in 1987 (OECD, 1989, 68). However women workers with low educational attainment showed no major increase in unemployment during this period (18.4% in 1975 and 19.3% in 1987).

It appears that educational attainment is likely to enhance an individual's general position in the employment queue, making him or her more attractive to employers. Higher levels of educational attainment may also be associated with better labour market information and more effective job search techniques, thereby reducing the likelihood, or duration, of unemployment. Furthermore, the segmented and dual labour market perspectives predict that those with less schooling will be caught in jobs characterized by frequent turnover, low wages, and high unemployment (*op. cit.*, 58).

OECD's assessment of this evidence:

- The relationship between educational attainment and unemployment does not appear to be a linear one with overall increases in educational attainment leading to overall reductions in unemployment. Instead, the largest difference in experience is usually found between the least educated and everyone else.
- This suggests that any new education and training interventions are likely to have their largest impact on reducing unemployment if they are targeted on raising attainment levels of the least educated, rather than on trying to increase attainment levels overall.
- Within specific age groups, higher levels of attainment are associated with lower unemployment rates, though the importance of educational attainment diminishes in most countries with age and, presumably, experience. This pattern is most distinctive over time (and for both males and females) in Canada and the United States.
- This suggests that educational attainment is an important factor contributing to the 'competitiveness' of labour when workers have less vocational experience acquired on the job.

- Especially in Canada and the United States, those with the lowest levels of attainment are increasingly – and disproportionately relative to other attainment groupings – at risk of becoming unemployed, especially educationally disadvantaged men.

From this perspective, special attention needs to be given to adult literacy in Canada.

Functional Literacy

While there are no reliable international comparisons to be found on the subject of adult illiteracy, it is likely that illiteracy rates are higher in North America than in either northern Europe or Japan, (Darville). In Canada, a convention has developed among researchers on literacy that less than nine years of educational attainment is a proxy for functional illiteracy. Such measures are obviously crude indicators. On this basis, 18% of Canadians 15 years of age and over would have been functionally illiterate in 1987. *

In 1987, Southam newspapers published the results of a commissioned survey which tested the reading, writing and computational capacity of a sample of 2,400 Canadians and from this developed "a composite picture of a true cross section of real Canadians who can't read and write well enough to do many everyday tasks" (Calamai, 1988, 16). This survey indicated that 24% of adult Canadians were functionally illiterate. It found the following rates of functional illiteracy among sub-groupings in the sample:

- 72% of persons with only four years of schooling or less
- 53% of persons with five to eight years schooling
- 44% of Newfoundland residents
- 29% of francophones
- 27% of Torontonians
- 24% of high school dropouts
- 17% of British Columbians
- 17% of high school graduates
- 8% of university graduates

* It would be more accurate to describe them as educationally disadvantaged.

Half of those found to be functionally illiterate were over 55 years of age; 53% had finished nine or more years of schooling; and 33% reported graduating from high school. The study also found that 1.7 million persons found to function above the defined literacy threshold had attended school for less than nine years. The personal income of 'literate' exceeded 'illiterate' by 44% (Southam, 1987).

The Statistics Canada Survey of Literacy Skills Used in Daily Activities, administered to a 13,000 sample drawn from the labour force survey in October 1989, is expected to generate more accurate information when it is released in May 1990. Instead of identifying percentages of the population who are labelled 'functionally illiterate', the Statistics Canada survey measures reading, writing and mathematics skills on a scale from 0 to 4, thus identifying the respondents' relative capacities in the three skills. *

* OECD's Centre for Educational Research and Innovation has expressed interest in the Statistics Canada approach as a basis for similar compatible studies in other countries to enable, for the first time, international comparisons in this field.

5. Initial Education and the Preparation of Young People for Active Life

The initial education of young people in Canada is a vast enterprise which, as noted above, consumes almost two-thirds of Canadian educational expenditure. Enrolment in elementary and secondary education exceeded 4.6 million in 1987/88 (StatsCan, 1989b, 47). This section will focus upon three issues which have recently attracted considerable interest in the elementary/secondary education field:

- quality
- international comparisons of outcomes
- dropouts

Quality

In the introduction to its recent report *Schools and Quality: an International Report*, OECD states:

There is now widespread discussion in OECD member countries of the need to raise the quality of schooling. The entry of the word 'quality' into the lexicon of professional educators, politicians, employers and the public at large is a new phenomenon though, of course, nouns like 'excellence', 'standards', and 'achievement' have long been common parlance. What it does represent is a fresh emphasis in educational discourse that risks leading to conceptual confusion, if not to facile slogan-making, as it becomes a convenient catch-all response to all the many criticisms currently levelled against public education systems, (OECD, 1989d, 9).

To place in context recent Canadian concerns regarding the 'quality of schooling', it is of interest to note the nature of similar concerns among our principal trading partners (*op.cit.*):

- *United States*: fears for the nation's economic competitiveness measured in direct relation to the decline, as measured by some indicators, in college entrance test scores or functional literacy.

- *Japan:* fears that the education system, though successfully imparting mastery of the traditional syllabus, is less successful in engendering the creative, higher-order skills that will increasingly be required in the future.
- *OECD Europe:* owing to recent high levels of youth unemployment, concern that too many young people are being inadequately prepared for the world of work, both with respect to labour market knowledge and skills and to appropriate values.

In the following account, a summary of arguments is presented of the considerably more detailed OECD report quoted above.

Values are at the heart of a concept so subjective as quality, when it is used in its normative interpretation. One means of evaluating the quality of a given education system is to assess the degree to which it attains its goals. But the broad goals of most systems are such that it would always be possible to do better. To attain all such goals would be utopian. The prominence of the current discussion of quality reflects what OECD has called a groundswell of disenchantment with, and public questioning of, the present condition of education. This disenchantment is often based upon subjective factors of perceptions of performance and societal expectations, rather than objective evidence. OECD suggests that schools today are now confronted with an inflated and bewildering array of expectations which explains, perhaps as much as any other factor, the current pre-occupation with quality.

One of the key value questions is 'quality of what'? Identifying which aims in education should be given priority raises the issue of distinctions between inputs, processes and outcomes. For many, quality is primarily about outcomes, and this judgment is based on a mixture of common sense and metaphors borrowed from economics. But, in education, a key problem is to identify the actual relations between inputs, processes and outcomes. It can be misleading to focus on outcomes to the extent of ignoring or downgrading the determinants that lead into them. Any approach to improving quality must focus on the links between these different factors.

And which outcomes? Are cognitive outcomes more important than affective, social, aesthetic and moral learning? The evidence of test scores, though interesting, is not enough. Many who allege that standards have declined and who

call for a 'return to the basics' are equally concerned about deteriorating moral values, inadequate preparation for citizenship, and insufficient regard for social graces such as neatness, punctuality and politeness. The economic analogy breaks down when it implicitly considers children and youth as passive receptacles, there simply to be filled up. If a child reaches adolescence brilliant in text performance but bored or insecure, something has evidently gone amiss. The public expects the schools to address these non-cognitive factors.

Where should the schools place their emphasis between the gifted, the broad mass of students and those with learning problems? The question of 'quality for whom?' also must be addressed. Much depends upon the point of view of the critic. Those whose priority, for example, is to integrate the handicapped in mainstream schools will tend to evaluate high-quality schooling in terms of opportunities for the disabled to participate. Those who care primarily about the production of highly skilled scientists and technologists will wish to give focus to developing bright students' aptitudes in subjects such as mathematics. A societal consensus among these competing priorities is elusive. If any consensus is possible in response to the 'quality for whom' question, it will be a compromise: the challenge for the schools is to raise the attainment levels of all pupils.

These considerations spill over into a discussion of 'educational standards'. There is a common, inaccurate assumption that this term is widely understood and that there is general agreement on what constitutes standards in education. Substantial evidence suggests that findings and indicators of student performance in a selected area do not stand up as proxies for performance levels across all relevant fields of knowledge, skills and appreciation. The search for standards will always be controversial because judgments must be made in a constant climate of competing claims and political disagreements over educational priorities. The search for technical exactitude is not a substitute for the inexact and complex negotiation of educational aims and values. That the common form of the word 'standards' is plural is already a warning of this. It refers to a cluster, whose contents often remain unstated or, if stated, become a subject for strong disagreement.

The OECD's conclusion is that:

The main purpose of clarification (of standards) should not be to engage in endless debate concerning whether standards have risen or fallen. Where dissatisfactions exist, the accomplishments of schools can be set more fruitfully against contemporary and future demands rather than

against romantic visions of past achievements.... The process of developing indicators can help to clarify and forge agreement on fundamental goals and values. But they will never reflect the totality of what is understood to be quality in schooling.... Nor do indicators provide technocratic solutions that circumvent the need to address the values and assumptions on which they are based. No matter how well constructed technically, indicators are only useful as there is acceptance of the assumptions underpinning them. They cannot provide absolute readings of educational 'health'. There is, in other words, no technical way of skirting around the subjective nature of the quality concept (*op.cit.*, 49).

International Comparisons of Outcomes

The discussions of international comparisons of outcomes date back to western, principally United States' concerns about the technical capacities of its education system as a result of the 1957 'Sputnik crisis'. Today's equivalents are multi-country inquiries into selective aspects of educational attainment, and they become prominent, even political ammunition, when unfavourable comparisons are made. The OECD has commented that:

The targets of the worry tend to be twofold – immediate rivals among highly industrialized western countries and the rapidly emerging competitors in South East Asia and Latin America. The worries in the latter case stem not only from shifting patterns of world trade but also from the results of international assessments showing that certain rapidly developing countries in South East Asia, with class sizes considerably larger than those in most OECD education systems, and with students living in a social milieu notably less privileged, are now scoring as well as, or sometimes even better than students in the rich industrialized countries, notably in mathematics and the sciences (*op.cit.*, 21).

Taking into account the above comments, which should offer some measure of caution about the utility and policy relevance of selective international comparisons, two recent studies are summarized below to provide an indication of selected Canadian jurisdictions' relative performance in such studies:

- Second International Study of Mathematics 1981/82
- International Assessment of Mathematics and Science 1988

The now somewhat dated 1981/82 study, sponsored by the International Association for the Evaluation of Educational Achievement, compared mathematics skills in twenty-one countries, including two Canadian jurisdictions, British Columbia and Ontario. Two groups were sampled:

Population A: grade where majority of students are 13 years of age in mid-year; and

Population B: students in the "normally accepted terminal grade of the secondary education system, and who are studying mathematics as a substantial part of their academic program" (Robitaille, 1989, 8).

The 'population B' results indicate wide variations in performance which can be explained in part because of substantial variations in the percent of the cohort in the sample. (Some comparisons with Hong Kong – widely quoted in educational debates – are suspect from a policy point of view owing to these variations: five percent of Hong Kong 17 year old males meet the definition above, compared with almost one third of Canadians the same age.) Population A is of greater interest, as well as more reliable from a policy point of view, because of greater similarities in the percentage of cohort represented.

The Population A results (mean percentage answered correctly) for a composite of arithmetic, algebra, geometry, measurement and statistics test results in 1981/82 are presented in Table 5:1.

Table 5:1
IEA 2nd Mathematical Study, 1981, Average Percent Correct
(Robitaille, 1989, 8)

| | % |
|-------------------|----|
| Japan | 62 |
| Netherlands | 57 |
| Hungary | 56 |
| Belgium (Flemish) | 53 |
| France | 53 |
| British Columbia | 52 |
| Belgium (French) | 51 |
| Ontario | 49 |
| Scotland | 48 |
| England and Wales | 47 |
| Finland | 47 |
| New Zealand | 46 |
| United States | 45 |
| Sweden | 42 |

Note that the Canadian children – who are now 22 years old – scored in the mid range of this study, well above the scores of their counterparts in several of our principal trading partners.

Appendix D contains a graph from the U.S. Department of Education to illustrate these data.

In the second, more recent study, sponsored by the Centre for the Assessment of Educational Progress of the Educational Testing Service, four Canadian provinces participated, along with five other countries (Lapointe, 1989).

Its composite mathematics results include the results of tests of numbers and operations, relations, functions and algebraic expressions, geometry, measurement, data organization and interpretation, and logic and problem solving. The results, (expressed in scores based upon a scale of 1,000), are shown in Table 5:2. Korean

students scored the highest but Canadians ranked well ahead of students from the United Kingdom and the United States.

Table 5:2
Educational Testing Service Mathematics Results, 1988
(Lapointe, 1989, 14)

Score out of 1000

| | |
|-------------------------|-----|
| Korea | 568 |
| Quebec (French) | 543 |
| British Columbia | 540 |
| Quebec (English) | 536 |
| New Brunswick (English) | 529 |
| Ontario (English) | 516 |
| New Brunswick (French) | 514 |
| Spain | 512 |
| United Kingdom | 510 |
| Ireland | 504 |
| Ontario (French) | 482 |
| United States | 474 |

The composite science results, presented in Table 5:3, are based on tests of life sciences, physics, chemistry, earth and space sciences, and nature of science. To the extent that these data are useful for policy purposes in Canada, they do not bear out the extreme or alarmist statements which have circulated recently to the effect that Canadian initial education lags in international comparisons. Indeed, in reference to our largest trading partner, the data suggest a comparative advantage accruing to Canada.

Table 5:3
Educational Testing Service Science Results
(Lapointe, 1989, 36)

Score out of 1000

| | |
|-------------------------|-----|
| British Columbia | 551 |
| Korea | 550 |
| United Kingdom | 520 |
| Quebec (English) | 515 |
| Ontario (English) | 515 |
| Quebec (French) | 513 |
| New Brunswick (English) | 511 |
| Spain | 504 |
| United States | 479 |
| Ireland | 469 |
| Ontario (French) | 468 |
| New Brunswick (French) | 468 |

Dropouts

The issue of dropouts from secondary education has received considerable attention in recent years. Statistics Canada has developed an indicator of Canadian secondary school graduates as a percentage of the 18 year-old population which has increased from 62% to 71% over the decade from 1976/77 to 1986/87 (StatsCan, 1989b, 148).

Data published by the British Columbia Royal Commission on Education in 1988, *The Learners of British Columbia*, state that "the graduation rate increased from 75% in 1981 to 79% in 1985 and then gradually dropped to 71% in 1987" (Marx, 1988, 15).

The *Ontario Study on the Relevance of Education and the Issue of Dropouts*, authored by George Radwanski, attained prominence in public debates on education following its release in 1987. Radwanski used three separate methods of quantifying the dropout phenomenon (Radwanski, 1987, 68):

- *a crude retention rate* – the proportion of a student cohort enrolling in Grade 9 in any given year who obtain the secondary school graduating diploma four years later, (67% in both 1984 and 1985);
- *retirements without certificate* – the number of students leaving the system without graduating as a percentage of total enrolment in grades 9 to 12 compounded by a factor of four (33% in 1984; 30 % in 1983); and
- *level of education by age 22* – secondary school graduates as a percentage of the 22 year old cohort (67% in 1981).

Radwanski concludes that the major variables influencing those who drop out are: socio-economic status, family structure, high school streaming, academic performance, part-time work, ethnic background, and psychological characteristics. A study by the Kamloops School District in 1988 indicated that pupils left school for reasons of "health, dislike of school, failure, family problems, incarceration, pregnancy, joining the workforce, and financial concerns" (Marx, 1988, 15).

The Canadian retention rate is similar to the one in the U.S.A. but substantially lower than the 87% reported for Japan (OECD, 1989b, 91).

