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MOSST Background Paper

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RECENT TRENDS IN DEGREES
AWARDED AND ENROLMENTS AT
CANADIAN UNIVERSITIES



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SUMMARY

This paper reviews the recent trends in university enrolments and degrees awarded in order to obtain a better understanding of the current capacity of the university system for generating highly qualified manpower. The study also assesses the trends in the number of university graduates that are available on the job market.

Total university enrolments in full-time equivalents (FTE) and degrees awarded increased by 3% per annum from 1972 to 1978. This is in marked contrast to the expansion of the 1960s when enrolments grew by 12% per year (from 1960-61 to 1970-71).

At the undergraduate level, full-time enrolments and degrees awarded in the applied fields grew at a much faster pace (5-6% per year) than the general arts and science fields (2-3% per year) over the period 1972 to 1978.

At the graduate level, enrolments (FTE) and degrees awarded grew at about 3% per annum over the period 1972 to 1978. In recent years, graduate full-time enrolments have begun to decrease (1977 and 1978), both in the applied and the pure science fields. Major exceptions to this pattern were the education and commerce fields where degrees awarded grew by 9% and 11% per year respectively (1972 to 1977).

Taking into account such factors as foreign students, immigration, Canadians with degrees from abroad, etc., it is estimated that over the period 1972-73 to 1977-78 the supply of persons with university degrees potentially available on the job market grew at about 4% per year at the undergraduate level, with the number remaining almost constant in engineering, physical sciences and mathematics, humanities and fine arts and the social sciences. At the graduate level, the number also remained constant over the period 1972-73 to 1977-78, with decreases in the fields of engineering and applied sciences, life sciences, physical sciences and mathematics, health sciences and humanities and fine arts; and increases in education, social sciences, law and commerce.

Male full-time undergraduate enrolments grew slowly from 1972 to 1978 and male full-time graduate enrolments decreased over this period. Female full-time undergraduate and graduate enrolments grew steadily over this period, both in the applied and pure science fields.

Part-time enrolments grew steadily over the period 1972 to 1978 at the graduate and undergraduate levels for males, but particularly for females.

There was a general expansion in the foreign student population over the period 1972 to 1978. Undergraduate foreign student enrolments increased by 113%. The proportion of foreign student enrolment to total enrolment increased from 3% to 5% over this period. Graduate foreign student enrolment increased by 116%, with the proportion of total enrolment rising from 8% to 14%. The growth took place in all fields except the humanities and fine arts, and the social sciences. In 1978, the proportion of foreign students was 30% in engineering and applied sciences, and 28% in mathematics and physical sciences.

On a regional basis, in 1978 some 45% of the degrees awarded at the undergraduate level came from Ontario, 23% from Quebec, 23% from the Western provinces and 10% from the Atlantic provinces. Over the period 1974 to 1978 the number of undergraduate degrees awarded decreased in the Atlantic provinces, and grew by 6%-7% in Quebec and Ontario, and 3% in the Western provinces. The share of graduates from Quebec and Ontario increased in the human and natural sciences and the share of graduates from the health sciences increased in the Western provinces over this same period.

At the graduate level, in 1978 half the graduates came from Ontario, followed by Quebec (24%), the Western provinces (20%) and the Atlantic provinces (6%). Over the period 1972 to 1978, the share of graduates from Quebec increased from 18% to 24%. The share decreased from Ontario (53% to 50%) and the Western region (24% to 20%). The proportion of graduates from the Atlantic region increased slightly from 5% to 6%.

Looking at concentration by size of university at the undergraduate level, 20 universities accounted for 78% of all enrolments in 1977, with the other 28 universities accounting for the remainder. Similarly, 89% of graduate enrolment was concentrated in 20 universities in that year.

INTRODUCTION

This study reviews the recent trends in university enrolments and degrees awarded. The purpose of the review is to obtain a better understanding of the current capacity of the university system for generating highly qualified manpower. This study also assesses the trends in the number of university graduates that are available on the labour market, by reviewing the number of foreign students in Canada, the number of immigrants, and the number of Canadian graduates who are obtaining degrees abroad. Such supply estimates are essential in determining future requirements/supply balances under various R&D scenarios.

The study is divided into 4 sections. The first provides a description of the general trends in the growth of enrolments and degrees awarded at the undergraduate and graduate levels. Also contained in this section is a discussion of the major factors influencing these trends. The second part details the relative growth in enrolments and degrees awarded within the major disciplinary groups. A regional analysis is provided in the third section. The fourth part briefly describes the growth in the number of graduates classified by university of graduation.

I TRENDS IN TOTAL ENROLMENTS AND DEGREES AWARDED

(1) Undergraduate Degrees Awarded and Enrolments

Undergraduate enrolments (FTE) and degrees awarded increased by 3-4% per year over the period 1972 to 1978 (Table 1). Total full-time enrolments actually declined from 1976 to 1978. This is a rather dramatic shift in the trends of enrolments and degrees awarded when compared to the 1960s. For example, over the period 1961-62 to 1970-71 total bachelor and first professional degrees awarded grew at an average annual rate of 12%.

A number of factors have influenced these overall trends in the growth and composition of undergraduate enrolments, and thus degrees awarded, over the 1970s:

- (i) A gradual reduction in the full-time male undergraduate participation rates⁽¹⁾ from 1972-73 to 1975-76, and then a more pronounced decrease over the two years 1976-77 and 1977-78. This was the major factor contributing to a reduced growth between 1972-73 and 1975-76, and actual declines in 1976-77 and 1977-78, in male undergraduate enrolments. More detail is provided in Table 2.
- (ii) A significant increase in the participation rates of female full-time undergraduates from 1972-73 to 1977-78. This was the major reason for the increase in female full-time enrolments from 103,000 to 141,000 over the same period (see Table 2).
- (iii) A continued increase in the male, and particularly female, part-time participation rates. This was the main factor accounting for the expansion in part-time enrolments (see Table 3).

(1) Participation rate is defined as the proportion of students within a specified basic population group. In this study, participation rates are used for various categories of enrolment within which participation behaviour is relatively homogenous (e.g., full-time undergraduate males, etc.). See Appendix A for a more detailed description of participation rates.

- (iv) An expansion in the male and especially the female full-time enrolments at community colleges - institutions which represent a viable alternative to universities (see Table 4).
- (v) A continuing increase in the post-secondary population age groups.
- (vi) An increase in total undergraduate foreign (student visa) enrolments of 113% over the period 1972-73 to 1977-78. In relative terms, the percentage of foreign student enrolment to total enrolment increased from 3% to 5% over this period (see Table 5).

(2) Graduate Enrolments and Degrees Awarded

Over the period 1972 to 1978 the growth in graduate enrolments (FTE) and degrees awarded increased at 3% per year. Full-time enrolments actually decreased between 1977 and 1978 (Table 6).

A number of factors have influenced the overall level and composition of these enrolment trends, and the major influences are summarized below:

- (i) Since the early 1970s, the participation rates of male full-time graduates have fallen significantly. This has been the major factor in the precipitous decline of male full-time enrolments from 26,400 in 1972-73 to 18,700 in 1977-78 (see Table 7).
- (ii) Over the 1970s female full-time graduate enrolment grew by 24%, from 8,456 in 1972-73 to 10,454 in 1977-78. The main reason for this growth was the increase in the source population base rather than an increase in the participation rates, which grew by less than 7% throughout this period (see Table 7).
- (iii) Male part-time enrolments increased rather steadily from 1972-73 to 1975-76 and then decreased to 1977-78 (as shown in Table 8). Although the participation rates followed this same trend the main reason for the relative increase in male part-time enrolments was the growth in the population base.

- (iv) Female part-time enrolments increased from 4,900 in 1972-73 to 9,500 in 1977-78, as shown in Table 8. The main reason for this development was the general increase in participation rates.

- (v) One of the most significant features in graduate enrolment trends has been the relative growth in foreign students (Table 9). In 1972-73, 8% of the total enrolment was foreign students and by 1977-78 this proportion had increased to 14%. This growth took place mainly in agriculture and biological sciences, mathematics and physical sciences and engineering and applied sciences. More details are provided in Table 10.

TABLE 1

UNDERGRADUATE ENROLMENTS AND DEGREES AWARDED 1972-1978

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Enrolments (FTE) ¹	284033	296342	313768	335086	342330	339430	333250
Full-time	259203	271675	288006	307657	315272	312623	306794
Part-time	93116	92503	96609	102861	101468	100529	99209
Degrees Awarded	72563	70696	74851	80737	83276	87356	89282

NOTE: ¹ Full-time equivalent enrolment is calculated on the basis that 3.75 part-time undergraduate enrolments equals 1 full-time enrolment.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annual, 1972-1978 and "Degrees, Diplomas and Certificates Awarded by Universities", Cat. No. 81-211, Annual, 1972-75, Education, Science and Culture Division, Ottawa.