Table 5:4 provides an international comparison of enrolment rates for the 15-19 year age group in 1986/87. These data are expressed in percentage form and include persons in both secondary and post-secondary education on both a full-time and part-time basis.

Table 5:4
 Enrolment Rates for 15 – 19 Year Olds, 1986/87
 Expressed as a Percentage of the Cohort
 (OECD, 1989b, 37)

| | Age | | | | |
|----------------|-----|-----|-----|----|----|
| | 15 | 16 | 17 | 18 | 19 |
| Canada | 98 | 94 | 79 | 54 | 40 |
| Denmark | 97 | 90 | 75 | 68 | 52 |
| France | 95 | 88 | 80 | 60 | 43 |
| Germany | 100 | 100 | 100 | 84 | 57 |
| Netherlands | 99 | 93 | 78 | 60 | 43 |
| New Zealand | 92 | 69 | 39 | 23 | 20 |
| Norway | 100 | 87 | 76 | 62 | 30 |
| Sweden | 98 | 81 | 83 | 43 | 22 |
| Switzerland | 92 | 85 | 56 | 53 | 37 |
| United Kingdom | 99 | 69 | 49 | 33 | 11 |
| United States | 98 | 95 | 89 | 60 | 49 |

Despite the fact that the Canadian data exclude 103,665 part-time community college students whose ages are unknown, Canada appears to be in the upper quartile of reporting countries. The Swedish data also exclude part-time students. *

In the overview of Radwanski's detailed recommendations to the Ontario government, he advises that:

...it is important to think of the education system as a continuum that stretches from earliest childhood through post-secondary institutions and into the adult world of work. As we are so often reminded, education and learning in today's rapidly-changing world are not finite but lifelong endeavours for which the elementary and secondary school years are vital preparatory stages (Radwanski, 1987, 121).

* The Japanese data are not reported because they exclude post-secondary students and are therefore incompatible.

As Canada faces a situation of declining youth cohorts entering its labour market, a warning from OECD's 1989 *Employment Outlook* appears pertinent:

There may be a great challenge in achieving higher levels of educational attainment for low achievers in those countries in which declining sizes of youth cohorts promise to contribute to labour shortages. This development may bid up wages for entry level jobs, tempting young persons to leave school early, even if their educational attainment is sufficient for immediate employment but inadequate for long-term career preparation. Interventions may therefore be necessary to make education sufficiently interesting to compete with labour market opportunities, or, where labour market shortages may be unavoidable, flexible enough (with provisions for income replacement if need be) to be able to be combined with employment throughout working life (OECD, 1989c, 82).

In this context, dropping out is potentially most serious if it has the effect of inhibiting the capacity of a young person to function as a lifelong learner. The economic and social costs of high failure and drop out rates in the front end model deserve serious attention. Any enterprise with a 33% "failure scrapping" rate would be out of business very soon.

The focus of attention in the past has been almost exclusively on seeking ways to retain young people in the education system. Altogether too little attention has been devoted to policy changes to enable dropouts to obtain second chances at a later date when they may be once again motivated to learn.

6. Post-secondary Education

In recent years, issues around quality, relevance and adaptability of Canadian post-secondary education, in both universities and community colleges, have come to the fore in public discussion. Two partly inter-related factors have strongly influenced debate regarding the 'health' of post-secondary education:

- concerns with the quality of post-secondary education emanating from the United States; and
- a recognition that the competitiveness of industrialized countries will increasingly depend on their human resources, particularly on their scientific and technological capacity.

The United States Debate

The quality of the United States' diversified system of higher education has been questioned in recent reports (National Commission on Excellence in Education, 1983; Study Group on the Conditions of Excellence in American Higher Education, 1984; Boyer, 1987). These concerns are based on several indicators:

- a decline in standards according to formal assessments, (e.g. College Board achievement and aptitude tests of undergraduates, and for graduates, a decline in the average scores in a majority of subject areas on the Graduate Record Examination);
- sharp increases in the number of remedial college courses, particularly in mathematics;
- subjective estimates of standards, (increased percentage of faculty assessing students' ability as poor); and
- an increase in the proportion of students enrolling in vocational and professional fields of studies as opposed to arts and science.

This 'quality' crisis in U.S. higher education has resulted in doubts about an unlimited diversity in higher education. As Teichler (1988, 95) puts it, "the notion of a 'quality crisis' in the United States can be implicitly considered as a 'diversity

crisis' ". Another effect, according to Teichler, of the growing concern regarding standards is a decreasing confidence in the system's self-regulatory mechanism. Some of those who traditionally have tended to believe in the strength of market forces to regulate the system are now calling on government to play a larger role.

The U.S. debate has spilled over into the Canadian scene without sufficient attention being accorded to the differences in context. The Canadian post-secondary system is less diversified than the U.S. system. Canada has no equivalence to the private, elite United States universities. In the U.S., these are seen as a safeguard for both quality and diversity (Teichler, *op.cit.*). A number of informed observers consider that wider variations in the quality of post-secondary institutions exist in the U.S. than in either Canada, Japan or OECD Europe.

What the U.S. debate has made painfully clear is the absence of Canadian research and data that can be used to assess Canadian standards. As has been pointed out in the National Advisory Board on Science and Technology's *University Committee Report*, there is an urgent need to develop indicators that can be used to monitor the quality and efficiency of post-secondary education in Canada. In the absence of hard data, any debate risks becoming opinionated instead of factual and analytical.

In the absence of hard data similar to what is available in the U.S., the Canadian system will be analysed here with respect to the size and composition of its students and its research capacity.

Size

The Canadian system of post-secondary education expanded rapidly during the 1960s and 1970s. Today, Canada has one of the highest participation rates in post-secondary education in the world, as indicated in Table 6:1.

Table 6:1
Population Rates in Post-secondary Education.
Students/100 000 population (UNESCO, 1989, Table 3.6)

| | 1975 | 1986 |
|----------------|-------|-------|
| Canada | 3,600 | 4,853 |
| Germany | 2,291 | 2,608 |
| Japan | 2,017 | 1,987 |
| United Kingdom | 1,308 | 1,806 |
| United States | 5,179 | 5,167 |
| Sweden | 1,985 | 2,635 |

Note that in 1975 the Canadian figure was 26% below the U.S. figure, but that this difference declined to 6% by 1986.

Due to an early expansion of the post-secondary system, Canada has, with the sole exception of the United States, a larger proportion of the working age population with some form of post-secondary education than any other OECD country (OECD, 1989c, 56). However, it should be noted that while the majority of Canadians with some post-secondary experience do not possess a degree, the majority of Japanese with post-secondary experience have graduated. Further, other countries, where the expansion started later, are rapidly closing this educational gap. In the age group 25-34, 34% of Japanese males have a university degree, while the equivalent number for Canadian males is 16%. For women, Canada exceeds Japan in this category, 16% to 12%.

As the provision of advanced training and transfer of technology and expertise to economic and social institutions are seen as increasingly important for economic competitiveness, the relation between certificate, undergraduate and graduate enrolment has become an issue.

According to UNESCO figures for 1985-86 (Table 6:2) Canada has a relatively large proportion of its post-secondary students in graduate studies.

Table 6:2
Enrolment in Post-secondary Education by Level
(UNESCO, 1989, Table 3.9)

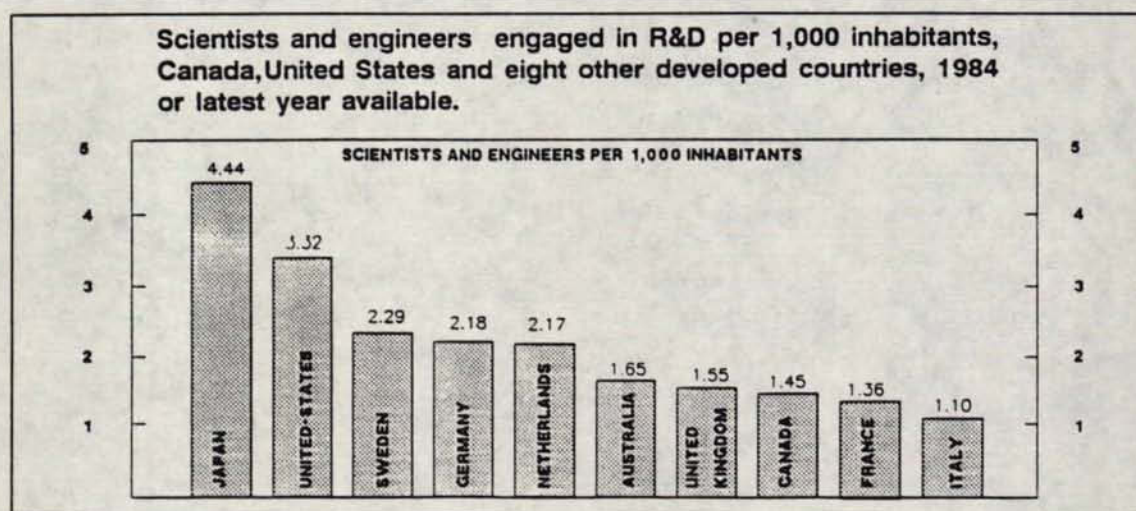
| | <i>Certificate</i> % | <i>Undergrad.</i> % | <i>Graduate</i> % |
|----------------|-------------------------|------------------------|----------------------|
| Canada | 20 | 72 | 8 |
| Germany | 14 | 85 | 2 |
| Japan | 18 | 79 | 3 |
| United Kingdom | 35 | 54 | 11 |

Proportion of Students in Science and Technology

Universities

Figure 6:1 demonstrates that Canada has one of the lowest proportions of scientists and engineers per 1,000 inhabitants among industrialized countries.

Figure 6:1
(Nobert, 1989, 30)



This relatively low frequency of engineers and scientists in the Canadian labour market has become a growing concern in recent years. Table 6:3 demonstrates that, compared to the United States, Japan and the United Kingdom, Canada has fewer natural science and engineering degrees per 10,000 labour force participants, but more than Germany or Sweden:

Table 6:3
Natural Science and Engineering Degrees and Advanced Degrees
Number of Degrees per 10,000 Labour Force Participants
(NABST, 1988a, 73)

| | <i>Bachelors'</i> | <i>Advanced</i> |
|----------------|-------------------|-----------------|
| Canada | 13 | 2 |
| Germany | 11 | 1 |
| Japan | 15 | 2 |
| Sweden | 6 | 1 |
| United Kingdom | 14 | 4 |
| United States | 17 | 5 |

During the 1970s, the relative enrolment in sciences and engineering increased steadily in Canada. This development has come to a halt during the 1980s. A comparison of enrolment in 1983-84 and 1987-88 demonstrates a slight relative decrease in undergraduate enrolment while graduate enrolment remains substantially the same (see appendix E, Table 1). *

* A closer look at the sciences and engineering for the period 1983-87 reveals that full-time undergraduate enrolment in agriculture and biological sciences increased by 32%, engineering and applied sciences decreased by 8% while mathematics and physical sciences decreased by 13%. The figures for part-time undergraduates were 48%, no change in engineering and applied sciences, and -22% for mathematics and physical sciences. The graduate enrolment increased in all three fields of study (14% in agriculture, 7% in engineering and 17% in mathematics). In view of concerns over the sciences and engineering, the very low level of part-time students in these sectors ought to be a subject of concern. (See appendix E, Table 1.)

Women's share of university undergraduate enrolment in sciences and technologies increased modestly from 27% in 1983-84 to 30% in 1987-88. This increase was most pronounced in agriculture and biological sciences, where women constituted 55% of the undergraduate enrolment by 1987-88. In that year, women represented only 13% of engineering students.

Looking at undergraduate and graduate degrees awarded in 1983 and 1987, the relative share of science and technology increased slightly, (see appendix E, Table 2).

In summary, recent data on enrolment and degrees indicate that despite increased labour market possibilities for graduates in the sciences and engineering, these disciplines have not increased their relative share of the student population in recent years.

Community Colleges

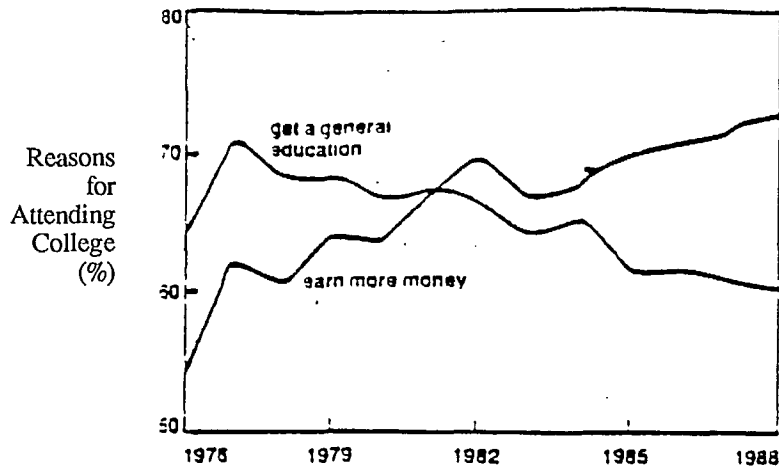
In community colleges, a similar enrolment pattern is evident. After a gradual increase in engineering and applied sciences and the natural sciences and primary industries during the 1970s and early 1980s, there has been a decrease in recent years from 24% of total full-time community college enrolment in 1983-84 to 19% in 1987-88. Over this period, this represented an absolute decrease of 16,000 students. Women's enrolment in these fields grew from 6% in 1975-67 to 9% in 1983-84, and fell to 6% in 1987-88 (StatsCan, 1989f).

Appendix E, Table 3 describes full-time Fall enrolments in community colleges and related institutions and demonstrates that despite an improved labour market, engineering, applied science, natural science and primary industries have declined in relation to other fields, particularly to university transfer programs, social sciences, services, business and commerce.

Concerns regarding the number of students in sciences and engineering is not confined to Canada. In the United States, interest in undergraduate fundamental science majors among college entrants has dropped dramatically over the past 23 years (Green, 1989). Further, in the last six years there has been an abrupt decline in interest in technology careers. The declining interest in the sciences has, according to Green's figures, been paralleled by a sharp increase in business programs. Note that the shift from sciences to business has come at a time when interest in obtaining a general education has declined and interest in earning a higher

salary has shown a sharp increase among American college entrants (see Figure 6:1).

Figure 6:2
Reasons for Attending College
(Green, 1989, 47a)



Research Capacity

Research and development capacity are the most creative expression of a human resources development system and lubricate its high end. One indicator of a nation's research capacity is its share of the world's research papers. The data in Table 6:4 indicate how Canada is doing in comparison with some of its major trading partners. As the scientific output is partly related to the size of the university enterprise, particularly the number of faculty, share of research output is compared to size of faculty. When analysed in this fashion, Canadian research output is quite impressive. While the size of the Canadian university faculty is only 7% of that of the United States, the number of research papers represents 11% of the U.S. production. Measured in this way, Germany, and in particular Japan, have a low output of research while the United Kingdom, and to a lesser extent Canada, have high output. The low output in Germany and Japan can be explained in part by language barriers. It is also worth noting that Japan is rapidly increasing its share.

Table 6:4
Share of World's Research Papers in Relation to University Faculty

| | <i>Share of World's Research Papers</i> | <i>Share of Research Papers/Rel. to USA</i> | <i>Faculty in Relation to Number in USA</i> |
|----------------|---|---|---|
| Canada | 4 | 11 | 7 |
| Germany | 6 | 16 | 26 |
| Japan | 7 | 19 | 36 |
| United Kingdom | 8 | 22 | 6 |
| United States | 37 | 100 | 100 |

(Data on Research Papers from Statistics Canada 88-202, Table 3.1; data on faculty from UNESCO, 1989, table 1:4)

Although the data in the above table seem to indicate that Canadian scholars are quite competitive, it should be noted that the total output of Canadian research papers has remained quite stable, or, in fact, gone down slightly between 1973 and 1982, (NABST, 1988b, 47). Further, according to data presented in the NABST report, there is an indication that Canadian papers are cited less often than papers from the best United States universities.

Compared to countries with high national expenditures on research and development – such as the United States, Japan, Sweden and Germany – the private sector plays a smaller role in Canada. Table 6:5 illustrates that in 1985 the university sector in Canada was responsible for a larger share of R & D than is the case particularly in the United States and Germany, and to a lesser extent, Japan.

Table 6:5
Share of R & D Expenditure by Sector in Selected OECD Countries , 1985 (%)
(OECD, 1989f)

| | <i>Private Sector</i> | <i>Non-profit Org'ns</i> | <i>Government</i> | <i>University</i> |
|----------------|---------------------------|------------------------------|-------------------|-------------------|
| Belgium | 72 | 4 | 5 | 19 |
| Canada | 53 | 1 | 23 | 22 |
| Finland | 61 | 1 | 20 | 19 |
| France | 59 | 1 | 25 | 15 |
| Germany | 73 | 1 | 13 | 14 |
| Japan | 67 | 4 | 9 | 20 |
| Netherlands | 56 | 2 | 18 | 23 |
| Norway | 63 | 1 | 14 | 22 |
| Sweden | 68 | 0 | 4 | 27 |
| Switzerland | 75 | 5 | 6 | 14 |
| United Kingdom | 63 | 3 | 20 | 13 |
| United States | 71 | 3 | 12 | 14 |

Table 6:6
R & D as a % of GNP in Selected OECD Countries, 1985
(OECD, 1989f)

| | <i>Total</i> | <i>University</i> |
|----------------|--------------|-------------------|
| Sweden | 2.9 | 0.7 |
| Japan | 2.8 | 0.6 |
| United States | 2.8 | 0.4 |
| Switzerland | 2.7 | 0.4 |
| Germany | 2.7 | 0.4 |
| France | 2.3 | 0.3 |
| United Kingdom | 2.3 | 0.3 |
| Netherlands | 2.1 | 0.5 |
| Belgium | 1.7 | 0.3 |
| Norway | 1.6 | 0.3 |
| Finland | 1.5 | 0.3 |
| Canada | 1.4 | 0.3 |

Adaptability

Traditionally, governments have been the main sources of funding for university research and development expenditures in Canada. In 1985, 36% of the funding for university research came from universities' operating budgets. In addition, the federal government contributed 38% through a variety of direct grants, the provinces 11%, private, non-profit organizations 12%, and the private sector 3% (StatsCan, 1985).

Despite the relatively important role that Canadian universities play in R & D, A. W. Johnson has observed in his 1985 report to the federal government that:

while the continuing focus is on Canada's traditional concerns about building a quality, and near-universal system of higher education, accessible to all Canadians who can benefit from it, only secondary

attention has been given to the fostering of research in the nation's universities (Johnson, 1985, 60).

Johnson argues that the low priority accorded to research is inconsistent with the challenges facing Canada today. This should be considered in the contextual position, as demonstrated in Table 6.6 that the overall size of Canadian R & D effort is modest in comparison with our principal competitors

At a time when research and development is being promoted as a means to encourage economic growth, universities would appear to have a special role to play, owing in part to the comparatively low involvement of Canadian industry in research and development activities. Stuart Smith, the then Chairman of the Science Council of Canada, offered the following summary:

Most of our large companies are not research-intensive, so they do not act as incubators for new entrepreneurial ventures. Therefore, we must look to our universities, even more than other countries do, as a source for the spin-off phenomenon. It would be easier and better for spin-offs to occur from other industries since people there have marketing experience and business knowledge. Universities struggle to establish their public identity without having burdens or commercialism thrust upon them. Nonetheless, it is essential for Canada that we have more commercial ability arising from our universities (Science Council, 1986).

University-industry links are growing through such mechanisms as offices of industrial liaison or technology transfer, the creation of spin-off companies, co-operative education programs, internments in industry, faculty-employee exchanges, contract research and employee continuing education. However, the Corporate-Higher Education Forum has identified several barriers to university-industry collaboration in research and technology transfer (Cyr, 1985):

- the differing nature of research in universities and firms;
- higher education focuses on basic research and knowledge-building, with a long term interest while the private sector emphasizes application and conducts research and development to tight deadlines;

- restrictions on the dissemination of research findings resulting from private or business funding conflict with academic rewards for publication; and
- differing scheduling, budgeting and project management systems in universities and industries.

The growing importance of innovation in the economy has brought the relationship between industry and universities and colleges into focus. Over the past five years, several initiatives have taken place in OECD countries to enhance the links between higher education and industry, resulting in stimulation to the high technology sector in the economy. This development has spawned a fear within universities that they may be forced to move in the direction of narrowly vocational approaches.

Although this tendency may offer short term advantages, the long term effects have been argued to be counter-productive.

The following adaptability issues, identified in a recent OECD analysis of the links between higher education and the economy, are relevant to the Canadian context (OECD, 1989a, 63):

- defining an appropriate balance between general education and vocational specialization as well as between scientific and technological research and research in the arts and humanities;
- avoiding the risk of undermining the cultural objectives of higher education on which the long-term development of democratic societies depends; and
- meeting the demand for training of non-traditional students, especially adults, both for professional upgrading and recycling as well as for personal fulfillment in an increasingly leisure-intensive society.

7. Adult Education and Training

Rising concern in Canada with adult education and training has resulted from changes in both the supply of and demand for workers and skills. As a result of declining birth rates, it is no longer possible to rely primarily on young labour force entrants to fill new jobs. The aging of the Canadian workforce has also increased the need for continuous retraining and skill development among adults. At the same time, the emerging globalization of production and markets is creating several technological, trade and structural forces which are dramatically changing the nature of work in Canada.

As the Canadian Labour Market and Productivity Centre (CLMPC) stated in a recent review, adult education and training "are the critical link between the demand and the supply sides of the labour market" (CLMPC, 1989a, 19). According to its recent poll, business and labour agree. Of those surveyed in a 1990 poll, 60% said that education and training are the most important factors in improving Canadian competitiveness (CLMPC, 1990).

This heightened awareness of the importance of adult education and training in Canada has emerged from what a recent OECD publication terms an "adult learning crisis":

Some would even argue that the emerging knowledge-intensive economy demands a new kind of "learning enterprise" focused on adults rather than children, on learning rather than education, on technology rather than institutions, and on private competition rather than public administration (OECD, 1989e, 72).

Public policies for adult education and training can be evaluated according to the degree to which they promote:

- an adequate volume of training;
- a satisfactory quality of training;
- an equitable distribution of costs and benefits among providers and participants in training;

- an equitable distribution of costs among firms and industries;
- mobility of labour between regions;
- an adequate response to changing labour market conditions;
- appropriate participation in training by particular labour force groups; and
- greater parity of treatment for those receiving general education and vocational training.

Bearing in mind these criteria, this section will present a critical analysis of adult education and training in Canada by focusing on specific quantitative and qualitative performance indicators, as well as outcomes relating to expenditures for, participation in, and distribution of adult training.

The Structure of Adult Education and Training

Since the Canadian adult training system is much more decentralized, unregulated and diverse than the initial and higher education systems, it is useful to provide a description of its organization as a point of departure.

Appendix F illustrates the roles and elements of the adult training system in Canada. The system involves diverse types of organizations, learning and adults. It is financed, provided, regulated and co-ordinated by a multiplicity of organizations with interrelated, and sometimes conflicting or overlapping mandates, roles and objectives:

- Public Sector Local, provincial and federal governments; crown corporations and other agencies; colleges, technical institutes, vocational schools and school boards.
- Private Sector Employers and industry training centres; business and trade associations; private training institutions; unions and other labour organizations; consultants.

- Voluntary Sector Professional, educational and technical associations; community and non-profit organizations; advocacy groups

These organizations play various roles in a wide variety of training, upgrading, retraining and continuing education for adults throughout all regions and sectors of the country. While the plurality of Canada's adult training system is necessary to respond to diverse needs and situations, it also presents a challenge for developing policies and strategies which are consistent and complementary among the providers and participants of training.

The Canadian adult education and training system is relatively decentralized and unregulated. The federal and provincial governments provide the majority of funding for adult training. The provinces have constitutional responsibility for education, while the federal government has responsibility for economic and employment matters, which accounts for federal support for labour market training. Public educational institutions and private training institutions are the main deliverers of adult education and training. Provincial governments regulate certain types of training (e.g. apprenticeship). Employers, industry associations and voluntary groups also co-ordinate, fund, and deliver on-the-job and in-service training. Federal and provincial governments have designed mechanisms for coordination and consultation on training activities.

Federal Government

Under the *National Training Act, 1982*, the Government of Canada provides funding to training institutions, firms, workers, associations and community groups for apprenticeship, institutional and industrial training, along with income support. Most of this is administered through the Canadian Jobs Strategy (CJS). In addition to other CJS programs, in 1987-88, CJS training funds totalled \$924 million: \$438 million of this went towards institutional training costs, involving 133,300 participants, and \$398 million went towards income support of trainees, mainly for participants in institutional training (CLMPC, 1989a).

In recent years, the federal government has placed increasing emphasis on private sector training, addressing skill shortages and on training and work experience for 'those most in need', including members of designated target groups, (i.e. women,

persons with disabilities, visible minorities, native people, social assistance recipients and older workers).

The federal government has recently announced a Labour Force Development Strategy (LFDS) which includes changes to unemployment insurance (UI) legislation and additional funds for new labour market initiatives. The former involves tighter regulations for UI entitlement and more emphasis on providing training for UI recipients. The latter involves \$800 million in new funds each year for private sector training, social assistance recipients, displaced older workers, entrepreneurial training and adjustment initiatives. *

Provincial Governments

Within the authority of specific training and education legislation, provincial governments provide substantial funding for the delivery of adult education and training through their financing of public colleges, technical institutes, vocational schools and specialized institutions. Provincial governments fund and regulate apprenticeship training and tradesperson upgrading in over 100 occupations, and regulate private educational institutions. They also administer labour market programs which are often targeted at specific industries, labour force groups, and other training priorities. There are no consolidated figures available on expenditures or the extent of provincial training programs.

Many of the labour market and training programs delivered by colleges and other provincial agencies are cost-shared with, or funded by, the federal government. For example, the federal government provided \$84.5 million for training and \$80 million for income support for 47,500 apprentices in 1987-88 (CLMPC, 1989c); provinces contributed \$30.9 million in 1985-86 toward apprenticeship course costs and upgrading.

In addition to providing the majority of full-time pre-employment, certificate and diploma programs in Canada, over 200 community colleges, colleges of applied arts and technology, CEGEPs, technical institutes and vocational schools provide a significant amount of part-time, short-term adult education and training. Particularly in Quebec, many adult training programs are delivered by school boards. Universities provide a growing amount of continuing professional education.

* In April 1990, the enabling legislation for these initiatives has not as yet been enacted.

In 1983, public educational institutions provided 41% of all adult education courses (Secretary of State, 1984). The institutions with the largest share were colleges (17%) and school boards (13%). Colleges provided the most job-related adult education (17% of the total). Public institutions provided 41% of all part-time, short-term job-related training in Canada in 1985 (StatsCan, 1986).

Public educational institutions collaborate closely with employer, labour, professional and community groups as many of these organizations do not have the resources to develop or deliver worker training. College-business partnerships have become more prevalent in recent years and are being encouraged by government policies and funding.

Federal-Provincial Agreements

The federal and provincial governments cost-share certain types of adult training-related activities under several bilateral agreements involving several hundred million dollars in funding. These include joint agreements on training, employability enhancement of social assistance recipients, older worker adjustment, vocational rehabilitation of disabled persons, and English and French language training.

Private Training Institutions

Private training institutions include private business and correspondence schools, licensed industry training schools, and firms which provide training services. In 1983, such institutions provided 12% of all adult education, and 5% of all job-related adult education in Canada. In 1985, they provided 4% of all part-time, short-term job-related courses (*op.cit.*). While private training institutions in Canada are largely privately funded, they receive a significant amount of project funding under the Canadian Jobs Strategy.

The number and range of programs offered by private training institutions are rapidly increasing. By 1988, there were an estimated 900 licensed private business schools in Canada. British Columbia provides an example of their growth, where enrolments increased from 19,000 to 55,000 over the period from 1977 to 1989, and where the number of private schools grew from 120 to 430 over the same period (Industry, Science and Technology Canada, 1988).

Industry-Based Training

While the financing and provision of public adult education and training is well-developed in Canada, it is relatively less so in the private employer community. With the exception of apprenticeship training, private training institutions, and training in a few licensed occupations, there is relatively little regulation or statutory control of adult education and training. Unlike European countries such as France and Germany, there are no statutory requirements for employers to finance or provide educational leave or employee training in Canada. Voluntary collective training funds exist in certain industries and some collective agreements, but these are more the exception than the rule.

Recent studies have found that one-quarter of private firms provide formal training for their employees, amounting to an estimated \$1.4 billion annually (Employment and Immigration Canada, 1989). In 1985, employers provided 34% of all part-time, short-term job-related training in Canada (StatsCan 1986).

While there is a strong consensus that a "training culture" does not exist in Canadian industry, many individual firms are very active and innovative in the provision of training, including technology-intensive small and medium-sized establishments, and also generally in larger corporations. Some industry associations provide leadership in establishing training strategies for their members' workforces. The Electrical and Electronic Manufacturers' Association of Canada is a recent example of this (Employment and Immigration Canada, 1987a).

Labour Unions and the Voluntary Sector

If data on employer training is sparse, information on training provided by unions, professional associations and community groups is even more so. Unions and voluntary organizations often provide focal points for, and co-ordination of training, as well as some funding. They are also active in the identification of their constituents' training needs.

In 1983, voluntary, labour, professional and religious organizations provided 29% of all adult education, and 21% of all job-related adult education courses (Secretary of State, 1984). In 1985, unions and professional associations accounted for 11% of part-time, short-term job-related training courses (StatsCan, 1986).

Performance Indicators

What is the current nature and extent of adult education and training in Canada? Is the quality and quantity adequate to meet the country's economic and social goals? How is training distributed among Canadian workers and organizations? Are governments and the private sector investing enough in job training?

This section responds to such questions and will rely mainly on the Statistics Canada Adult Training and Human Resource Training Development Surveys, surveys of employer-sponsored training, statistics on publicly-sponsored adult training, information regarding attitudes towards training, statistics and analyses on international comparisons of training, and data on training distribution patterns among workers.

Overall Incidence of Adult Education and Training

An important indicator of the competitiveness of the labour force is the degree to which it has access to education and training, particularly job-related training which can increase employee productivity, give disadvantaged workers a 'second chance', and help workers adjust to up-side or down-side change.

Adult Education

Based on a survey of adult education, 19% of adult Canadians (3.2 million adults) participated in at least one adult education course in 1983 (StatsCan 1984). Forty-one percent of these adults took a job-related course (8% of the adult population). Employers provided 42% of such courses. The average adult Canadian participated in 4.8 hours of job-related education in 1983.