TABLE 2

FULL-TIME UNDERGRADUATE ENROLMENTS AND PARTICIPATION RATES

	<u>MALES</u>		<u>FEMALES</u>	
	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATE TO BASE YEAR (1978)</u>	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATE TO BASE YEAR (1978)</u>
1972-73	163,583	108.4	103,020	81.6
1973-74	167,877	107.8	111,075	86.1
1974-75	171,464	106.8	122,050	92.5
1975-76	176,950	107.1	134,963	99.9
1976-77	174,430	105.0	139,297	100.6
1977-78	170,644	100.0	141,052	100.0

NOTE: The methodology used to calculate participation rates is explained in Appendix A.

SOURCE: MOSST, "University Enrolment Projections to 2000", Background Paper No. 15, (these estimates exclude foreign students).

TABLE 3

PART-TIME UNDERGRADUATE ENROLMENTS AND PARTICIPATION RATES

	<u>MALES</u>		<u>FEMALES</u>	
	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATE TO BASE YEAR (1978)</u>	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATE TO BASE YEAR (1978)</u>
1972-73	58,125	90.9	65,358	73.4
1973-74	57,128	86.6	70,940	77.5
1974-75	60,372	88.7	78,079	82.9
1975-76	67,518	96.1	86,179	89.1
1976-77	69,132	95.4	89,598	89.4
1977-78	74,557	100.0	102,887	100.0

NOTE: The methodology used to calculate participation rates is explained in Appendix A.

SOURCE: MOSST, "University Enrolment Projections to 2000", Background Paper No. 15.

TABLE 4

COMMUNITY COLLEGE (FULL-TIME)

	<u>MALE TRANSFER</u>	<u>FEMALE TRANSFER</u>	<u>MALE CAREER</u>	<u>FEMALE CAREER</u>
1972-73	38,286	24,933	62,931	47,089
1973-74	41,323	27,200	65,810	60,011
1974-75	41,102	31,235	65,023	66,945
1975-76	41,499	32,977	70,895	69,501
1976-77	42,722	33,797	71,662	73,497
1977-78	44,679	37,792	73,909	78,755

NOTE: Transfer students are those in community colleges who are enrolled in one or two-year academic programs after which students may proceed to university. Career or terminal students are those in community colleges who are enrolled in vocationally oriented programs which provide students with a recognized diploma or certificate, and which normally do not lead to further post-secondary study.

SOURCE: MOSST, "University Enrolment Projections to 2000", Background Paper No. 15.

TABLE 5

(1)

UNDERGRADUATE FOREIGN STUDENT ENROLMENT (FTE)

1972-73 - 1977-78

<u>YEAR</u>	<u>FTE STUDENT VISAS</u>	<u>% OF STUDENT¹ VISAS TO TOTAL ENROL. (FTE)</u>
1972-73	6948	2.5
1973-74	6438	2.2
1974-75	7084	2.3
1975-76	10569	3.5
1976-77	12376	3.6
1977-78	14852	4.4
1978-79	14811	4.5

NOTE: ¹Full-time equivalent enrolment is calculated on the basis that 3.75 part-time undergraduate enrolments equals 1 full-time enrolment.

SOURCE: Data obtained from Statistics Canada, Education, Science and Culture Division, Ottawa and Table 1 above.

TABLE 6

GRADUATE ENROLMENT AND DEGREES AWARDED 1972-1978

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Enrolments (FTE) ¹	36339	37617	39684	42451	43285	43983	43987
Full-time	29327	29540	31296	33175	33865	34398	34275
Part-time	17530	20192	20970	23190	23551	23962	24279
Degrees Awarded	11982	12559	12092	12908	13245	14081	14456

NOTE: ¹Full-time equivalent enrolment is calculated on the basis that 2.5 part-time graduate enrolments equals 1 full-time enrolment.

SOURCE: Statistics Canada, "University: Enrolments and Degrees", Cat. No. 81-204, Annual, 1972-1978 and "Degrees, Diplomas and Certificates Awarded by Universities", Cat. No. 81-211, Annual, 1972-75, Education, Science and Culture Division, Ottawa.

TABLE 7

FULL-TIME GRADUATE ENROLMENTS AND PARTICIPATION RATES

	<u>MALES</u>		<u>FEMALES</u>	
	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATES TO BASE YEAR (1978)</u>	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATES TO BASE YEAR (1978)</u>
1972-73	26,446	165.8	8,456	93.6
1973-74	26,141	155.3	8,984	96.4
1974-75	21,584	125.7	8,666	90.0
1975-76	21,486	121.1	9,746	98.5
1976-77	19,585	107.5	10,021	98.6
1977-78	18,740	100.0	10,454	100.0

NOTE: The methodology used to calculate participation rates is explained in Appendix A.

SOURCE: MOSST, "University Enrolment Projections to 2000", Background Paper No. 15, (these estimates exclude foreign students).

TABLE 8

PART-TIME GRADUATE ENROLMENTS AND PARTICIPATION RATES

	<u>MALES</u>		<u>FEMALES</u>	
	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATES TO BASE YEAR (1978)</u>	<u>ENROLMENTS</u>	<u>RATIO OF PART. RATES TO BASE YEAR (1978)</u>
1972-73	14,601	97.2	4,923	60.1
1973-74	16,340	105.5	6,139	72.7
1974-75	16,917	105.9	6,721	77.4
1975-76	18,017	109.4	7,901	88.5
1976-77	17,968	104.4	8,738	94.4
1977-78	17,710	100.0	9,512	100.0

NOTE: The methodology used to calculate participation rates is explained in Appendix A.

SOURCE: MOSST, "University Enrolment Projections to 2000", Background Paper No. 15, (these estimates exclude foreign students).

TABLE 9

GRADUATE FOREIGN STUDENT ENROLMENT (FTE)¹

<u>YEAR</u>	<u>STUDENT VISAS</u>	<u>% OF STUDENT VISAS TO TOTAL ENROLMENT</u>
1972-73	2950	8.1
1973-74	2451	6.5
1974-75	3487	8.8
1975-76	4403	10.4
1976-77	5106	11.8
1977-78	5975	13.6
1978-79	6017	13.7

NOTE: ¹Full-time equivalent enrolment is calculated on the basis that 2.5 part-time graduate enrolments equals 1 full-time enrolment.

SOURCE: Data obtained from Statistics Canada, Education, Science and Culture Division, Ottawa and Table 6 above.

TABLE 10

% FULL-TIME GRADUATE FOREIGN STUDENTS OF FULL-TIME

GRADUATE STUDENTS BY FIELD OF STUDY

1972-73 - 1978-79

<u>FIELD OF STUDY</u>	<u>1972- 1973</u>	<u>1973- 1974</u>	<u>1974- 1975</u>	<u>1975- 1976</u>	<u>1976- 1977</u>	<u>1977- 1978</u>	<u>1978- 1979</u>
Education	5.5	4.0	5.9	5.7	8.1	9.6	10.0
Humanities & Fine Arts	9.2	5.7	10.0	10.6	11.5	12.8	12.1
Social Sciences ¹	8.2	7.9	9.5	12.0	13.9	15.1	10.9
Agric. & Biol. Sc. ²	10.1	11.7	10.5	16.3	17.6	18.9	17.9
Eng. & Applied Sc.	16.5	15.3	18.8	22.1	22.0	27.6	30.3
Math. & Physical Sc.	10.5	10.1	12.0	17.1	21.5	25.3	28.0
Health	6.1	4.6	5.8	7.5	8.8	11.4	11.0

¹Includes law and commerce

²Includes forestry

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees",
Cat. No. 81-204, Annual, 1972-73 to 1978 and data obtained
from Education, Science and Culture Division, Ottawa.

II ENROLMENTS AND DEGREES AWARDED BY DISCIPLINE

(1) Undergraduate Level

Tables 11 to 19 show full-time enrolments (where available), degrees awarded and an estimate of the number of graduates who were available to take jobs, by major disciplinary group. The number of job seekers is a MOSST estimate, based on the number of degrees awarded and adjusted for such factors as foreign students, graduates continuing their studies instead of seeking employment, immigration, etc. (See Appendix B for details on these adjustments.)

The number of degrees awarded in the natural sciences, which include the physical sciences, engineering and the life sciences, grew at a 4% annual rate, from 13,200 in 1972-73 to 16,600 in 1978-79 (see Table 11). The estimated number of students available for employment increased at an annual rate of 2% from 11,400 to 12,800 over the same period. Two major factors account for the difference between degrees awarded and the number of job seekers:

- (i) a relative decrease in the number of degrees awarded to foreign students who are required to leave Canada after completion of their degrees; and
- (ii) a relative decrease in the number of immigrants. More details are shown in Appendix B, Tables B-1 and B-2.

Undergraduate enrolments in the engineering and applied sciences were almost constant from 1972 to 1974 but then began to rise steadily from 24,200 in 1974-75 to 32,100 in 1978-79. Degrees awarded showed no increase from 1972-73 to 1975-76 but then started to increase over the next three years reflecting the enrolment growth which began in the mid 1970s. The proportion of female degree holders in engineering was low (4% in 1977) in comparison to other fields and remained low over the 1970s. The proportion of undergraduates in engineering continuing their education full-time fell from 19% in 1972 to 15% in 1977. In the other natural sciences, the proportion continuing their education on a full-time basis fell from 26% to 24%. More information on enrolments and degrees awarded at the undergraduate level in engineering and applied sciences is given in Table 12 and Appendix Tables C-3, B-1 and B-2.

The number of undergraduate degrees awarded in the life sciences grew by 6% annually, from 4,500 in 1972 to 6,500 in 1978 (see Table 13). Most of this growth took place in the latter half of the 1970s and was largely due to an increase in the number of females. Degrees awarded to females grew by 19% yearly from 1972 to 1977. It is estimated that about 30% of all undergraduate degree holders in 1977 continued their education on a full-time basis. This proportion showed little change over the 1970s reflecting student preferences to continue their education. The estimated number of first degree holders potentially available to enter the job market, therefore, was correspondingly lower than the total number of degrees awarded over the 1970s. More details are shown in Appendix Tables B-1 and B-2.

Unlike engineering and the life sciences, the number of graduates from the physical sciences remained constant at about 4,200 over the period 1972 to 1978 (see Table 14).

Full-time undergraduate degrees awarded, and the estimated number of job seekers in the humanities and fine arts, increased marginally (2% per year) over the period 1972 to 1978. More details are shown in Table 15 and Appendix Tables B-1 and B-2.

In the health-related fields, full-time enrolments grew by 20%, while the number of degrees awarded and potential job seekers grew by nearly 50% over the period 1972 to 1977. The main reason for this discrepancy was the rapid growth in degrees awarded from 1972 to 1974 reflecting a high enrolment growth in the late 1960s and early 1970s. After 1974 degrees awarded grew by 10% and actually decreased between 1977 and 1978. More details are shown in Table 16 and Appendix Tables B-1 and B-2.

Full-time enrolments and degrees awarded in the education fields increased steadily at 2-3% yearly over the period 1972-78. Enrolments decreased in 1977 and 1978, and degrees awarded decreased in 1978 (see Table 17).

Degrees awarded in the social sciences increased by 2% per annum over the period 1972 to 1978. The potential number of job seekers is estimated to have increased little over the period. More details are shown in Table 18 and Appendix Tables B-1 and B-2.

Full-time enrolments and degrees awarded in the law and commerce fields increased rapidly over the 1970s, with enrolments increasing by 8% per year and degrees awarded at an even faster pace of 11% per year from 1972 to 1978. Undergraduate degrees awarded to females in these fields grew from 10% of the total in 1972 to 24% of the total in 1977. More details are provided in Table 19 and Appendix Tables B-1, B-2 and C-3.

Data for the individual fields of study shown in Tables 11 to 19 have been grouped into two categories. The first, general arts and science, includes the following disciplines: general arts, social sciences, humanities and fine arts, physical sciences and mathematics, and the life sciences. The second group consists of the more applied programs and includes: health, engineering, education, law, commerce, veterinary medicine, computer science and social work. Trends in these two broader groupings are discussed in the following section. The reason for the regrouping is to obtain an insight into the difference in trends related to the applied and career-oriented disciplines as compared with trends in the non-applied areas.

(a) General Arts and Science

Total full-time enrolments in these fields increased only marginally over the period 1972 to 1978, as shown in Table 20. Enrolments showed an actual decline from 1976 to 1978. The number of degrees awarded increased at a relatively low pace over the period 1972-78.

The trends in undergraduate general arts and science graduations have been associated with a number of inter-related factors. The growth rate in the 18-24 age group decreased to about 3% per annum over the 1970s, from a 4-5% yearly growth rate over the 1960s. Some 90% of the general arts and science enrolments is in the 18-24 age group, and thus the reduced growth in this age group has had a more pronounced affect on these fields than on other disciplines with different age compositions.

Judging from the results of recent surveys, job opportunities are a major concern of university students⁽²⁾. Throughout the 1970s, the unemployment rate for all university graduates was consistently lower than for those without university qualifications. Even within the youth age group (15-24), unemployment for university graduates was lower than for the other educational groups⁽³⁾. Nevertheless, several studies have indicated that, over the 1970s, larger proportions of university students from the general arts and science fields have been experiencing difficulty finding employment than graduates from other fields⁽⁴⁾.

The third major factor associated with the trends in enrolments and degrees awarded of the general arts and science graduates has been the rapid growth in the community college system. Some have argued that this is a reflection of a gradual shift in student preferences away from the general programs offered by the universities⁽⁵⁾.

-
- (2) A recent survey by the Secretary of State Department indicated that 14% of the university students sampled cited employment prospects and 23% cited career advancement as the most important reasons for choosing a particular program (see, "Some characteristics of post-secondary students in Canada", Education Support Branch, Department of the Secretary of State). In a survey conducted at the University of Western Ontario, 70% of the undergraduate students who responded felt university enrolment should be limited because of job market conditions (see "Western News", 14(13), March 30, 1978).
- (3) See, Statistics Canada, "The Labour Force", December 1977.
- (4) See for example, Office of Student Services, "Post graduation activities of 1975 UBC graduates in selected faculties". University of British Columbia, February, 1976; "Future Trends in Enrolment and Manpower Supply in Ontario", Z. Zsigmond et. al., Statistics Canada, Ottawa, 1976; and "Employment of 1976 University and College Graduates"; Education, Science and Culture Division, Statistics Canada.
- (5) See, for example, National Union of Students, "Education: a system in chaos, a case for planned education", March 1979.

The growth in female participation rates, on the other hand, has offset the negative effects on enrolments due to the slowdown in the 18-24 age group, the weak job market, and the rising preference for community college training. For example, 40% of the graduates in 1972 were women; and by 1977 this proportion had increased to 50%. More details are provided in Appendix Tables C-1, C-3, B-1 and B-2.

(b) Career-oriented Programs

Due to occupational and institutional requirements, the number of students permitted into the career-oriented or applied disciplines is controlled. The particular method of control varies from discipline to discipline and from province to province. For example, engineering and commerce and business programs are restricted in Alberta, Saskatchewan, Manitoba, Toronto, Queen's and Montreal. In most universities this is accomplished through a quota system and a floating grade requirement⁽⁶⁾. Education faculties and nursing schools restrict enrolments in all universities. Interviews and/or written language tests and available places are the methods used to control the number of entrants for these fields. In the case of law, medicine and dentistry, not only are enrolments controlled through professional examinations, but the absolute number of available places acts as the most influential control mechanism.

Despite these controls, enrolments and the number of graduations from the career-oriented fields increased at a much faster pace than the supply of graduates from the general arts and science fields. In total, enrolments and the number of graduates from these fields grew at an average annual rate of 5-6% per year from 1972 to 1978. This growth was not much different from that of the 1960s. More details on enrolments and degrees awarded in the applied fields of study are given in Table 20.

A major characteristic of this growth has been the increased participation of women. Proportionately more females have been entering these historically male-dominated fields. For example, the proportion of females graduating in the applied fields increased from 37% of the total in 1972 to 45% in 1977. Appendix Table C-3 provides more data on female degrees awarded.

(6) At present, Dalhousie is one exception. While operating at full capacity it does accept all qualified applicants.

The particular pattern of growth between 1972 and 1978 within the various applied fields depended on a mix of institutional and labour market factors. In the case of engineering, the supply was largely a function of labour market requirements. The number of graduates grew at about 4% per year which was sufficient to maintain a relatively balanced market. The number of graduates from the health and law fields grew at about 7% and 4% per year respectively, and this growth was mainly a function of available places within the professional schools. In general, many more people applied for these programs than the schools could accommodate. However, the schools in close consultation with the respective professional associations limited the number of openings in line with respective needs and costs of operating such professional schools.

The number of graduates in commerce and business grew at a rapid pace of 14% per year over the 1970s. This trend reflected the favourable market situation for the graduates in these fields. In the case of education, the number of graduates grew at about 3% per year. This was a dramatic change from the 17% annual growth rate over the 1960s. Lack of jobs in education due to the decline in the elementary and secondary school population, combined with the increased tendency by schools of education to reduce costs, were major factors accounting for this slowdown in the growth rate of the number of graduates.

(ii) Graduate Level

Enrolments and degrees awarded at the graduate level are shown in Tables 21 to 29 for the years 1972-73 to 1978-79. Also contained in these tables is an estimate of the number of potential job seekers, estimated with the aid of the methodology described in Appendix B.