This adult education participation rate of 19% in Canada compares with 40% in Sweden. Participation rates by educational attainment are compared for Canada, Norway and Sweden in Table 7:1.

Table 7:1
Participation in Adult Education
% of Adults
(Olofsson & Rubenson, 1985)

| <i>Educational Attainment</i> | <i>Canada</i> | <i>Norway</i> | <i>Sweden</i> |
|-------------------------------|---------------|---------------|---------------|
| Less than 9 years | 5 | 8 | 21 |
| High School | 19 | 19 | 46 |
| University | 45 | 36 | 64 |
| All adults | 19 | 19 | 40 |

Proportionately, as many Swedish adults with only a high school education participate in adult education as do Canadian adults with university education.

Job-Related Training

Eight percent of working age adults participated in job-related training in 1985, (StatsCan, 1986). Almost three-quarters of these were engaged in part-time or short-term training.

Interest in employer-sponsored training is growing in all OECD countries, including Canada. Compared to other industrialized countries, the overall volume of training in Canadian companies is low. The Adult Training Survey found that 6% of adults participated in some form of employer-sponsored training during 1985. This can be compared with a survey which found that 25% of workers in Sweden participated in employer-sponsored education in 1987 and 30% in 1989 (Swedish National Board of Statistics, 1990). In terms of full-time employer-sponsored training longer than one-month's duration, Swedish participation is five times the Canadian rate.

The Advisory Council on Adjustment reported that, while the average Canadian worker participated in 6.7 hours of formal training during 1988, Australian workers received an average of 17 hours of training, Swedish workers 170 hours and the average Japanese worker 200 hours of training (Australia, 1989; de Grandpré, 1989). While these data need to be considered with caution owing to

methodological and data collection differences, an obvious overall trend is evident, and not one to Canada's advantage. As Employment and Immigration Canada recently concluded, "clearly, many Canadian employers have not recognized their responsibility for skills development" (EIC, 1989).

In Japan, Germany, Switzerland and Sweden, both private and public sector employers make extensive use of workplace training as an integral part of organizational strategies. Each of these countries has a national workplace training system which is a major component of its overall educational infrastructure. In Japan, for example, employers go to considerable lengths to train and provide continuing education for all levels of workers. All of these countries have for a long time recognized the importance of employer-sponsored training, and are now well-positioned to adapt more easily to the increasingly competitive world economy (Australia, 1989; Ontario Premier's Council, 1989).

The low level of employer-sponsored training reported in Canada has to do with both the number of companies that provide training and, where companies are involved in training, the relative proportion of their workforces that receive training.

The recent Human Resource Training and Development Survey [HRTDS] administered by Statistics Canada * found that approximately one-third of Canadian companies provide any form of training. This figure is somewhat higher than earlier estimates that 25% of Canadian companies finance employee training (EIC, 1987b; 1989). As the studies have applied different methodologies when estimating the number of companies that train, it is not possible to compare the results from the various Canadian surveys.

The HRTDS found that although larger employers are more likely to train their employees than smaller employers, very substantial numbers of smaller employers report training activity (Table 7:2).

* This Survey, sponsored by Employment and Immigration Canada, has established a benchmark for measuring private sector training. Based on a sample of some 14,000 enterprises drawn to reflect the overall composition of the labour market, it measured private expenditure on education and training during the year ended October 31, 1987. The expenditures were defined to include tuition, wages and salaries of employees, wages and salaries of instructors, costs of travel, accommodation, rent, training materials, administration costs, machinery and other overhead costs, but excluded indirect costs such as lost employee time. The results are based on a 47% response rate.

Table 7:2
Canadian Employers Who Train
By Size of Establishment
(StatsCan, 1990, 15)

| <i>Employees</i> | <i>Number of Employers Who Train</i> | <i>Incidence %</i> |
|------------------|--|------------------------|
| fewer than 10 | 164,089 | 27 |
| 10 - 99 | 59,048 | 48 |
| 100 - 499 | 5,011 | 73 |
| 500 + | 975 | 90 |

As Table 7:3 demonstrates, the problem of training in small companies is not peculiar to Canada, but exists elsewhere, for example in Japan.

Table 7:3
Training Employers by Size, Canada and Japan
% of Employers Who Train
(StatsCan, 1990; OECD, 1989g)

| <i>Number of Employees</i> | <i>Canada</i> | <i>Japan</i> |
|----------------------------|---------------|--------------|
| 0 - 9 | 27 | |
| 10 - 49 | 48 | |
| 50 - 99 | 55 | |
| 30 - 99 | | 58 |
| 100 - 499 | 73 | 87 |
| 500 - 999 | 86 | 93 |
| 1,000 + | 92 | 98 |

These data suggest a similar pattern of incidence of training by employer size in the two economies. Although the comparisons are imprecise, a similar pattern of firm size is likely to exist in the two economies. As a result, if, as has been reported above (de Grandpré, 1989), the average Japanese worker receives a substantially greater amount of training on the job, this suggests that Japanese employers train larger portions of their workforces than do their Canadian counterparts and that the volume of training per worker trained is substantially higher in Japan.

Table 7:4 indicates that the incidence of employer-sponsored training in the Canadian economy also varies by industrial sector.

Table 7:4
Employer-Sponsored Training in Canada
Incidence by Industrial Sector
(StatsCan, 1990, 15)

| <i>Sector</i> | <i>Number of Employers Who Train</i> | <i>Incidence %</i> |
|---------------|--|------------------------|
| Construction | 35,044 | 24 |
| Food | 12,013 | 16 |
| Manufacturing | 16,464 | 35 |
| Retail | 58,006 | 35 |
| Services | 90,533 | 34 |
| Wholesale | 17,100 | 35 |
| Total | 229,180 | 31 |

Expenditures on Adult Training

Overall Labour Market Program Expenditures

Another indicator of the magnitude of adult education and training is the amount of public and private funds directed at such learning. One problem in presenting data regarding public expenditures on adult education and training in Canada is that some adult students follow 'regular' full-time and part-time community college or university programs. Thus, part of the regular funding for these institutions is

'consumed' by adult students with labour market attachments. No data exist to segregate such college and university expenditures. As a result, the data presented in this section apply only to identified expenditures on adult training.

Federal Expenditures

Labour market training is a crucial instrument in a nation's overall human resource strategy. Canada does not compare favourably with other major OECD economies regarding overall labour market program expenditures (training, employment services, job creation subsidies, and measures for special groups). In 1988, Canada's labour market expenditures amounted to 2.11% of GDP, a ranking of eleventh place (see Table 7:5). This, in itself, does not tell the whole story. As low as the total is, a substantial portion of Canada's labour market expenditures are devoted to income maintenance as opposed to 'active' measures. Three-quarters of our labour market expenditures in 1988 were devoted to unemployment insurance and early retirement, whereas almost half of Germany's and almost 70% of Sweden's expenditures were for active training and employment measures.

Table 7:5
Public Expenditures on Labour Market Programs
as % of GDP
(OECD, 1989b, 205)

| | <i>Total Public Labour</i> | |
|----------------|--|--|
| | <i>Market Expenditures</i> (% of GDP) | <i>Active Expenditures</i> (% of GDP) (% of Total) |
| Denmark | 5.53 | 1.19 21.5 |
| Ireland | 4.83 | 1.40 29.0 |
| Belgium | 4.21 | 1.20 28.5 |
| Netherlands | 3.82 | 1.13 29.6 |
| Spain | 3.14 | 0.78 24.8 |
| France | 3.07 | 0.81 26.3 |
| Sweden | 2.59 | 1.79 69.1 |
| United Kingdom | 2.50 | 0.77 30.8 |
| West Germany | 2.41 | 1.05 43.6 |
| Finland | 2.32 | 0.92 39.6 |
| Canada | 2.11 | 0.52 24.6 |
| United States | 0.69 | 0.25 36.3 |
| Japan | 0.58 | 0.20 34.5 |

The relatively low levels reported in Tables 7:5 and 7:6 for the United States and Japan reflect their economies' substantial reliance on the private sector for leadership in labour market adjustment and training.

Labour Market Training Expenditures

Canada also compares unfavourably in terms of labour market training * expenditures as a proportion of GDP. As indicated in Table 7:6, in 1988 the ratio for Canada was 0.2% of GDP, which was tenth overall.

* Labour market training includes subsistence allowances and course costs for unemployed trainees and subsidies to employers for in-firm training.

Table 7:6
Public Expenditure on Labour Market Training
as % of GDP in 1988
(OECD, 1989b, 205)

| <i>Labour Market Training Expenditures (% of GDP)</i> | |
|---|------|
| Ireland | 0.52 |
| Denmark | 0.51 |
| Sweden | 0.51 |
| New Zealand | 0.50 |
| Germany | 0.32 |
| France | 0.28 |
| Finland | 0.27 |
| Portugal | 0.26 |
| Netherlands | 0.21 |
| Canada | 0.20 |
| United States | 0.11 |
| Japan | 0.03 |

A large component of Canada's labour market training expenditures is administered through Employment and Immigration Canada's Canadian Jobs Strategy. While the Canadian economy has grown at an impressive rate since 1982, and even though Canada's 'active' expenditures are comparatively low to begin with, federal government training expenditures have decreased in recent years in the face of growing skill shortages and labour market mis-matches.

Overall labour market program expenditures, including training, employment services, job creation subsidies, and income support have decreased \$600 million in current dollars (or almost 20%) since 1984-85 to a level of \$1.8 billion in 1987-88. Over the same period, the number of participants in federal labour market programs has decreased by 35,000 per annum on average for each of the four years from 1985 to 1988 (Ontario, 1989a).

Table 7:7 demonstrates that the training and income support components of federal labour market programs have declined by \$165 million in current dollars (15%) from 1984-85 and 1987-88.

Table 7:7
Federal Labour Market Training
Training and Income Support Components
(CLMPC, 1989a, 21)

| | <i>Training Expenditures 1984-85</i> | <i>Training Expenditures 1987-88</i> |
|------------------------|--|--|
| | <i>[\$ millions]</i> | |
| Industrial Support | 156 | 60 |
| Income Support | 335 | 398 |
| Institutional Training | 501 | 438 |
| Other | 97 | 28 |
| Total Training | 1089 | 924 |

The number of participants in federally-sponsored institutional training courses decreased from 229,700 to 133,300 over the period from 1984-85 to 1987-88. As a proportion of total labour force, this represents a drop from 2% to 1% (*op. cit.*).

While the federal government continues to emphasize the importance of employer-sponsored training in its pronouncements, its expenditures on such training have decreased by 62% over the same four year period (CLMPC, 1989a).

The problem of developing public (federal and provincial) assistance programs to stimulate training in small companies is illustrated in Table 7:8, which reports employer responses in the HRTDS to questions concerning utilization of training assistance programs.

Table 7:8
 Training Assistance Programs Used [%]
 By Employer Size [# of Employees]
 [A=Companies that Train; B=Total Number of Companies]
 (StatsCan, 1990)

| <i>Program Sponsor</i> | <i>0-99</i> | | <i>100 - 499</i> | | <i>500 - 999</i> | | <i>1,000+</i> | |
|----------------------------------|-------------|----------|------------------|----------|------------------|----------|---------------|----------|
| | <i>A</i> | <i>B</i> | <i>A</i> | <i>B</i> | <i>A</i> | <i>B</i> | <i>A</i> | <i>B</i> |
| Apprenticeship | 12 | 4 | 15 | 12 | 16 | 14 | 19 | 18 |
| Provincial Gov't | 9 | 3 | 15 | 12 | 17 | 15 | 19 | 18 |
| Federal Gov't | 4 | 1 | 10 | 8 | 14 | 13 | 14 | 14 |
| Other | 18 | 6 | 13 | 10 | 8 | 7 | 12 | 11 |
| None | 28 | 9 | 18 | 14 | 15 | 14 | 13 | 12 |
| Unknown | 29 | 9 | 29 | 22 | 31 | 27 | 23 | 22 |
| Not applicable (do not train) | - | 69 | - | 23 | - | 12 | - | 5 |

One problem in interpreting the data is the high number of companies involved in training that did not respond to the question. However, there are strong reasons to assume that "unknown" really stands for "none".

The utilization of training assistance programs was directly related to the number of employees. Of the total number of companies with less than 100 employees, only 14% participated in any kind of training assistance program. The corresponding figure for the largest companies was 61%.

Table 7:8 indicates that not only did use of assistance programs vary by number of employees, but there was also some difference in what kind of programs were used. The most commonly used program among companies with fewer than 100 employees was "other". Provincial and federal support were more frequently used by larger companies, while apprenticeship use was evenly distributed among the various groups.

Provincial Labour Market Expenditures

There are no consolidated sources of labour market training expenditure data by provincial and territorial governments in Canada. *A Labour Market Jurisdiction Study: A Provincial/Territorial Comparison* provides an inventory of such expenditures on 'direct job creation' and 'training' programs (Government of Newfoundland, 1988). The study does not total all provincial expenditures, and some provinces include full-time college programs and federally funded programs. If all expenditures and participant figures are added, excluding full-time college programs and programs which were funded by the federal government, these expenditures reflect a significant investment in adult education and training by provinces and territories. For 1987-88, they totalled approximately \$916 million, involving 409,926 participants. There are no data to determine whether provincial training expenditures have changed over time.

Employer-Sponsored Education and Training

Expenditures

Based on an aggregate investment of \$1.4 billion, employer-sponsored training amounts to just over \$100 per worker per year in Canada (de Grandpré, 1989). This figure has been drawn from the HRTDS. Employment and Immigration Canada (EIC, 1989) estimates that this represents only one half of the investment of employer-sponsored training per employee in the United States, where over \$30 billion [US funds] is spent annually on formal training – or up to \$180 billion if informal training is included (Carnevale and Gainer, 1989, 15).

Private sector training expenditures (as a percentage of gross wages and salaries) are very modest in comparison to private sector expenditures among some of our principal trading partners (see Tables 7:9 and 7:10).

Table 7:9
Employer-Sponsored Training
Expenditures as % of Gross Wages & Salaries
(Australia, 1989, 66; de Grandpré, 1989, 42, 44)

| | <i>Expenditure % of Payroll</i> | <i>Year of Estimate</i> |
|---------------|-------------------------------------|-----------------------------|
| France | 2.3 | 1986 |
| Australia | 2.2 | 1987 |
| United States | 1.0 | 1987 |
| Canada | 0.5 | 1987 |

As is evident in Table 7:10, Canadian industry does not compare favourably if training expenditures are considered as a percentage of GDP.

Table 7:10
Employer-Sponsored Training as % of GDP
(Australia, 1989, 66; EIC, 1989, 22)

| | <i>Expenditure (% of GDP)</i> | <i>Year of Estimate</i> |
|---------------|-----------------------------------|-----------------------------|
| West Germany | 2.0 | 1982 |
| Japan | 1.4 | 1984 |
| United States | 1.2 | 1980 |
| Australia | 0.9 | 1983 |
| Canada | 0.3 | 1987 |

The most recent report of the Ontario Premier's Council put Canadian industry training expenditures in another perspective:

Compared with the \$2 billion spent annually on advertising and the \$22 billion of (annual) capital expenditures in the province, the (\$1 billion) investment in training seems marginal (Ontario Premier's Council, 1989, 123).