Full-time masters enrolments in the natural sciences increased up to the year 1976-77 and then decreased to 1978-79. Full-time Ph.D. enrolments in the natural sciences decreased from a level of 4,300 in 1972-73 to 3,400 in 1978-79. Masters degrees awarded showed no significant increase from 1972 to 1978. Ph.D. degrees awarded decreased by 3% per annum from 1972 to 1977.

The estimated number of potential job seekers in the natural sciences decreased at a faster pace than degrees awarded over the period 1972 to 1977. This was mainly due to the estimated increase in degrees awarded to foreign

students (who are expected to leave the country after graduation), a slight increase in the number of degrees awarded to part-time students (who already have jobs), and a decrease in the number of immigrant degree holders. Further details on the natural science fields are shown in Tables 21, 22, 23 and 24, and in Appendix B, Tables B-3 and B-4.

Although full-time masters enrolments in the humanities and fine arts increased from 1972 to 1978, degrees awarded showed a marginal decline. At the Ph.D. level, full-time enrolments decreased slightly over the period 1972-73 to 1978-79, whereas degrees awarded increased from 200 in 1972 to 300 in 1975 and then decreased to 270 by 1978. Total graduate degrees awarded, and the number of potential job seekers, in the humanities and fine arts decreased marginally from 1972 to 1978. Further details are shown in Table 25 and Appendix B, Tables B-3 and B-4.

Both full-time masters enrolments and degrees awarded in the health fields increased over the 1970s - yearly enrolments grew from 570 in 1972-73 to 1,210 in 1978-79, and degrees awarded from 310 in 1972-73 to 520 in 1978-79. Ph.D. enrolments in the health fields decreased from 1972 to 1976 and then increased gradually for 1977-78 and 1978-79. Ph.D. degrees awarded gradually declined over the period 1972-73 to 1977-78 and increased slightly for 1978-79. Masters degrees increased from 313 to 517 over the period 1972-73 to 1978-79. In total, graduate degrees awarded increased 6% annually over the period 1972-73 to 1978-79. The estimated number of job seekers decreased, however, due to a slight increase in the number of degrees awarded to foreign and part-time students and a decrease in the number of immigrants. More detail is provided in Table 26 and Appendix Tables B-3 and B-4.

Full-time enrolments and degrees awarded at both the masters and Ph.D. levels increased rather steadily over the 1970s in the education and social science fields. In total, graduate degrees awarded increased yearly at about 8% from 1972 to 1978 for education. Much of this expansion could be accounted for by the growth in degrees to females. The proportion of degrees awarded to women grew from 28% in 1972 to 38% in 1977. In the social sciences, degrees awarded increased at 4% per year, whereas the number of potential job seekers remained relatively constant due to the increase in the number of degrees awarded to foreign students who are required to leave the country after graduation. More detail on enrolments and degrees awarded in these two fields of study is provided in Tables 27 and 28, and Appendix Tables B-3, B-4, C-2 and C-4.

At the masters level, full-time enrolments and degrees awarded increased significantly in the law and commerce fields during the 1970s. Ph.D. enrolments increased slightly, and growth in the number of degrees awarded remained relatively constant over the 1972-73 to 1978-79 period. The proportion of graduate degrees awarded to women in the commerce fields increased from 3% in 1972 to 14% in 1977. More details on enrolments and degrees awarded are shown in Table 29 and Appendix Tables B-3, B-4 and C-4.

The fields of study shown in the above tables are again divided into two groups. The disciplines included in the first group are the basic or fundamental sciences which include the social sciences, humanities and fine arts, physical sciences and mathematics and the life sciences. The second group is composed of the more applied fields of health, engineering, education, law, commerce, veterinary medicine, computer science and social work.

The number of enrolments and graduate degrees awarded in the basic or fundamental science fields showed very little growth over the 1970s. In total, degrees awarded and enrolments grew by 2% per year over the period 1972 to 1978 (see Table 30). These trends are in marked contrast to the expansion of the 1960s. For example, graduate degrees in these fields grew at about 15% per year from 1961-62 to 1970-71.

Characteristic features of the basic fundamental sciences are the relatively high "drop-out" rates of those enrolled, the relatively longer time required to obtain a graduate degree and a larger proportion of part-time studies. These features are reflected in the relatively low ratio of degrees awarded to enrolments. In 1977, for example, the ratio of degrees awarded to enrolments was 31% for the basic sciences compared to 41% for all fields. This 1977 ratio has fallen from a level of 35% in 1972, implying that fewer of the students enrolled in the latter part of the 1970s are going on to complete their degrees⁽⁷⁾.

The growth in graduate enrolments and degrees during the 1970s in the applied programs was relatively low. This is quite the opposite observed for undergraduate enrolments and degrees, which rose sharply over this period. Further details on graduate enrolments and degrees in the applied programs are shown in Table 30 and Appendix Table C-4.

(7) For a more detailed discussion see, Social Sciences and Humanities Research Council, "Report of the Commission on Graduate Studies in the Humanities and Social Sciences", Vol. I, Ottawa, 1978.

Education and commerce degrees awarded grew at annual rates of 9% and 11% respectively (from 1972 to 1977). A major reason for the expansion in the education disciplines was the increase in part-time enrolments. The number of business graduates has been increasing due to labour market demand. When education and commerce fields are excluded, graduate degrees in the applied fields category as a whole grew at about 1% per year.

As shown in Table 30, in the applied category, the ratio of degrees awarded to total full-time enrolment was about 55% to 60% throughout the 1970s. In comparison to the basic sciences, this ratio is rather high, and is a function of a lower proportion of part-time students, lower "drop out" rates, and generally a shorter time period required to complete a graduate degree, at least in the case of full-time students.

The factors associated with the trends in the basic and applied fields have been:

- a decreasing growth in the number of undergraduates in the basic and fundamental science fields which has reduced the number of students potentially available to undertake graduate studies in these fields;
- a relatively strong demand and resulting higher salaries for undergraduate degree holders in applied fields, which may have had some influence on the decisions by undergraduates to enter the job market rather than continue their studies in the applied sciences;
- a reduction in the number of new job openings in professions which have traditionally been filled by graduate students, particularly from the fundamental sciences. For example, there were few new job openings for faculty in the universities;
- a gradual reduction in the support of graduate students by both the provinces and the Federal Government. At the provincial level, for example, Ontario has frozen funding for graduate programs at the 1975-76 levels despite enrolment increases.

As well, Ontario graduate bursaries were terminated in 1975-76. At the federal level, the number of graduate students supported by the granting councils decreased at a 7% annual rate over the period 1970-71 to 1976-77;

- an increase in the participation of women in the basic sciences, which partly offset the decrease in male enrolments. For example, in 1972, 26% of the graduates were women. This proportion increased to 33% in 1977. (Based on data in Appendix Tables B-3, B-4 and C-2); and
- a relative increase in the proportion of female degree holders in the applied sciences. For example, the proportion of female graduate degree holders increased from 15% in 1972 to 28% in 1977. (Based on data in Appendix Tables B-3, B-4 and C-4.)

TABLE 11

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN THE NATURAL SCIENCES¹ 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY²</u>
1972-73	na	13156	11354
1973-74	na	12905	11994
1974-75	na	13551	12738
1975-76	na	14136	12875
1976-77	na	14806	12777
1977-78	na	15668	12792
1978-79	na	16589	na

NOTES: 1- Natural Sciences include Physical Sciences and Mathematics, Engineering and Applied Sciences and the Life Sciences.

2- Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix 'B'.

TABLE 12

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR ENGINEERING¹ & APPLIED SCIENCES 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY</u> ²
1972-73	21584	4449	4803
1973-74	21857	4426	5162
1974-75	24150	4494	5415
1975-76	26808	4325	5229
1976-77	29314	4595	5152
1977-78	31018	5042	5162
1978-79	32106	5758	na

NOTES: 1- Excludes Forestry.

2- Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix 'B'.

TABLE 13

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE LIFE SCIENCES¹ 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY²</u>
1972-73	na	4519	3340
1973-74	na	4401	3481
1974-75	na	4701	3729
1975-76	na	5562	4210
1976-77	na	6190	4465
1977-78	na	6439	4437
1978-79	na	6511	na

NOTES: ¹Includes Forestry.

²Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 14

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR MATH. & PHYSICAL SCIENCES 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY¹</u>
1972-73	na	4188	3211
1973-74	na	4078	3351
1974-75	na	4356	3594
1975-76	na	4249	3436
1976-77	na	4021	3160
1977-78	na	4187	3193
1978-79	na	4320	na

NOTE: ¹ Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees" Cat. No 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 15

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE HUMANITIES & FINE ARTS 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY¹</u>
1972-73	na	11157	8385
1973-74	na	10865	8512
1974-75	na	11604	9147
1975-76	na	12151	9205
1976-77	na	12042	8983
1977-78	na	12757	9303
1978-79	na	12704	na

NOTE: ¹ Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 16

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE HEALTH FIELDS 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY</u> ¹
1972-73	17148	3854	4824
1973-74	18298	4007	5323
1974-75	18969	4991	6259
1975-76	19818	5138	6118
1976-77	20607	5492	5960
1977-78	20533	5698	5959
1978-79	20608	5669	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 17
UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN EDUCATION 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY¹</u>
1972-73	33319	16019	14531
1973-74	33768	15285	13935
1974-75	35906	15332	14300
1975-76	41748	18420	16903
1976-77	43791	19604	18096
1977-78	42218	19853	18099
1978-79	38464	19514	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 18

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN SOCIAL SCIENCES¹ 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY²</u>
1972-73	na	14549	10000
1973-74	na	13591	9893
1974-75	na	13562	9832
1975-76	na	14522	10068
1976-77	na	14467	10152
1977-78	na	15727	10732
1978-79	na	16157	na

NOTES: ¹Excludes Law and Commerce.

²Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 19

UNDERGRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN LAW & COMMERCE 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>	<u>DEGREES AWARDED</u>	<u>ADJUSTED SUPPLY¹</u>
1972-73	26076	5808	5297
1973-74	29189	6233	5844
1974-75	32083	7634	7097
1975-76	35658	8335	7352
1976-77	38043	9081	8302
1977-78	39632	10004	8766
1978-79	42350	10879	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 20

FULL-TIME BACHELOR AND FIRST PROFESSIONAL ENROLMENTS AND DEGREES AWARDED 1972-1978

<u>Enrolments</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
General Arts and Sc. Programs	157415	164773	172440	178275	178502	174668	168084
Applied Programs	101293	106370	114888	127891	135401	137188	137463
TOTAL ¹	259203	271675	288006	307657	315272	312623	306794
<u>Degrees Awarded²</u>							
General Arts and Sc. Programs	41313	39469	41031	42339	42678	44719	46098
Applied Programs	31250	31227	33961	37680	40598	42376	43184
TOTAL	72563	70696	74992	80019	83276	87095	89282

NOTES: ¹Included in total enrolments are the "other and not reported" categories.

²Computer Science is included in general arts and science programs for 1978 while for all other years it is included in applied programs.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees",
Cat. No. 81-204, Annuals, 1972-73 to 1978.

TABLE 21

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED SUPPLY
IN THE NATURAL SCIENCES¹ 1972-1978

YEAR	ENROLMENTS			DEGREES AWARDED			ADJUSTED SUPPLY ²		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	5046	4280	9326	2537	1025	3562	2479	1322	3801
1973-74	5178	3890	9068	2409	1106	3515	2437	1460	3897
1974-75	5441	3594	9035	2197	1022	3219	2232	1382	3614
1975-76	6203	3633	9836	2216	879	3095	2122	1151	3273
1976-77	6447	3702	10149	2468	766	3234	2166	925	3091
1977-78	6255	3594	9849	2699	800	3499	2238	913	3151
1978-79	5995	3423	9418	2661	848	3509	na	na	na

NOTES: ¹ Natural Sciences = Math. and Physical Sc., Engineering, Architecture and Life Sciences.

² Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 22

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED SUPPLY
FOR ENGINEERING¹ & APPLIED SCIENCES 1972-78

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY²</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	1955	1178	3133	987	258	1245	1011	316	1327
1973-74	1955	1047	3002	973	290	1263	1017	351	1368
1974-75	2174	986	3160	902	295	1197	940	371	1311
1975-76	2431	971	3402	857	209	1066	877	272	1149
1976-77	2357	978	3335	991	181	1172	910	224	1134
1977-78	2383	950	3333	1097	198	1295	912	227	1139
1978-79	2194	852	3046	1102	218	1320	na	na	na

NOTES: ¹Excludes Forestry.

²Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 23

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE LIFE SCIENCES¹ 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY²</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	1144	945	2089	583	243	826	599	323	922
1973-74	1299	933	2232	511	259	770	546	351	897
1974-75	1283	863	2146	477	253	730	515	336	851
1975-76	1611	924	2535	531	247	778	530	315	845
1976-77	1915	981	2896	618	207	825	570	250	820
1977-78	1889	974	2863	674	233	907	606	262	868
1978-79	1901	985	2886	682	245	927	na	na	na

NOTES: ¹Includes Forestry

²Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 24

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED SUPPLY
IN MATH. & PHYSICAL SCIENCES, 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY¹</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	1947	2157	4104	957	524	1481	869	683	1552
1973-74	1924	1910	3834	925	557	1482	874	758	1632
1974-75	1984	1745	3729	821	478	1299	777	675	1452
1975-76	2161	1738	3899	831	425	1256	715	564	1279
1976-77	2175	1743	3918	864	381	1245	686	451	1137
1977-78	1983	1670	3653	935	375	1310	720	424	1144
1978-79	1900	1586	3486	877	385	1262	na	na	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 25

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE HUMANITIES & FINE ARTS 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY¹</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	4477	2108	6585	2359	208	2567	2182	262	2444
1973-74	4405	1990	6395	2366	233	2599	2331	304	2635
1974-75	4811	2044	6855	2116	268	2384	2122	321	2443
1975-76	4883	2000	6883	2211	301	2512	2191	351	2542
1976-77	4975	2054	7029	2075	253	2328	2065	274	2339
1977-78	5310	2022	7332	2175	267	2442	2116	289	2405
1978-79	5323	1905	7228	2198	266	2464	na	na	na

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NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 26

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY FOR THE HEALTH FIELDS 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY ¹</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	568	527	1095	313	151	464	382	158	540
1973-74	684	470	1154	343	178	521	421	183	604
1974-75	866	435	1301	305	153	458	396	161	557
1975-76	923	478	1401	382	122	504	444	125	569
1976-77	1008	474	1482	398	105	503	401	104	505
1977-78	1035	506	1541	436	105	541	414	101	515
1978-79	1207	591	1798	517	125	642	na	na	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 27

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN EDUCATION 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY¹</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	1893	654	2547	1721	109	1830	1069	88	1157
1973-74	2095	659	2754	1952	122	2074	1109	89	1198
1974-75	2049	679	2728	1992	128	2120	1032	101	1133
1975-76	2472	722	3194	2161	155	2316	1074	123	1197
1976-77	2635	748	3383	2354	157	2511	1109	107	1216
1977-78	2683	759	3442	2594	173	2767	1224	111	1335
1978-79	2600	834	3434	2825	157	2982	na	na	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 28

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED
SUPPLY IN SOCIAL SCIENCES¹ 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY²</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	4792	2087	6879	2196	215	2411	2089	269	2358
1973-74	5082	2189	7271	2314	275	2589	2177	336	2513
1974-75	5409	2249	7658	2306	311	2617	2030	359	2389
1975-76	5781	2366	8147	2434	346	2780	2089	360	2449
1976-77	6018	2580	8598	2583	389	2972	2230	363	2593
1977-78	6139	2609	8748	2600	342	2942	2048	319	2367
1978-79	6167	2582	8749	2718	400	3118	na	na	na

NOTES: ¹Excludes Law and Commerce.

²Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 29

GRADUATE FULL-TIME ENROLMENTS, DEGREES AWARDED AND ADJUSTED SUPPLY
IN LAW AND COMMERCE 1972-1978

<u>YEAR</u>	<u>ENROLMENTS</u>			<u>DEGREES AWARDED</u>			<u>ADJUSTED SUPPLY¹</u>		
	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>	<u>MA</u>	<u>PhD</u>	<u>TOTAL</u>
1972-73	2315	118	2433	1163	16	1179	1201	19	1220
1973-74	2542	97	2639	1269	15	1284	1348	24	1372
1974-75	2756	108	2864	1323	14	1337	1555	21	1576
1975-76	2988	132	3120	1678	26	1704	1669	32	1701
1976-77	2940	120	3060	1753	21	1774	1637	27	1664
1977-78	3121	141	3262	1947	15	1962	1873	21	1894
1978-79	3229	164	3393	1811	23	1834	na	na	na

NOTE: ¹Adjusted supply is an estimate by MOSST of the number of recent university graduates who are available for employment. A detailed explanation is contained in Appendix B.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

TABLE 30

FULL-TIME GRADUATE ENROLMENTS AND DEGREES AWARDED 1972-1978

<u>Enrolments</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Basic Sciences	18943	18988	19748	20807	21762	21816	21461
Applied Sciences	9922	10293	10693	11774	11939	12358	12559
TOTAL ¹	29327	29540	31296	33175	33865	34398	34275
 <u>Degrees Awarded</u>							
Basic Sciences	6572	6822	6236	6605	6722	6778	7324
Applied Sciences	5420	5737	5856	6133	6523	7303	7132
TOTAL	11992	12559	12092	12738	13245	14081	14456

NOTE: ¹Total enrolments include unreported specializations.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees",
Cat. No. 81-204, Annuals, 1972-73 to 1978 and Appendix B.