Overall, training expenditures by employers are low in Canada; yet some Canadian companies provide very large investments in employee training. For example:

- McDonnell Douglas Canada allocates 5% of its 3,000 employees' time to training (Ontario Premier's Council, 1989)
- IBM Canada spent about \$36 million, or \$3,000 per each of its 12,000 employees in 1986, on formal employee training (EIC, 1989)
- Bell-Northern Research offers 40,000 training days per year to its 6,300 employees (Ontario Premier's Council, 1989)

In view of the low public and private investment in Canada on adult education and training, it is not surprising that the World Competitiveness Report (IMEDE and the World Economic Forum, 1989) was less than impressed by the Canadian effort.

According to the Report, while Canada has an excellent reputation and record for overall education expenditures, this is not the case for its vocational training component. In 1989, Canada ranked an impressive fourth overall. On the Report's Human Resources dimension, Canada ranked second overall, mainly because of its public expenditures on education and high participation rates in secondary schooling and higher education. Despite the high Human Resources rating, Canada ranked eleventh for vocational training efforts and eleventh for the quality of skilled labour.

Figure 7:1

| WORLD COMPETITIVENESS RANKINGS | | | |
|---------------------------------|-----|----------------------------|------|
| CANADIAN POSITIONS | | | |
| HIGH | | LOW | |
| Public expenditure on education | 2nd | Vocational training | 11th |
| Secondary school participation | 1st | Quality of skilled labour | 11th |
| Higher education expenditures | 2nd | Quantity of skilled labour | 8th |
| | | Worker motivation | 14th |
| | | Labour flexibility | 5th |
| | | Managerial talent | 10th |
| | | Labour saving technology | 14th |
| | | Automation | 10th |
| | | Employee fluctuation | 12th |

There is growing awareness in Canada of the underfunding of adult training. While 58% of Canadian adults believe that the workplace is the most effective setting for worker training (CLMPC, 1989b), 40% of business leaders and more than 80% of labour leaders recently polled by CLMPC considered that available training programs in their business or industry were inadequate (CLMPC, 1990). Further, the HRTDS found that companies in general and large companies in particular reported not meeting their training needs. Among 'training companies', those reporting not meeting their needs increased with size from 25% [under 100 employees], to 30% [100 - 499 employees], to 37% [500 - 999 employees], to 51% [more than 1,000 employees] (StatsCan, 1990, 12).

Companies stating that they had not met all their training needs were given a list of barriers and asked to state which applied in their case. The results are inconclusive because a considerable number of companies chose not to respond to the question. The "no response" ranges from 40% of the small companies which train to 20% for the largest training companies. Table 7:11 presents the reasons given by those companies that did respond.

Table 7:11
Reasons Why Training Needs not Met [%]
(StatsCan, 1990)

| <i>Reason</i> | <i>0-99</i> | <i>100-499</i> | <i>500-999</i> | <i>1,000+</i> |
|-------------------------------|-------------|----------------|----------------|---------------|
| Limited Resources | 32 | 24 | 27 | 31 |
| Lack of Instructors | 6 | 13 | 12 | 13 |
| Courses Not Available | 12 | 12 | 12 | 12 |
| No Training Facilities | 2 | 8 | 7 | 8 |
| Lack of Employee Interest | 11 | 9 | 4 | 4 |
| Training Assistance Program: | | | | |
| Too Complex | 7 | 8 | 8 | 7 |
| Criteria Too Rigid | 8 | 11 | 11 | 8 |
| Insufficient Gov't Assistance | 9 | 6 | 8 | 5 |
| Other | 12 | 11 | 11 | 13 |

Not surprisingly, the most frequently mentioned obstacle was "limited resources". There was no major variation in response pattern by company size. The smaller companies mentioned lack of instructors and facilities to a lesser extent than the larger companies. Further, the former reported lack of employee interest somewhat more often than the latter. On the whole, however, the same overall pattern of response emerged.

Distribution of Adult Education and Training

Who participates in what kind of training?

Another important indicator is how adult education and training – including employer and government-sponsored training – is distributed among the Canadian labour force. While adult education and training can provide opportunities for under-educated and under-employed adults to improve themselves, some evidence suggests that formal learning reinforces the gap between educational 'haves' and 'have nots'. Recent surveys (reported below) confirm the conventional wisdom that certain segments of the Canadian labour force are significantly under-represented in adult education and training.

Adult Education Survey

The 1983 Survey of Adult Education found that persons with a university degree were eight times more likely than those with only an elementary education to participate in adult education courses (Secretary of State, 1984). Young (25-34) adults were three times (at 29%) more likely than older workers (55-64) to participate in such learning. Blue collar workers were less than half as likely as white collar workers to participate in an adult education course (16% vs. 33%). While 19% of all adults in Canada and 24% of adults in Alberta were engaged in adult education, the adult participation rate was only 9% in Newfoundland.

Adult Training Survey

The results of the 1985 Adult Training Survey (StatsCan, 1986) indicate that adults with a university degree were 15 times more likely to participate in part-time job-related training than those with only an elementary education. In Alberta, 14% of adults participated in part-time/short-term job-related training in 1985, compared to only 3% in Newfoundland.

Workers in public administration jobs and finance had an employer-sponsored training rate of 15% while workers in utilities and community services had participation rates of 14% and 13% respectively. Only 4% of construction and agriculture workers participated in such training. Blue collar workers and older workers were significantly under-represented in job-related training in 1985.

While the participation rate for women in part-time/short-term training (8%) was marginally lower than that of men (9%), the survey yielded significant gender differences. In all types of adult training, employers were more likely to reimburse tuition fees of male than female employees, particularly in the governmental sector. Men were twice as likely as women to participate in full-time employer-sponsored training.

Other Employer Surveys

Statistics from employer surveys on worker participation in training are consistent with adult education research. The lower-skilled, the lower-paid, visible minorities, women, youth and the educationally disadvantaged are under-represented in employer-sponsored training. Employees in the upper end of the organizational

hierarchy (executive, managerial, professional and other white collar workers) are over-represented. The 25-44 age group demonstrates the highest industrial training participation rates (EIC, 1987b; Ontario 1989b).

A 1985 survey of industry training indicated that 17% of professional/technical employees and 16% of managerial employees participated in formal training whereas only 6% of construction workers and 4% of transportation workers did so (EIC, 1987b).

The CLMPC survey *Speaking Out on Training* indicates that 53% of unskilled workers, as opposed to 41% of all workers and 37% of professional and administrative workers, received no job training in the last two years (CLMPC, 1989a). Fifty-two percent of unskilled workers, as opposed to 30% of all workers and 20% of professional and administrative workers, considered that they were not adequately prepared to adapt to workplace change due to lack of training, education and experience.

Another indicator of the under-representation of certain groups in industry training is participation rates in apprenticeship training. Although their participation rates are increasing, women currently account for only 4% of all apprentices in Canada, while constituting 45% of the labour force (CLMPC, 1989c).

Federal Training Programs

Employment and Immigration Canada discontinued its *Annual Statistical Bulletin* in 1985. It is therefore difficult to obtain detailed statistics on participants in federally sponsored training programs. In addition to the Department's Annual Reports, the only data readily available are for special labour market groups for which EIC has established target participation levels.

Table 7:12 reports participation rates in CJS programs in 1987-88 for women, native persons, members of visible minorities, persons with disabilities and social assistance recipients.

Table 7:12
Participation Rates in CJS Programs 1987-88 by Target Groups
(EIC, 1988a, 27; 1988b, 62)

| | <i>All Programs</i> | <i>Industry-Based Programs</i> | |
|------------------------------|---------------------|--------------------------------|-------------------------|
| | | <i>Skill Shortages</i> | <i>Skill Investment</i> |
| Women | 41.8 | 7.8 | 37.6 |
| Natives | 7.4 | 2.5 | 4.8 |
| Disabled | 1.9 | 0.2 | 0.4 |
| Visible Minorities | 4.8 | 1.0 | 2.0 |
| Social Assistance Recipients | 13.6 | 2.5 | 0.9 |

Target group participation rates were particularly low in industry-based programs (i.e. Skill Shortages and Skill Investment). Target group participation rates in CJS programs have not improved since 1985-86.

Within the last two years, Employment and Immigration Canada has administered a follow-up survey to CJS participants who have completed training programs, and established three outcome measures:

- *Impact Rate*: the percentage of participants employed or taking further training after taking part in a CJS program
- *Skill Utilization Rate*: the percentage of those employed after CJS participation who are employed using skills acquired through CJS training; and
- *CJS participants' perceptions* of the usefulness of the training and work experience in retaining or finding employment

Based on outcome measures from the first half of 1987-88, the three month impact rate for CJS participants was 63%, the skill utilization rate was 73%, and 85% of participants considered CJS training to be valuable (EIC, 1988b). The outcome measures were up marginally from 1986-87 [see Table 7:13].

Table 7:13
Canadian Jobs Strategy Outcomes
% of Participants (EIC, 1988b, 76)

| | 86 - 87 | 87 - 88 |
|------------------------|---------|---------|
| Impact Rate | 58.7 | 62.9 |
| Skill Utilization Rate | 73.5 | 73.0 |
| Value of Training | 84.7 | 85.5 |

Table 7:14 reports the impact rate for CJS target group participants.

Table 7:14
Impact Rate for CJS Target Groups
% of Participants (EIC, 1988b, 76)

| | |
|------------------------------|------|
| Youth | 64.8 |
| Visible Minorities | 64.3 |
| Women | 60.3 |
| Disabled Persons | 52.9 |
| Social Assistance Recipients | 49.7 |
| Native Persons | 45.1 |

Workplace training participants were significantly more likely than in-school training participants to use their training and to be employed, with the exception of those in Job Development programs [see Table 7:15].

Table 7:15
CJS Impact Rate 1987-88
% of Participants
(EIC, 1988b, 81)

| | <i>Workplace Training</i> | <i>In-School Training</i> |
|------------------|---------------------------|---------------------------|
| Skill Shortages | 89 | 65 |
| Skill Investment | 92 | 79 |
| Job Entry | 63 | 55 |
| Job Development | 50 | 50 |

A Canadian Jobs Strategy follow-up survey measured the change in average weekly wages for training participants. For 1987, it found that wages for CJS participants increased an average of 15%, or \$2,500 per annum (CLMPC, 1989a, 29).

Although formal apprenticeships represent only 1.4% of employment in Canada, the skilled trades are important in the high-skilled construction, manufacturing and resource sectors. While new apprenticeship registrations have recently increased to the levels they attained prior to the recession of the early 1980s, the completion rate for apprenticeships remains well below its pre-recession level. In addition to the very low proportion of apprentices who are female (4%), relatively higher drop out rates in recent years have become an important concern at the policy level. The CLMPC Report of the Task Force on Apprenticeship estimates that the ratio of discontinuants to new registrations (the 'quit rate') is 30%. The CLMPC considers this rate "unhealthy" and adds that it "has long term implications for skill shortages" (CLMPC, 1989c, 10).

Co-ordination and Consultation

In light of the multiplicity of organizations involved in adult education and training in Canada, mechanisms for communication and consultation amongst stakeholders are obviously important. The Council of Ministers of Education, Canada and the Committee of Ministers with Responsibility for Labour Market Matters provide some linkages for federal-provincial and inter-provincial activities. There are also bilateral federal-provincial committees in each province which co-ordinate joint

training activities. In view of the extent of the need, these mechanisms currently offer a feeble response. A recent inter-provincial report concludes that:

Unfortunately, the design of federal programming is occurring in isolation from the planning activity of the provinces and territories. This lack of co-ordination holds out the potential for duplication and inefficiencies which can be ill-afforded (Quebec, 1989, 5).

The CLMPC's *Report of the Business/Labour Task Force on Adjustment* also identifies the lack of co-ordination and potential for duplication of efforts, and recommends the need for a co-ordinating mechanism (CLMPC, 1989d).

The Council of Ministers of Education, Canada recently stated that delineation of roles and responsibilities is a key requirement for improving Canada's adult education and training system (CMEC, 1989). The Council of Ministers of Education has been directed by the November 1989 First Ministers' Conference to work with a representative of the Prime Minister * to propose terms of reference, a mechanism and a plan for implementing a study of Canada's human resource development needs.

A Caution: the Importance of Utilization

Canadian discussions on the changing economy and competitiveness have focussed on the availability of adequate human resources. However, it is not human resources in and of themselves that will result in greater flexibility and a more efficient economy. They are a necessary, but not a sufficient, condition for economic gains. In order to achieve flexibility and efficiency, work has to be organized in such a manner that the available human resources are fully utilized. Thus, a partial explanation for the relatively slow absorption of new technology in North America in comparison with competitors such as Germany, Japan and Sweden may include a more Tayloristic work organizational pattern on this continent. This factor should not be overlooked in policy discussion and debate (Boyer, 1989).

* The Prime Minister has named Douglas Wright, President of the University of Waterloo, as his representative.

8. Recurrent Education in Canada

*A Score Card**

To what extent does the Canadian educational system in 1990 reflect the concept of recurrent education? To what extent does it promote and enhance lifelong learning?

Looking at the system as a whole, it is evident that the advantages which Canada has had owing to the rapid expansion of secondary and post-secondary education two decades ago are quickly being eroded. Other countries, such as Japan and several northern European countries, have recently expanded their systems. This means that they will have access to an increasingly well-educated workforce as measured by years of schooling. As a result, Canada will increasingly have to compete by [a] enhancing the quality of existing schooling at both the comprehensive secondary, and post-secondary levels and [b] develop a system of recurrent education which implies increasing the number of people periodically returning to education and training during their working lives.

International comparative data, though very slim in range, indicate that Canadian adolescents are doing better in science and mathematics than has been recognized in recent public debates. What is alarming is the continuing high wastage in high schools. The loss of human capital that this represents is one of the major weaknesses in the effort to achieve a competitive economy in Canada.

The dropout is not just a threat to the economy but also to the very notion of a just and fair society. The combined effects of technological and organizational changes are making it increasingly difficult for those who drop out to enter the labour market – and when they do so, they get locked into low skilled jobs which lack security. What is worrisome, is the continuing high wastage in high schools and the streaming away from the sciences which make the pool of eligible students for sciences and technology at the university level too small for comfort.

Looking at post-secondary education from an economic perspective, it is disturbing that engineering and sciences, rather than increasing their share of students and awarded degrees, have shown a slight decrease in recent years. In addition, the

* Readers are reminded that the views expressed in this report are those of the authors, rather than the National Advisory Board on Science and Technology.

intellectual reserve that women constitute, is not effectively being tapped for science and technology. Experiments are needed in the curriculum in order to increase women's share of science and technology places, particularly in engineering.

The underfunding of research in Canada, in comparison with other major trading partners, impacts negatively on the ability of Canadian universities to reach and maintain in the forefront of research. Although there has been some increase, the private sector is still contributing a very modest share of university-based research. The recent emphasis on joint-ventures between industry and universities is useful but, unless it is matched by an increasing investment in basic research (as takes place in Japan and Sweden), the expected benefits will, in all likelihood, not materialize.

Following a broad review of policy documents of each of the three sectors that constitute a 'system' of recurrent education – initial education, post-secondary education and adult education and training – one is led to the conclusion that, although there is increasing awareness of the necessity for some form of recurrent education, the emphasis is still almost entirely on the various parts, rather than upon a comprehensive framework for promoting recurrent education. This applies not only to the various components of the 'system' but also to an evident lack of integration between various policy sectors: the economy and labour market, education and social services.

Further, particular issues such as student financing are not discussed in the context of recurrent education. If this were to happen, the role of paid educational leave would have to be injected into the discussion. Thus, despite numerous rhetorical references to lifelong learning, the model that drives policy discussion in Canada is still the traditional front end model of education.

While Canada is losing its edge in the formal education system, it has simultaneously to overcome serious deficiencies in adult education and training. To a large extent, Canada may be said to lack a 'training culture', particularly in its private sector, at a time when this culture is vibrant among many of our principal competitors in Europe, Asia and south of the border.* This lack is costly because it inhibits Canada's capacity to adapt quickly to new technologies. Overcoming this problem is one of the principal challenges to the Canadian economy in the 1990s.

* Witness the vibrant training activities in the French economy stimulated by the 'taxe d'apprentissage'.

A broad trend is visible from reviewing international comparative information: reliance on the market as an incentive to train is not sufficient. Overall strategies are essential. Where they exist, they bear fruit. Canada needs a national strategy, which would involve commitment not just from the federal government but from the provinces and the other social partners.

Clearly, Canada is not investing adequately in adult education and training, when viewed on a comparative basis. Greater investments are needed from both levels of government as well as from the private sector. The role of the public sector is to animate a national strategy and to assist workers in danger of being displaced as well as those with a marginal attachment to the labour market. The private sector role is to build employee training into investment strategies.

Training curricula must become more comprehensive, and provide learners with a broad understanding of the new technologies. In order to succeed, training programs also require strong support from employees. A public awareness campaign may be needed to promote this radical change in thinking on the part of Canada's enterprise culture and Canadian working people.

While improvements to Canada's formal educational systems will bear economic fruit in the long term, improvements to adult education and training promise immediate results.

Policy Issues and Options

Initial Education

Three crucial problems facing the schools are: the uneven development of literacy skills in elementary education, the high dropout rates and the development of a learning environment that encourages pupils to pursue the sciences.

A broadening of the student population in the sciences has to be achieved without sacrificing the present standards. Various program alternatives, degree structures, curricula options and teaching methods need to be explored. The preparation and availability of science teachers must be addressed.

To tackle the high dropout rates must become a number one priority. Not only will the lack of at least a high school education increasingly make it difficult to live an active social life. It also reduces the overall economic competitiveness.

The most urgent problem to tackle is the dropout rate. Despite all the concern that has been voiced, one cannot help feeling that there exists an underlying conception that the wastage is inevitable, even acceptable, and that not very much can be done about it. Curriculum changes, such as the one recently suggested by the British Columbia Royal Commission on Education (Sullivan, 1988), certainly address the dropout question, but there is not a concentrated focus on this very serious problem. Instead, it becomes just one among many issues that the school system is asked to address.

It is important to recognize that the cause of dropping out is to a large extent outside the school system, and that the schools should not be made the scapegoats. Longitudinal research has clearly demonstrated that the family plays an important role in the drop out phenomenon. Thus, any strategy to deal with dropouts will have to grapple with the out-of-school environment. This includes the need for quality day care which can partly compensate for lack of educational stimulation in the home as well as after school facilities.

While bearing in mind that there is only so much that the school can do, a fundamental change needs to occur in public acceptance of the dropping out of secondary education. It must be made absolutely clear that a 30% drop out rate is no longer tolerable. Targets should be identified and a Canada-wide task force should be mandated to research approaches to deal with the issue.

Of course, despite best efforts, there will always be some students who drop out. Special efforts must be made to ensure that these people get a fair chance to return to school, to drop in, when they are once again motivated to do so. Availability of programs is not enough. Research on participation in adult education among young adults shows that many drop out of school with the expectation that working life will be much better soon change their view after exposure to the real world. Without active measures to help them get back into some form of education, many of them will not come back. Dropping out should be replaced with 'stepping out'.

In summary, an analysis of the drop out phenomenon will have to address the underlying reasons for dropping out and deal with what can be done to compensate for the handicap of a non-stimulating home environment. It also has to look at what

can be done within the school, including curriculum changes which offer alternative programs and, more than anything else, how the current public acquiescence in the wastage can be ended. This is a task for each of the social partners.

Post-Secondary Education

Increasing the numbers of students entering the sciences and engineering is no easy task. This problem is by no means confined to Canada. Student choices are a reflection of broader social values as well as their perception of the benefits to be gained from pursuing various academic options. As a result, it would appear that it is not sufficient to gain an appreciation of the natural sciences in secondary school, or even to develop incentives such as scholarships or lower fees for those entering such priority programs. Unless the rewards for entering these programs are perceived to be substantial and long-lasting, the above stimulations will likely have a minimal impact.

There appears to be a need for action at three levels: [1] those representing the intended labour market must make that market worthwhile to enter, [2] the high schools must prepare the students for choices at the point of graduation between arts and sciences, and [3] the post-secondary systems must attempt to develop avenues for cross overs between arts and sciences.

Canada lacks a tradition of monitoring the post-secondary system closely in view of the projected labour market. As in the United States, there is an expectation that the market forces, left to themselves, will create an appropriate fit. The evidence presented here suggests strongly that the market mechanisms are insufficient in this regard. An option worth considering is the introduction of more targetted general funding as well as special target measures, such as ones mentioned above, to direct more students toward engineering and the sciences.

How can and should R & D be increased in Canada? What we are primarily concerned with is R & D conducted in a university setting. However, as has been pointed out in several policy documents, the relatively low involvement of the private sector is what distinguishes Canada from several of its major trading partners. During the 1980s private investment in R & D increased 50% faster than government investment in OECD countries. Some evidence exists to suggest that this trend is now changing in view of growing recognition of the need to stimulate basic research. Initial enthusiasm regarding university-industry collaboration in

research is now being replaced by caution regarding the optimal balance between basic and applied research.

There are two basic ways that university research can be strengthened: [1] increasing the general funding base of universities, and [2] increasing the funding levels of research councils. Sweden is the most research-intensive country in the OECD and, like Canada, it relies heavily on the university sector. It is therefore of interest to note its recent research legislation which has the twin goals of fostering competition and stimulating the role of research councils, while simultaneously reducing the base level of university funding. Behind this decision is a belief that research councils, rather than individual universities and their faculties, are able to make the most informed decisions regarding research funding.

In searching for ways to improve Canadian post-secondary education, more emphasis ought to be given to developments in other countries, such as the 'Gemanthochschulen' in the Federal German Republic or the hierarchical system being developed in Japan. The Gemanthochschule can be seen as a comprehensive system of higher education where institutions of higher education in each region are merged into one comprehensive university. The motive behind this model is to create a link between the research orientation of the university and other institutions of higher learning with the intention of bringing the non-university sector into closer contact with research. In addition, recent concerns regarding a too diversified system in the United States should be considered when developing future policies in Canada.

Adult Education and Training

Evidence presented in this report suggests that this sector requires more sustained attention than the other two. This is especially the case because the adult education and training sector is organized in a complicated way and because it is not at all clear where the focus of responsibility for dealing with its problems lie.

Special effort should be directed toward identifying new forms of financing for employer-sponsored education. This could involve some kind of joint fund where employers, employees and governments contribute. Various European countries have ratified the International Labour Organization's Convention 140 on Education Leave of Absence. As a result, substantial flows of employer funds have been directed into employee education. This option requires serious consideration in Canada. While such initiatives have been resisted by employers in the past in

Canada, growing recognition of the cost to the economy of inaction suggests that the time may be ripe for fresh consideration of new approaches to stimulate on-the-job and in-service training in Canada.

This suggests the need to promote a "training culture" in Canada.

This paper has presented evidence which suggests that the quality, quantity and distribution of adult education and training are less than satisfactory. This evidence begs a question: What can governments do – either directly or indirectly – to influence the Canadian adult training system to provide more and better opportunities to a wider range of the labour force? An initial list of suggestions is offered here:

Setting a National Agenda: The facilitation of a training culture needs to become a priority on the Canadian agenda. This priority will require the collaboration of federal and provincial governments as well as by the private and voluntary sectors; it should include the following components:

Creating National Awareness: The federal government, in conjunction with other stakeholders, should mount an extensive communications strategy to build awareness among Canadians about the critical importance of adult education and training to maintaining economic and social well-being, and to all parts of Canadian society. This strategy might include a statement of national consensus and commitment towards building a Canadian training culture. In addition to a national strategy, there might be regional and sector-specific awareness campaigns.

Operationalizing a Training Culture: What does a training culture mean for individual Canadians, for employers, for labour organizations? The term needs to be operationalized. To move from a rhetorical to an action level, a Canadian "vision statement" could be adopted and used as a basis for translating goal statements into training strategies which can work at the local level.

Building a Comprehensive Data Base on Adult Education and Training: In view of the importance of this subject to the future of the country, building a comprehensive data base on adult education and training should become a Canadian priority. This is an area for federal leadership. Through Statistics Canada, the federal government has a unique capacity to generate timely information to inform training policy decisions.

Establishing Benchmarks and Adopting National Targets: An important action step is to establish training participation and outcome benchmarks through consistent, periodic surveys of employers and adults in Canada. Goals for improving the present state of the art can best be developed by establishing measures to how well the Canadian economy is doing with regard to quality, quantity and the distribution of adult education and training. Once training benchmarks in which Canadians can have confidence are established, a consensus on national targets for adult training can be adopted and communicated through a second phase of an awareness strategy.

The development and communication of national research and development indicators and targets in Canada during the past few years can be considered as a model to follow in the field of adult training.

Adult training indicators and targets can be developed for such indicators as:

- dollars spent on training per worker,
- hours of training per worker,
- public expenditure on training as a percentage of GDP,
- employer expenditures on training as a percentage of GDP and of payroll,
- the extent of participation in both public and private training by various segments of the labour force (particularly under-represented groups), and
- the percentage of employers and particular groups of employers (i.e. by size, industry, etc.) which provide training.

Enhancing Co-ordination, Communication and Consultation: With an increasing number and type of sponsors and providers involved in the adult training market, the need for co-ordination in the Canadian adult training infrastructure is becoming more important. The efficiency of the system depends, in part, on the degree to which the various roles of each stakeholder are co-ordinated, reducing duplication and overlap, and the extent to which substantial consultation occurs on a continuing basis.

One of the key prerequisites for improved co-ordination and consultation among adult training stakeholders is the delineation of and agreement upon roles and responsibilities. A lack of such common understanding is at the heart of past federal-provincial, public-private sector, and business-labour conflicts over training. *

A Canada-wide mechanism, with regional variations, is needed to provide a focal point for consultation and collaboration with regard to adult education and training. The Ontario Training Board recently announced by that Province and the National Labour Market Board proposed by the CLMPC Task Force on Programs for Unemployment Insurance Beneficiaries are possible models to consider.

Adopting More Effective Financing Models: A major financing issue which has been identified by all major reports on training (e.g. de Grandpré, 1989; CLMPC, 1989c) is effective ways of financing employer-sponsored education and training. There has been much discussion in the past decade about levy-grant, tax liability and other training funds. What is needed now is to look beyond such obvious options to new, innovative "made in Canada" approaches. The Electrical and Electronic Manufacturers' Association of Canada provides a recent positive example of this approach with its voluntary training fund.

In addition to financing worker training through employer funds, policies might consider approaches directed at individual workers, such as training entitlements or vouchers, mutual savings and insurance funds, or individual loans or study grants. Support directed at individual workers, as opposed to employers, has the potential to be more effectively and equitably distributed to the under-educated and other disadvantaged workers. Such policies also reinforce the individual responsibility for training.

Related to this issue is the growing need for a more effective training income support mechanism in Canada. Ontario, for example, has offered one option through its Canada Training Allowance proposal; another promising option is a

* A good example of an initiative which will require a substantial amount of co-ordination and consultation is the human resources development study that the First Ministers have asked the Council of Ministers of Education, Canada to undertake. In addition to various components of the private and voluntary sectors, this initiative will involve Education, Advanced Education, Labour market, Science and Technology and Economic Development Ministries across the country – as well as various parts of the private sector.

Canadian system of paid educational leave for education and training. One way to begin might be pilot projects focusing on individual industries.

Increasing the Participation of Under-represented Adults in Employer and Government Sponsored Education and Training: There is clear evidence that certain groups of adult Canadians do not have satisfactory access to general and technical education and training because of several types of barriers. As the OECD observes, "these kinds of market failures and market outcomes compel governmental intervention" (OECD, 1989a). All levels of government and training providers should be challenged to work together to develop approaches to increasing the participation of under-represented labour force groups in employment training through such mechanism as experimentation, pilot projects, seed funding and joint ventures. Using existing resources more effectively could be as important as additional funding.

Partnerships and Linkages: Due to the increasing integration of work and learning in our society, stronger connections are needed between:

- general and vocational education,
- enterprise and institutional-based training,
- initial and further education,
- private and public sector activities, and
- economic and education/training policies.

This could be reflected in initiatives to strengthen linkages between the various providers of adult training. Partnerships are needed among employers, schools, and training institutions, as well as among professional, labour and community groups.

A special role for governments may be to build bridges within the existing adult training infrastructures, as an alternative to inadvertently creating parallel systems in the private sector. Government initiatives to strengthen private sector training should be viewed from this perspective.

What happens with regard to human resources development will only partly depend upon measures taken in the educational arena because the demand ultimately depends upon what takes place in the labour market. It is essential to bear in mind that there exists no deterministic link between new technology and skills demand. Instead, these two factors are mediated through the organization of work. Building flexibility into the Canadian economy requires that a Tayloristic work organization system be replaced by an alternative mode or organization that gives more responsibility to the individual or team of workers. This process is underway, but needs to be accelerated. The comparatively low amount of education and training taking place in the Canadian labour force can be seen as a result of an obsolete management style. In order for a major change in human resource development to occur in Canada, there has to be a cultural shift which will embrace new modes of production. This assumes a capital-labour compromise and government has a key role to help overcome adversarial industrial relations so as to enable this new culture (Boyer, 1989).

No quick fixes are available for the problems confronting the Canadian educational system. The system is mature, stable, and capable of change only gradually. Stakeholders need to be persuaded, not cajoled, regarding the necessity for change. In this regard, Canada should look farther afield than its traditional preoccupation with trends in the United States. Some of the most promising developments, and the most impressive results, are today coming from Europe and Asia. These models need to be better understood.

9. Data Needs

A point of departure for all the above options is the acquisition of appropriate policy-oriented information. This capacity lies within the immediate grasp of the federal government and in Statistics Canada, it possesses the most capable instrument for acquiring and stimulating appropriate policy information. Through its membership in the OECD, the federal government also can influence the availability of appropriate international data bases which are essential to effective future human resources development policy. The need is urgent.

In its recent report *Good Jobs, Bad Jobs*, the Economic Council of Canada comments that:

...the usefulness of any policy dialogue on education and the future quality of Canada's workers will depend...on the availability of better empirical analysis. Hard and well-focussed research is badly needed on how Canada's education systems can prepare a high-quality, competitive workforce, capable of adapting to a rapidly changing knowledge-based economy. Accordingly, we believe that a major empirical study into the state of education in Canada must be undertaken, with a view to evaluating concerns about the quality of education in this country. The focus of the study should be the link between education and economic goals (Economic Council, 1990, 10).

As education, training and retraining increasingly are seen as having an essential role to play in mastering economic, technological and social change, and in creating a more fully active society, the demand for information on the various components of recurrent education becomes critical. Academic researchers, program managers and policy-makers require better information with which to test theoretical models and compare policy and program options. Ultimately, improved information can help decision-makers determine rationally where to deploy scarce resources for recurrent education.

In assessing the Canadian situation vis-a-vis recurrent education some serious data gaps have become obvious.