III REGIONAL TRENDS

From 1974 to 1978, the number of undergraduate degrees awarded in the human, natural and health sciences for Canada as a whole rose from 74,851 to 89,282, or by 4.5% per annum. The Quebec growth rate was 7% per annum followed by 6% in Ontario, 3% in the Western provinces, and a decline in the Atlantic provinces.

In the Atlantic provinces the decrease in the number of undergraduate degrees was due to a decrease in participation rates. The growth in degrees awarded in the Western provinces was due mainly to the growth in the population base and in Ontario and Quebec degrees awarded grew mainly as a result of increased participation rates.

In the human sciences⁽⁸⁾, Quebec and Ontario accounted for 67% of total undergraduate degrees in 1978, an increase from 62% in 1974. The number of degrees in the human sciences from the Atlantic region actually decreased, while the number of degrees from the Western provinces increased slightly from 1974 to 1978, barely maintaining the share in the total.

In the natural sciences⁽⁹⁾, the proportion of undergraduate degrees from Quebec increased from 20% of the national total in 1974 to 23% in 1978. Ontario also increased its share slightly from 41% to 42% of the total. The share of graduates from the Western provinces decreased (28% to 25%), as did the share from the Atlantic region (12% to 10%).

In the health sciences in 1978, Quebec produced the largest number of undergraduate degrees awarded (32%), followed by Ontario (31%), the Western provinces (28%), and the Atlantic provinces (9%). Compared with 1974, the Western provinces' share rose from 26% and the Atlantic provinces' share fell from 12%.

(8) Human sciences refers to the social sciences and humanities including education and law.

(9) The natural sciences are defined to include the physical sciences and mathematics, the life sciences and engineering.

The number of undergraduate degrees awarded in the four regions for the years 1974 to 1978 are given in Table 31 below.

Regarding graduate degrees awarded in the human, natural and health sciences in 1978, half the degrees were given in Ontario (50%), followed by Quebec (24%), the Western provinces (20%) and the Atlantic region (6%).

In the Atlantic provinces, graduate degrees awarded in these fields grew by 6% per year from 1971 to 1978, and the growth was mainly due to an increase in the population base rather than changes in participation rates. Graduate degrees awarded in Quebec also increased by 6% per year over this period, but the increase was due to a combination of increased participation rates and growth in the population base. In Ontario and the Western provinces the number of degrees awarded increased by only 3% and 1% per annum respectively, and participation rates in these regions declined over this period.

In the human sciences, over half (52%) of the graduates came from Ontario, in 1978 (compared with 55% in 1971), 23% came from Quebec (increasing from 20% in 1971); 18% from the Western provinces; and 7% from the Atlantic.

In the natural sciences, the total number of graduate degrees awarded declined from 3705 in 1971 to 3509 in 1978. The low point in the decline was 1975, and some of the lost ground has since been recovered. Only in Quebec was the 1971 level of graduates in the natural sciences exceeded in 1978, raising its share in the total to 25%. Ontario's share in 1978 was 45%, the West's 25%, and the Atlantic provinces' 5%.

The number of total health science graduates rose from 379 in 1971 to 549 in 1978. The bulk of the increases took place in Quebec and Ontario, in about equal terms. The number of graduates from Western universities in this field remained at about the same level over these years, around 100. There were 37 graduates in the Atlantic provinces in 1978.

More details on graduate degrees in the natural, health and human sciences in the various regions for the years 1971 to 1978 are given in Table 32.

TABLE 31

BACHELOR AND FIRST PROFESSIONAL DEGREES AWARDED FOR THE HUMAN,
 NATURAL AND HEALTH SCIENCES BY REGION AT CANADIAN UNIVERSITIES,
 1974-1978

<u>SCIENCE</u>	<u>REGION</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Human Sc.	Atlantic	6226	6076	6249	6098	6163
	Quebec	10831	12177	11644	13388	14563
	Ontario	19069	23404	25087	26000	25187
	Western	11848	11764	12214	12778	13341
	CANADA	47974	53421	55194	58264	59254
Natural Sc.	Atlantic	1561	1572	1584	1582	1585
	Quebec	2760	3254	3176	3760	3886
	Ontario	5499	6032	6246	6482	6959
	Western	3725	3616	3800	3841	4159
	CANADA	13545	14474	14806	15665	16589
Health	Atlantic	576	523	482	505	520
	Quebec	1576	1615	1819	1879	1795
	Ontario	1540	1598	1726	1768	1739
	Western	1299	1401	1464	1545	1615
	CANADA	4991	5137	5491	5697	5669
No Specialization	Atlantic	695	546	535	379	307
	Quebec	362	96	189	231	425
	Ontario	5578	5479	5852	6028	5829
	Western	1706	1584	1209	1092	1209
	CANADA	8341	7705	7785	7730	7770
TOTAL	Atlantic	9058	8717	8850	8564	8575
	Quebec	15529	17142	16828	19258	20669
	Ontario	31686	36513	38911	40278	39714
	Western	18578	18365	18687	19256	20324
	CANADA	74851	80737	83276	87356	89282

SOURCE: Statistics Canada, "Degrees, Diplomas and Certificates Awarded by Universities", Cat. No. 81-211, Annuals, 1974 and 1975 and "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1976-1978, Education Science and Culture Division, Ottawa.

TABLE 32
GRADUATE DEGREES AWARDED BY SCIENCE AND REGION AT CANADIAN UNIVERSITIES,
1971-1978

<u>SCIENCE</u>	<u>REGION</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Human Sc.	Atlantic	345	369	469	461	500	518	641	691
	Quebec	1443	1451	1765	1787	2028	2035	2164	2423
	Ontario	3919	4418	4600	4576	5058	5232	5432	5366
	Western	1472	1749	1712	1634	1725	1800	1874	1918
	CANADA	7179	7987	8546	8458	9311	9585	10111	10398
Natural Sc.	Atlantic	253	233	208	215	188	200	183	189
	Quebec	761	564	684	649	692	647	792	866
	Ontario	1648	1745	1581	1497	1548	1569	1677	1578
	Western	1043	1010	1042	858	744	821	846	876
	CANADA	3705	3552	3515	3219	3172	3237	3498	3509
Health Sc.	Atlantic	9	11	19	7	6	16	9	37
	Quebec	138	144	198	177	148	163	196	202
	Ontario	138	176	179	142	160	165	181	212
	Western	94	112	102	89	111	82	82	98
	CANADA	379	443	498	415	425	426	468	549
TOTAL SC.	Atlantic	607	613	696	683	694	734	833	917
	Quebec	2342	2159	2647	2613	2868	2845	3152	3491
	Ontario	5705	6339	6360	6215	6766	6966	7290	7156
	Western	2609	2871	2856	2581	2580	2703	2802	2892
TOTAL	CANADA	11263	11982	12559	12092	12908	13248	14077	14456

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1971-1978, Education, Science and Culture Division, Ottawa.

IV TRENDS IN ENROLMENT BY UNIVERSITY

In 1972 and 1977, 78% of full-time enrolments at the first degree level were concentrated in 20 universities, with the remaining 28 universities accounting for the remainder. With few exceptions, the concentration of enrolments in the various large universities did not change over this period. By 1977, Memorial and Dalhousie were replaced by Concordia and Windsor in the group of 20 largest universities. More details are provided in Table 33 below.

Full-time enrolments at the graduate level at selected universities are shown in Table 34. Twenty universities accounted for about 89% of graduate enrolments, and this proportion did not change between 1971 and 1977. With few exceptions, the universities with the largest undergraduate enrolments also accounted for the largest graduate enrolments.