Are schools creating lifelong learners? Are colleges responsive to changing demographics and the changing needs of adults? Are universities keeping up with new knowledge and technologies? There is no systematic and longitudinal collection of indicators regarding the performance of schools, community colleges, or universities. No measures exist for the system as a whole to determine if they are meeting their mandates. Present work by the OECD can give some guidance in the development of school indicators.

Just as international comparisons are valuable as inputs to policy discussion, so too would be a full range of inter-provincial comparisons in Canadian education. A major priority should be to consolidate existing provincial data bases into a Canadian system.

Quality and efficiency measures are greatly needed in both initial and post-secondary education. Consideration should be given to adapting the technology of the soon-to-be-released Statistics Canada Survey of Literacy Skills Used in Daily Activities to a representative sample of the Canadian youth population. For policy purposes, this would provide an inexpensive alternative to proposals for a broad-based national skills test.

Education and training in the private sector need to be monitored. Private sector education and training questions should be built into the Statistics Canada Quarterly Business Activity Survey. The Statistics Canada Labour Force Survey should be used for the periodic collection of data on adults' participation in work and non-work related education and training. Time-series studies are needed employing consistent definitions and scope; qualitative studies are needed to get at barriers and to document innovations.

There is a lack of evaluation of education and training for the labour force. What little evaluation of government-sponsored training exists is not widely distributed nor used strategically.

More data are needed on private training institutions. Government should work with industrial associations to establish a basic quantitative profile of their activity.

More information is needed on the costing of employer-sponsored training. How does it operate? How can 'informal' training costs and benefits be measured?

There is a lack of research and information on the economic costs and benefits of education and training, for an individual, a company or society at large. Better empirical data are needed to study the links between education, training and productivity, and between education and training and economic growth.

Comprehensive policy studies are needed including identification of how policies promote or inhibit education and training. Researchers and government should work more closely so that the former know what kinds of information would inform policy decisions.

There is a lack of compatibility in international data on education and training. Canada should work actively to increase and improve the capacity of the OECD and UNESCO to collect comparative data. In particular, OECD should be mandated and financed to undertake pro-active data collection.

More detailed analysis of specific industries, occupations, providers of training and participation in specific types of training is needed, as is a greater emphasis generally on part-time education and training.

A standard nomenclature for terms and concepts needs to be developed to facilitate the measurement of educational phenomena and to encourage the use of consistent operational definitions on the part of data collectors and researchers.

* * *

Canada's data deficits in the field of human resources development constitute a serious inhibition to reform and efficiency. Addressing data needs is an essential first step towards improving the dividends from our investment in a \$50 billion system whose success is vital to the future well-being of all Canadians.

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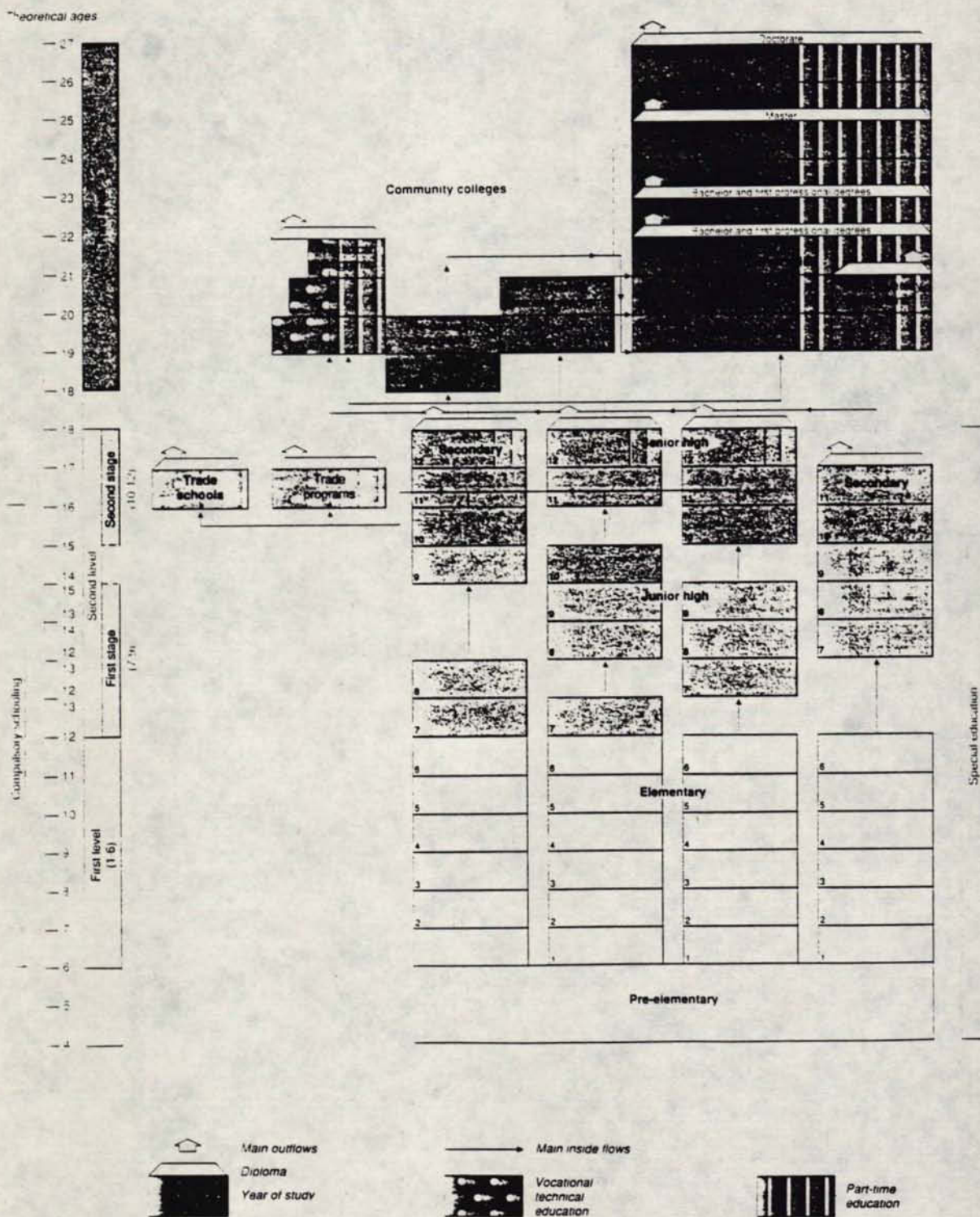
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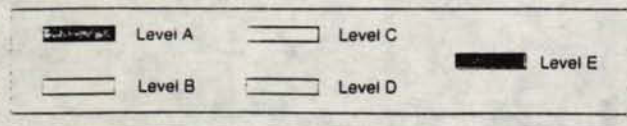
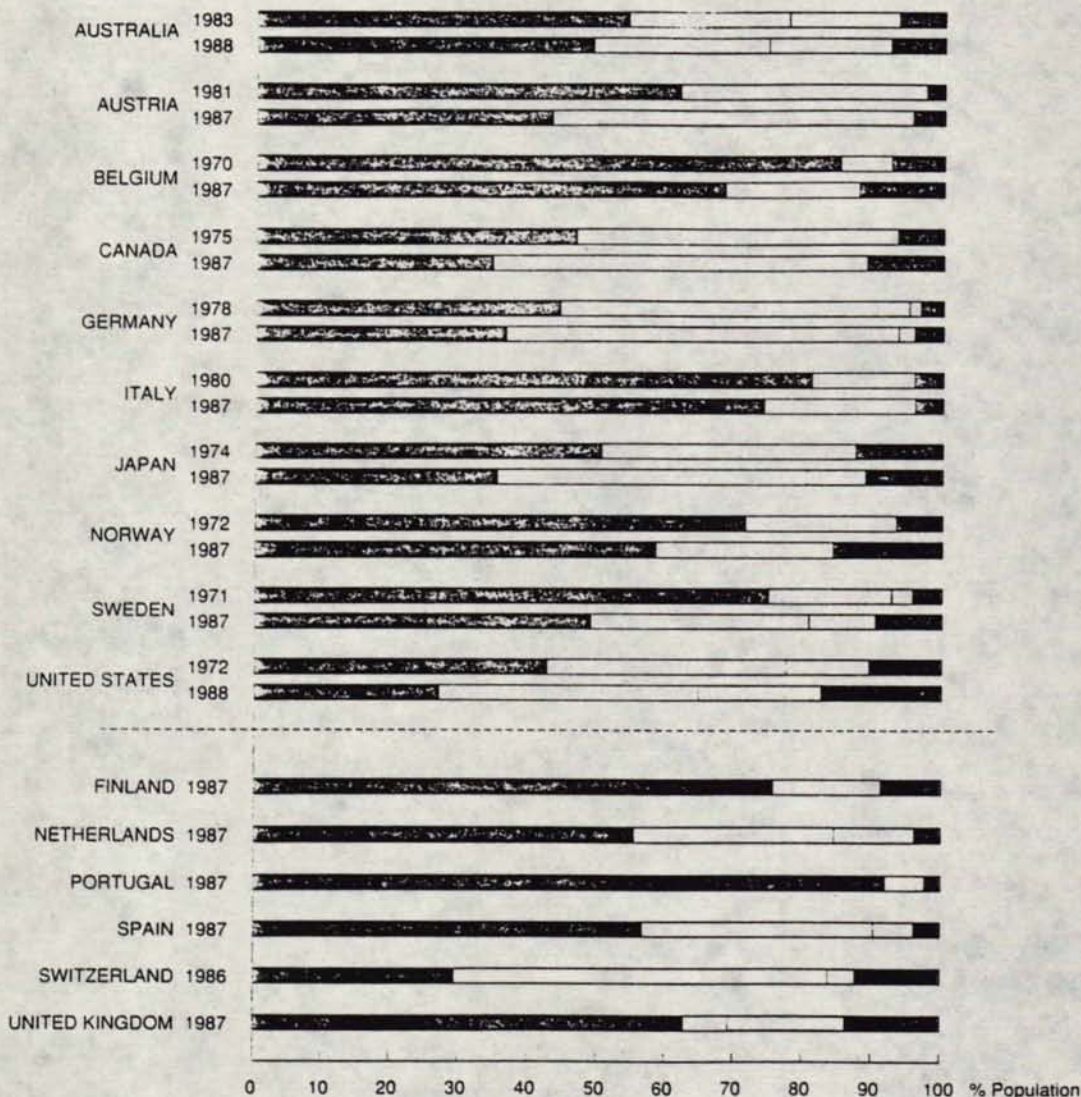
Appendix A

OECD has prepared this diagram to illustrate the structure of Canadian education. OECD notes that "in the case of federal countries, only the more commonly used types of structure are included". [OECD, 1989b, 111]



Appendix B

OECD has prepared this chart to illustrate changes over time in the composition of the working age population in selected countries by educational level. Note how Canada's comparative advantage in 1975 has been eroded over the ensuing 12 years [OECD, 1989c, 56]:



persons have been omitted. They comprise the following percentage of working age population : Australia (1983) 3.7%. (1988) 4.6% (students) ; Japan (1974) 9%. (1987) 10% (students) ; the Netherlands (1987) 13.5% (students) ; Portugal (1987) 0.3% (other qualification) ; Sweden (1971) 1.1%. (1987) 1.9% (other qualification or no answer) ; United Kingdom (1987) 5.6% (other qualification or no answer).

a. Educational attainment is classified on the basis of data submitted by national authorities. The classifications presented here may not reflect the full diversity of education and training systems in cases where data provided are not sufficiently detailed. For further information on the classification of educational attainment for each country, see Annex 2.C.

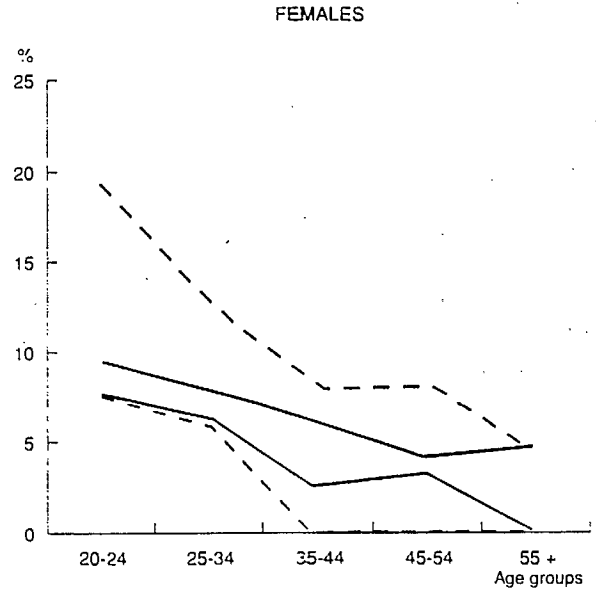
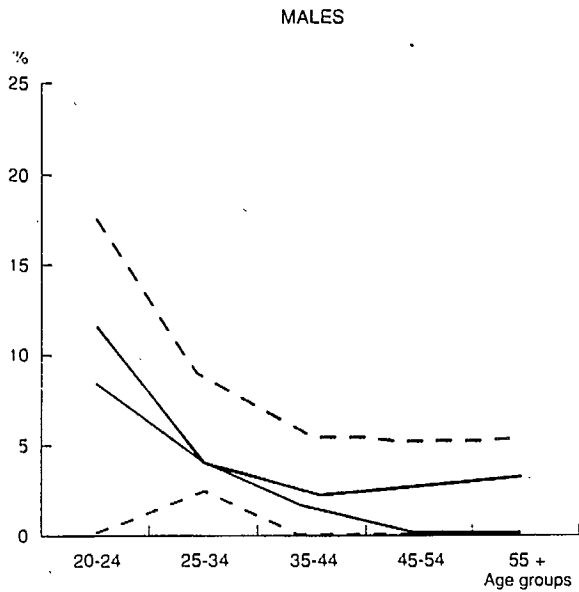
c. Data refer to persons 20 and over, with the following exceptions : 15 and over in Australia ; 15-74 in Finland ; 20-64 in Italy, the Netherlands, Sweden (1987) and the United Kingdom (males) ; 20-60 in the United Kingdom (females) ; 20-74 in Norway (1971) and Sweden (1971).

b. A number of countries include in their data persons whose level of attainment cannot be determined. For the purpose of the analysis, those

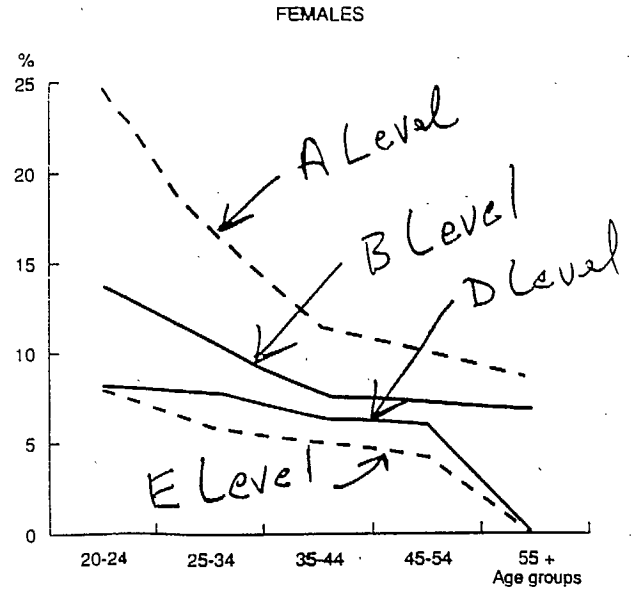
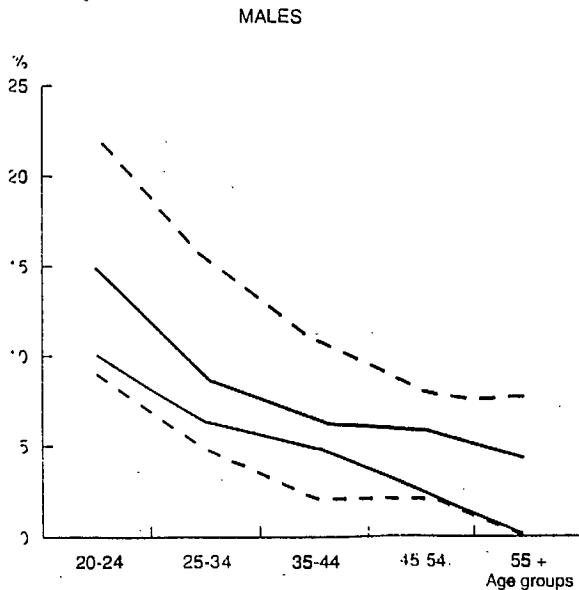
Source : Annex 2.D.