TABLE 33

FULL-TIME ENROLMENTS AT THE BACHELOR AND FIRST PROFESSIONAL
LEVEL AT SELECTED CANADIAN UNIVERSITIES BY REGION 1972-1977

REGION	1972			1977		
	UNIVERSITY	NO. ENROLLED	PERCENT	UNIVERSITY	NO. ENROLLED	PERCENT
ATLANTIC	- Memorial ¹	6740				
	- Dalhousie ¹	4957				
		<u>11697</u>	4.73			
QUEBEC	- Montreal	9898		- Laval	14315	
	- Laval	8596		- McGill	11811	
	- Quebec	8192		- Quebec	11608	
	- McGill	8159		- Montreal	10653	
				- Concordia	8762	
		<u>34845</u>	14.09		<u>57149</u>	19.28
ONTARIO	- Toronto	21638		- Toronto	25028	
	- Waterloo	11436		- Western	13239	
	- Western	10862		- Waterloo	13154	
	- York	9853		- York	10995	
	- Queen's	7679		- Ottawa	9093	
	- Carleton	7085		- Queen's	9001	
	- Guelph	6937		- Guelph	8996	
	- McMaster	6920		- McMaster	8710	
	- Ottawa	6738		- Carleton	7444	
			- Windsor	5980		
		<u>89148</u>	36.06		<u>111640</u>	37.67
WEST	- U.B.C.	14956		- U.B.C.	16816	
	- Alberta	14667		- Alberta	16483	
	- Manitoba	10611		- Manitoba	10686	
	- Saskatchewan	8092		- Calgary	9494	
	- Calgary	7735		- Saskatchewan	8964	
		<u>56061</u>	22.67		<u>62443</u>	21.07
TOTAL 20 Universities		<u>191751</u>	77.56		<u>231232</u>	78.02
TOTAL 48 Universities		<u>247244</u>	100.00		<u>296383</u>	100.00

NOTE: In 1977, the number enrolled at Memorial University was 4525 and Dalsousie, 5441.

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, 1977 and "Fall Enrolment in Universities", Cat. No. 81-204, 1972-73 and 1973-74.

TABLE 34

FULL-TIME ENROLMENTS AT THE MASTERS AND PHD LEVELS AT SELECTED
CANADIAN UNIVERSITIES BY REGION 1972-1977

REGION	UNIVERSITY	1972		UNIVERSITY	1977	
		NO. ENROLLED	PERCENT		NO. ENROLLED	PERCENT
ATLANTIC	- Dalhousie	698		- Dalhousie	931	
		<u>698</u>	2.46		<u>931</u>	2.80
QUEBEC	- McGill	2326		- McGill	3066	
	- Montreal	1574		- Montreal	1766	
	- Laval	1203		- Laval	1613	
	- Sherbrooke	708		- Sherbrooke	1158	
				- Quebec	866	
				- Concordia	659	
		<u>5811</u>	20.44		<u>9128</u>	27.41
ONTARIO	- Toronto	3699		- Toronto	4387	
	- Western	1398		- Western	1618	
	- McMaster	1171		- York	1203	
	- Waterloo	1136		- Waterloo	1184	
	- Ottawa	1044		- McMaster	1126	
	- York	900		- Ottawa	1112	
	- Queen's	888		- Queen's	1112	
	- Carleton	577		- Carleton	896	
	- Guelph	487				
			<u>11300</u>	39.75		<u>12638</u>
WESTERN	- U.B.C.	2553		- U.B.C.	2077	
	- Alberta	1853		- Alberta	1840	
	- Manitoba	1066		- Manitoba	1242	
	- Simon Fraser	789		- Calgary	914	
	- Calgary	781		- Simon Fraser	659	
	- Saskatchewan	461				
		<u>7503</u>	26.39		<u>6732</u>	20.22
TOTAL 20 Universities		<u>25312</u>	89.03		<u>29429</u>	88.38
TOTAL 48 Universities		<u>28431</u>	100.00		<u>33298</u>	100.00

SOURCE: Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, 1977 and "Fall Enrolment in Universities", Cat. No. 81-204, 1972-73 and 1973-74.

APPENDIX A

A Technical Note on the Methodology used to
Calculate Participation Rate Indices

APPENDIX A

A TECHNICAL NOTE ON THE METHODOLOGY USED
TO CALCULATE PARTICIPATION RATE INDICES

Traditionally, participation rates are defined as the ratio of enrolment to population, for a given aggregate, such as total full-time undergraduate enrolment as a percentage of the 18-21 population. Published data also provide such aggregate rates by sex.

However, such synthetic rates mask two factors that could offset the movement in aggregate participation rates:

- the actual university enrolment consists not only of persons in a specified age group such as 18-21, or 18-24, but contains some younger, and certainly many older persons. Further, the proportions of the under and over-aged persons are not constant over time; and
- the under and over-aged proportions vary significantly from one category of enrolment to the next, and also by sex. For example, distribution by single-year of age for undergraduate full-time male students is significantly different from that of part-time graduate females, etc. (Eight categories of enrolment with reasonably homogeneous distributions have been identified in another MOSST paper - see "University Enrolment Projections to 2000", p. 14.)

In computing participation rates, therefore, it is necessary to remove the distorting effects of changes in the various age distributions. The approach proposed here is to express participation changes in terms of rates for single-year age groups within each category of enrolment; and in terms of indices for aggregate categories of enrolment. (The categories of enrolment are undergraduate full-time male, graduate part-time female, etc.) The indices proposed here express the changes over time in the participation behaviour of a particular enrolment category net of any age shift effects.

In algebraic form, for a given male or female enrolment category, the aggregate participation rate index is defined as:

$$I_t = \left[\frac{\sum_i \left[\frac{E_t^i}{P_t^i} P_{(1977-78)}^i \right]}{\sum_i E_{(1977-78)}^i} \right] .100$$

where: E_t = enrolment for a specific age-sex group, in year t.

P_t = population for a specific age-sex group, in year t.

I_t = index of aggregate participation rate.

t = 1972-73 to 1977-78.

i = 28 age groups, (single years 17-40, and 5-year bands to 55+).

The participation rate for an individual single-year age group of enrolment, by sex, within a given category of enrolment is E_t^i / P_t^i .

APPENDIX B

Methodology for Estimation of Adjusted Supply

APPENDIX B

METHODOLOGY FOR THE ESTIMATION OF ADJUSTED SUPPLY

The purpose of this appendix is to detail the methodology used to calculate the number of university graduates from all sources who are potential labour market entrants each year for the period 1972 to 1977. Not all graduates of Canadian universities are available to enter the labour market. Some are foreign students who must return to their home country. Others received their degrees on a part-time basis and are already members of the labour force⁽¹⁾. Still other graduates continue their education and are therefore, not available to take jobs. Thus, in order to calculate the number of graduates from Canadian universities potentially available to enter the labour force, the estimates of the number of degrees awarded are reduced by the number of (visa) foreign students returning home, part-time graduates, and students continuing their education.

In addition to graduates from Canadian universities as adjusted above, two other sources provide the country with graduates available for the labour market. These are Canadian students who have studied in another country and return home, and immigrants.

These adjustments have been carried out by use of data from Statistics Canada and the Canada Employment and Immigration Commission. The procedure used in these calculations is as follows:

1. Degrees Awarded from 1974 to 1977 by 70 fields of study (FOS) and 3 degree levels were obtained from Statistics Canada. Prior to 1974 the disaggregation by FOS was often not detailed enough to provide for 70 fields of study. When this was the case, the appropriate aggregate groups were broken into individual FOS using the 1973-74 distribution for the group.

(1) Full-time students with part-time jobs are considered, for purposes of this analysis, to be potential labour market entrants.

2. Degrees Awarded to Students remaining in Canada were estimated as follows:
 - (a) It was assumed that the percentage of degrees awarded to foreign students in a given FOS and degree level depends on the level of their enrolment relative to native Canadians. Accordingly, degrees awarded were multiplied by percent full-time (FT) foreign enrolment. Full-time foreign student enrolment was obtained from Statistics Canada.
 - (b) The result from (a) was subtracted from degrees awarded to produce degrees awarded to students remaining in Canada.

3. The number of Students Continuing their Education Full-Time for each field of study was estimated as follows:
 - (a) Canadian BAs continuing FT
= BAs (from 2(b)) X % BAs continuing their education
(from HQMPS)(2) X $\frac{\text{FT MA Enrolments}}{\text{Total MA Enrolments}}$

 - (b) Canadian MAs continuing FT
= MAs (from 2(b)) X % MAs continuing their education
(from HQMPS) X $\frac{\text{FT PhD Enrolments}}{\text{Total PhD Enrolments}}$

 - (c) PhD = 0, since PhD is terminal degree

4. Degrees Awarded to Part-Time Students were calculated as follows:
 - (a) The number of students continuing their education on a full-time basis (from 3) were subtracted from the number of degrees awarded to students remaining in Canada 2(b). This step yields an estimate of degrees awarded to students finishing their education on a full-time basis plus part-time graduates.

(2) Highly Qualified Manpower Post-Censal Survey, Statistics Canada, 1973.

- (b) In order to calculate full-time students completing their full-time education the results from 4(a) were multiplied by the following ratio for each field of study:

Full-time Enrolment (Canadian)

Total Full-Time Equivalent (FTE) Enrolment (Canadian)
is derived in the following way:

- (i) Full-time (FT) enrolment Canadian
= FT enrolment X (1-% foreign enrolment
(from 2(a))
- (ii) Total FTE Enrolment (Canadian) =
FT Enrolment (Canadian) +
Part-time Enrolment (Canadian)
FTE Factor
as there are some foreign students studying on
a part-time basis.
- (iii) FTE Factor = 3.75 for BA and;
2.5 for MA and PhD
- (c) Part-time graduates were then calculated by
subtracting the results of 4(b) from 4(a).