Appendix C

This chart compares levels of unemployment by gender for 1975 and 1987. Note [1] that unemployment rates tend to decline with age, [2] that women's unemployment is higher than men's, and [3] that the relative disadvantage of low educational attainment has increased from 1975 to 1987. [OECD, 1989c, 61]:



1987

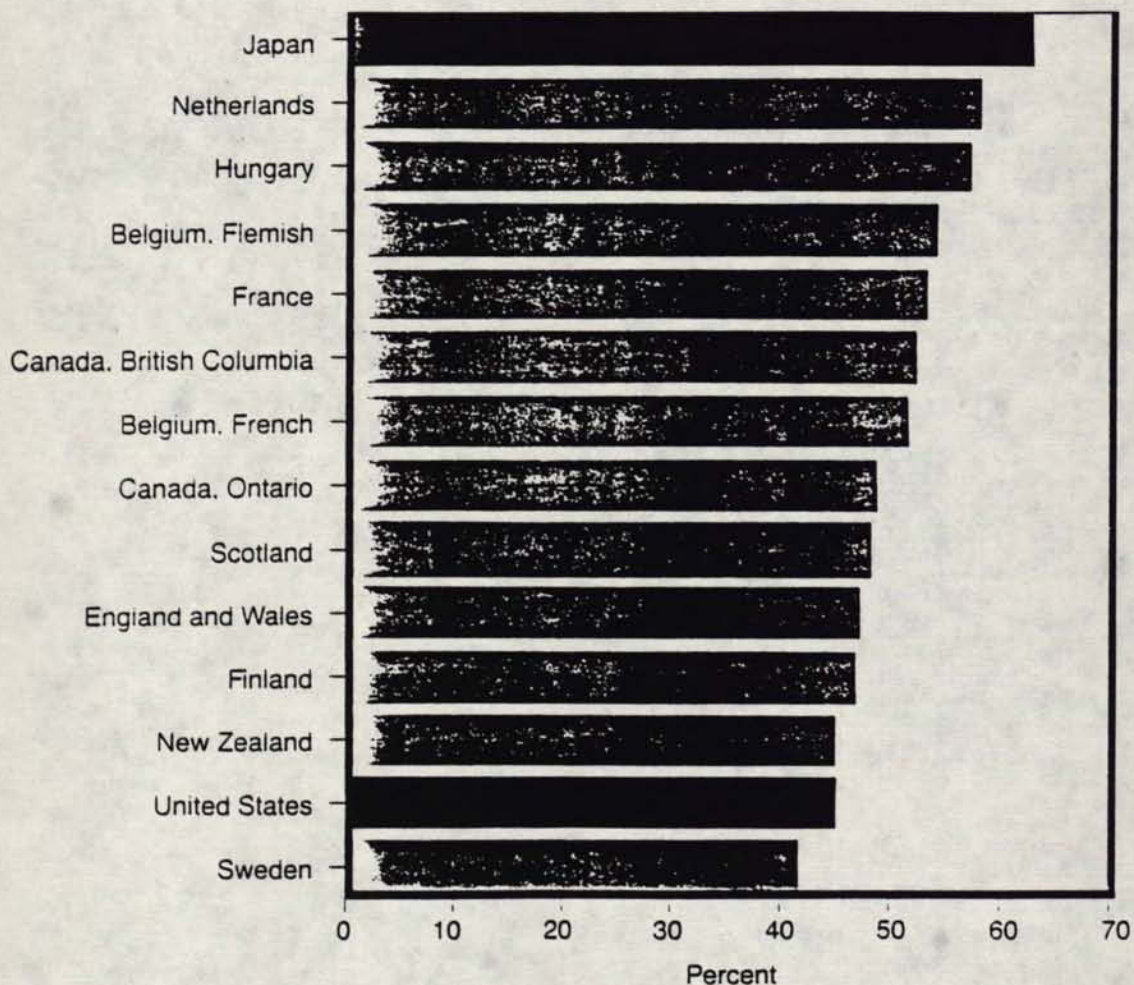


Appendix D

This chart illustrates graphically the results of the Second International Mathematics Study reported in the text. [National Centre for Education Statistics, 1989, 65]:

Indicator **28. International Math Comparison**

Mean percent of items answered correctly on a mathematics test of 8th grade students, by selected countries and provinces: 1981-82



SOURCE: U.S. Department of Education, Center for Education Statistics, contractor report, *Perceptions of the Intended and Implemented Mathematics Curriculum*, by Ian Livingston.

The average score of American 8th graders was below that of most of the participating nations. On most of the tests, Japanese students' average scores, the highest in the world, were about 10 to 20 percentage points higher than those of students in the United States.

Appendix E

University enrolment and degrees awarded by field of study, 1983-1987.

TABLE I.
ENROLMENT BY FIELD OF STUDY. PERCENTAGES 1983-84 AND 1987-88

| | Undergraduate | | | | Graduate | | | |
|---|---------------|-------------|------------|------------|-------------|-------------|-------------|-------------|
| | Full-Time | | Part-Time | | Full-time | | Part-Time | |
| | 1983-84 | 1987-88 | 1983-84 | 1987-88 | 1983-84 | 1987-88 | 1983-84 | 1987-88 |
| 1. Education | 10.0 | 10.1 | 11.3 | 10.6 | 8.9 | 9.0 | 28.4 | 30.0 |
| 2. Fine & Applied Arts | 3.5 | 3.4 | 2.2 | 2.3 | 2.1 | 2.1 | 1.4 | 1.4 |
| 3. Humanities | 6.9 | 9.1 | 5.2 | 6.5 | 12.9 | 13.1 | 11.7 | 10.8 |
| 4. Social Sciences | 27.7 | 31.1 | 25.3 | 29.0 | 28.6 | 28.3 | 35.1 | 36.4 |
| 5. Arts & Science - general | 19.1 | 14.4 | 16.4 | 13.6 | - | - | - | - |
| 6. Health Professions | 5.9 | 5.9 | 2.6 | 3.9 | 18.7 | 18.7 | 3.8 | 4.3 |
| 7. Agriculture & Biological Sciences | 5.5 | 6.8 | 1 | 1.3 | 7.1 | 7.3 | 2.0 | 2.1 |
| 8. Engineering & Applied Sciences | 10.7 | 9.1 | 1.7 | 1.6 | 10.8 | 10.5 | 7.6 | 6.5 |
| 9. Mathematics & Physical Science | 7.4 | 6.0 | 4.8 | 3.6 | 9.4 | 10.1 | 3.6 | 3.5 |
| Not reported | 3.4 | 4 | 29.6 | 27.5 | 1.3 | 1 | 6.3 | 5.6 |
| Science & Tech.(7+8+9) | 23.6 | 21.9 | 9.1 | 6.5 | 27.3 | 27.9 | 13.2 | 12.1 |

TABLE 2

DEGREES AWARDED BY FIELD OF STUDY, PERCENTAGES 1983 AND 1987

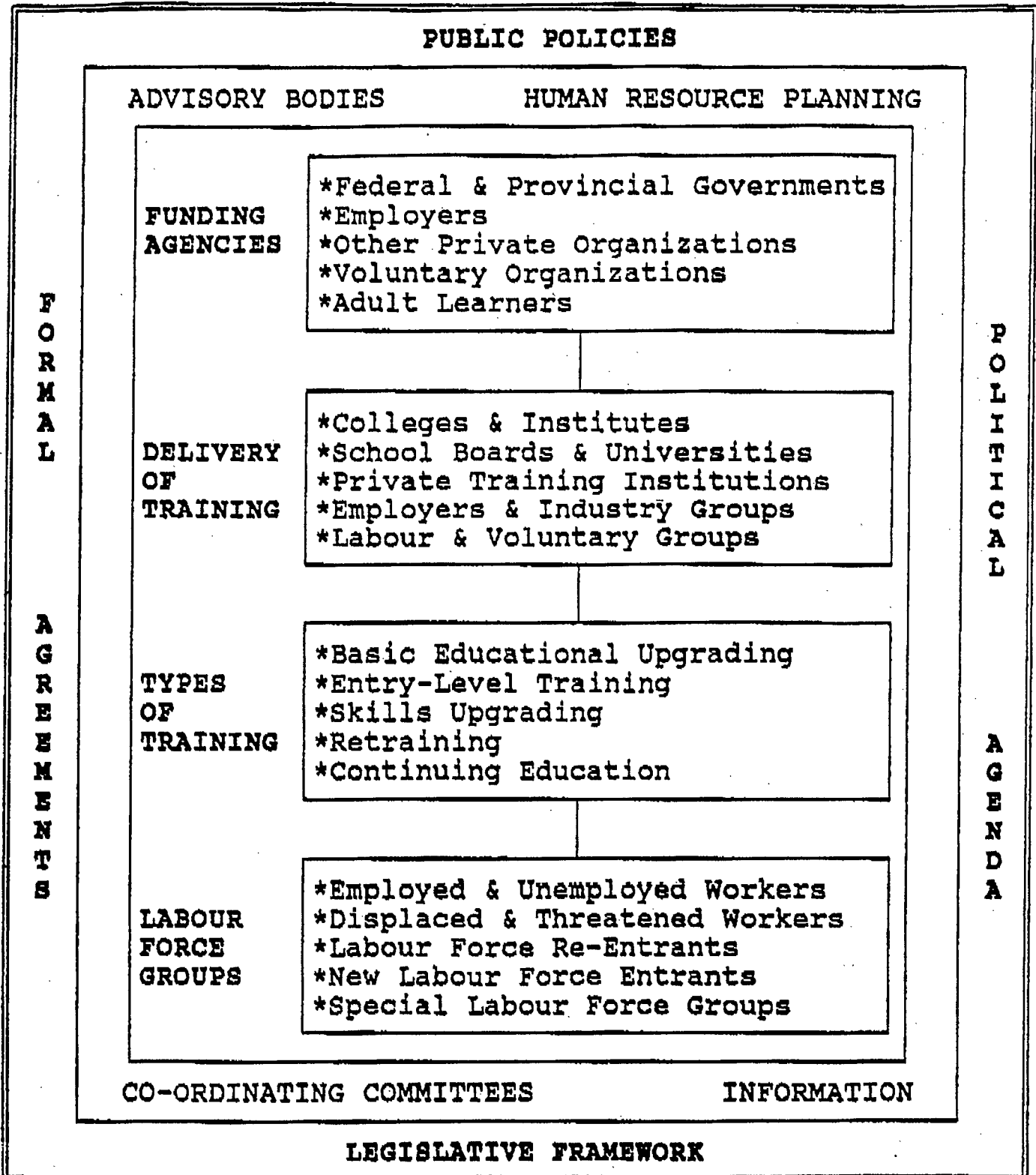
| | Undergraduate | | Graduate | | | |
|---|---------------|-------------|-------------|-------------|-------------|-------------|
| | | | Master | | Ph.D | |
| | 1983 | 1987 | 1983 | 1987 | 1983 | 1987 |
| 1. Education | 17.2 | 15.6 | 21.8 | 19.4 | 10.4 | 10.3 |
| 2. Fine & Applied Arts | 3.7 | 3.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 3. Humanities | 9.8 | 10.7 | 13.5 | 13.4 | 13.7 | 12.3 |
| 4. Social Sciences | 33.5 | 35.4 | 39.0 | 37.7 | 21.1 | 19.5 |
| 5. Health Professions | 6.8 | 6.8 | 4.1 | 5.6 | 9.6 | 9.9 |
| 6. Agriculture & Biological Sciences | 5.4 | 6.1 | 4.5 | 4.9 | 13.6 | 14.4 |
| 7. Engineering & Applied Sciences | 8.6 | 8.3 | 9.2 | 9.9 | 12.1 | 12.5 |
| 8. Mathematics & Physical Science | 6.1 | 7.3 | 6.0 | 7.9 | 18.7 | 20.0 |
| Not reported | 9.4 | 6.5 | - | - | - | - |
| Science & Tech.(6+7+8) | 20.1 | 21.9 | 19.7 | 21.9 | 44.3 | 46.9 |

Table 3 Full Time Enrolments in Community Colleges
by Program Type and Program Field

| Program type/programme field Genre de programme/domaine d'études | 1978 | 1981 | 1983 | 1984 | 1985 | 1986 | 1987 |
|--|------------------------|-------|-------|-------|-------|-------|-------|
| | (Thousands - milliers) | | | | | | |
| Total enrolment - Total des effectifs | 228.0 | 273.5 | 318.5 | 321.5 | 322.5 | 321.5 | 319.0 |
| Total enrolment in career programs - Total des effectifs des programmes menant à une carrière | 149.5 | 190.5 | 222.5 | 228.0 | 224.0 | 220.5 | 217.5 |
| Arts | 14.0 | 17.0 | 19.0 | 19.5 | 19.5 | 20.0 | 20.5 |
| Humanities and related - Sciences humaines et disciplines connexes | 2.0 | 2.5 | 2.5 | 3.0 | 3.0 | 3.0 | 3.0 |
| Health sciences and related - Sciences de la santé et disciplines connexes | 32.0 | 28.5 | 32.0 | 33.0 | 33.0 | 34.0 | 34.5 |
| Engineering and applied sciences - Génie et sciences appliquées | 35.5 | 52.0 | 85.0 | 84.5 | 80.5 | 55.0 | 51.0 |
| Natural sciences and primary industries - Sciences naturelles et industries primaires | 7.5 | 10.5 | 11.0 | 10.5 | 10.5 | 9.5 | 9.0 |
| Social sciences and services - Sciences sociales et services sociaux | 19.5 | 23.0 | 26.0 | 27.0 | 23.0 | 29.5 | 31.0 |
| Business and commerce - Affaires et commerce | 37.0 | 55.0 | 83.0 | 84.5 | 85.0 | 86.0 | 84.5 |
| Other, n.e.c. - Autres, n.e.c. | 1.0 | 1.5 | 3.0 | 3.5 | 3.5 | 3.5 | 4.0 |
| Not Reported - Non Déclaré | 1.0 | 0.5 | 0.5 | 0.5 | 1.0 | - | 0.5 |
| Total enrolment in university transfer programs - Total des effectifs des programmes de passage à l'université | 78.5 | 83.0 | 94.0 | 95.5 | 98.0 | 101.0 | 101.5 |

Appendix F

An illustration of the roles and elements of the adult training system in Canada:



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Morrison, Ian
Human resources development

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