It should be noted that this indirect method of calculation is likely to result in an overestimate of part-time graduates. The reason for this is that part-time enrolment is concentrated at the lower levels of enrolment, whereas the method used here assumes the same proportionate incidence throughout all levels of enrolment. (It would be possible, with additional effort, to derive direct estimates based on enrolments from Statistics Canada USIS file and the 1976 Survey of Graduates.)

5. Domestic supply = degrees awarded less degrees awarded to visa students (step 2(a) above), less degrees awarded to students continuing their education full-time (step 3 above), less part-time graduates (step 4 above).

6. Immigration by Field of Study (FOS) was estimated as follows:
- (a) Immigration by intended occupation data were obtained from the Employment and Immigration Commission for the years 1972 to 1976.
 - (b) Non-HQM occupations were excluded.
 - (c) For each year, each occupation was multiplied by the relevant percent degree requirement from the HQM demand model.
 - (d) The resulting matrices (5 X 68) were then post-multiplied by each of the 3 planes of the occupation by education matrix of the HQM demand model⁽³⁾ (68 X 70) to produce three matrices (5 X 70) of immigration by FOS and degree level.
7. Number of Canadians Receiving Degrees Abroad and Returning to Canada
- (a) Table 10 of the HQMPS provides estimates by field of study of the number of persons born in Canada and residing in Canada by 3 categories:
 - 1) Receiving all degrees in Canada;
 - 2) Receiving all degrees abroad; and
 - 3) Receiving degrees both in Canada and abroad.
 - (b) For most fields of study it was assumed that all people who earned degrees both in Canada and abroad earned their first level degree in Canada and their second or third level degree abroad. For all fields it was assumed that those people who earned all their degrees abroad were divided in first level versus second and third level according to the respective proportions for the FOS from Table 1 of the HQMPS⁽⁴⁾. For the following FOS, the first assumption (concerning degrees earned both in Canada and abroad) did not prove tenable:

(3) See "MOSST, HQM Demand Model, Methodology". This report is available on request from the Communications Services Division, Ministry of State for Science and Technology.

(4) Statistics Canada, "HQMPS Survey, 1973, Final Weighted Tables".

- 1) All Health
- 2) Architecture
- 3) General Science - No major
- 4) All Education
- 5) Law
- 6) Accounting

In all of these FOS (except 3) the first level degree is often obtained after a degree in another FOS. As well, advanced degrees are not offered in General Science - No Major.

Accordingly, for these FOS, the degrees earned by Canadian-born people whether all abroad or only partially abroad were assumed to be divided according to the same ratio of first to second and third levels of the total stock for the FOS according to Table 1.

- (c) The results of these calculations yield estimates of the first and advanced degree levels by FOS earned abroad by Canadians. These are divided by the relevant stock totals from Table 1 of the HQMPS to obtain ratios, which are then multiplied by the number of degrees awarded by FOS and level (BA vs MA + PhD) for each year to obtain an estimate of Canadians returning home. The advanced level degrees are then divided into MA vs PhD according to the ratio of MA vs PhD degrees awarded for each FOS for each year. (This is equivalent to multiplying the MA and PhD degrees awarded separately by the same ratio.)
8. Adjusted supply = domestic supply + immigration by field of study + the number of Canadians receiving degrees abroad and returning home, as shown in Tables B-1 to B-4. It should be noted that adjusted supply is likely to be slightly overestimated because the calculation did not take account of the number of Canadian graduates who emigrate, or leave Canada to continue their studies abroad.

APPENDIX TABLE B-1

COMPONENTS OF ADJUSTED SUPPLY BY MAJOR FIELD OF STUDY
BA's - 1972

MAJOR FIELDS OF STUDY

	MINUS	EQUALS	MINUS	MINUS	EQUALS	PLUS	PLUS	EQUALS	
	DEGREES AWARDED	FOREIGN DEGREES AWARDED	DEGS. AW. TO STUDENTS REM. IN CANADA	DEGS. AW. TO STUDENTS CONT. FT EDUCATION	PART TIME STUDENTS (1)	DOMESTIC SUPPLY	CANADIANS RETURNING HOME	IMMIGRANTS	ADJUSTED SUPPLY
HEALTH	3,854	100	3,754	351	60	3,344	177	1,302	4,824
ENGINEERING	4,449	428	4,021	827	24	3,170	140	1,492	4,803
LIFE SCIENCES	4,519	171	4,348	1,436	22	2,891	71	377	3,340
PHYSICAL SCIENCES AND MATHEMATICS	4,188	276	3,912	1,221	86	2,604	45	564	3,211
HUMANITIES AND FINE ARTS	11,157	418	10,739	2,945	506	7,289	335	762	8,385
EDUCATION	16,019	210	15,809	1,494	1,656	12,660	985	826	14,531
LAW	2,152	110	2,042	209	2	1,831	94	66	1,992
COMMERCE	3,656	186	3,470	410	254	2,806	189	310	3,305
SOCIAL SCIENCES	14,549	743	13,806	3,766	790	9,253	239	590	10,080
GENERAL ARTS	8,020	409	7,611	5,237	331	2,043	73	205	2,321
TOTAL	72,563	3,051	69,512	17,896	3,731	47,891	2,348	6,554	56,792

NOTE: (1) Difference between degrees awarded to students completing their education and degrees awarded to FT students completing their FT education.

(2) Differences are due to rounding.

APPENDIX TABLE B-2

COMPONENTS OF ADJUSTED SUPPLY BY MAJOR FIELD OF STUDY
BA's - 1977

MAJOR FIELDS OF STUDY

	DEGREES	MINUS	EQUALS	MINUS	MINUS	EQUALS	PLUS	PLUS	EQUALS
	AWARDED	FOREIGN DEGREES AWARDED	DEGS. AW. TO STUDENTS REM. IN CANADA	DEGS. AW. TO STUDENTS CONT. FT EDUCATION	PART TIME STUDENTS (1)	DOMESTIC SUPPLY	CANADIANS RETURNING HOME	IMMIGRANTS (1)	ADJUSTED SUPPLY
HEALTH	5,698	149	5,549	444	81	5,025	239	694	5,959
ENGINEERING	5,042	483	4,559	736	57	3,764	170	1,228	5,162
LIFE SCIENCES	6,439	245	6,195	1,981	134	4,080	108	250	4,437
PHYSICAL SCIENCES AND MATHEMATICS	4,187	276	3,911	1,055	107	2,749	42	402	3,193
HUMANITIES AND FINE ARTS	12,757	488	12,269	3,266	866	8,139	463	702	9,303
EDUCATION	19,853	255	19,595	1,321	2,026	16,248	1,223	629	18,099
LAW	2,707	138	2,569	162	11	2,396	118	68	2,582
COMMERCE	6,984	356	6,628	670	485	5,473	366	344	6,184
SOCIAL SCIENCES	15,703	801	14,902	3,714	1,178	10,011	256	465	10,732
GENERAL ARTS	7,725	394	7,331	5,044	276	2,011	70	186	2,267
TOTAL	87,095	3,588	83,508	18,393	5,221	59,896	3,055	4,968	67,918

NOTE: (1) Difference between degrees awarded to students completing their education and degrees awarded to FT students completing their FT education.

(2) Differences are due to rounding.

APPENDIX TABLE B-3

COMPONENTS OF ADJUSTED SUPPLY BY MAJOR FIELD OF STUDY
GRADS - 1977

MAJOR FIELDS OF STUDY

	DEGREES AWARDED	MINUS FOREIGN DEGREES AWARDED	EQUALS DEGS. AW. TO STUDENTS REM. IN CANADA	MINUS DEGS. AW. TO STUDENTS CONT. FT EDUCATION	MINUS PART TIME STUDENTS (1)	EQUALS DOMESTIC SUPPLY	PLUS CANADIANS RETURNING HOME	PLUS IMMIGRANTS	EQUALS ADJUSTED SUPPLY
HEALTH	541	43	498	38	53	405	18	92	515
ENGINEERING	1,295	362	934	124	176	633	273	235	1,139
LIFE SCIENCES	894	162	733	112	54	567	199	100	868
PHYSICAL SCIENCES AND MATHEMATICS	1,310	314	996	148	98	750	186	212	1,144
HUMANITIES AND FINE ARTS	2,442	203	2,239	346	342	1,554	595	258	2,405
EDUCATION	2,767	428	2,339	167	1,091	1,081	170	84	1,335
LAW	150	17	133	6	48	79	6	11	96
COMMERCE	1,919	68	1,851	120	512	1,218	434	145	1,798
SOCIAL SCIENCES	2,763	489	2,274	286	344	1,643	454	272	2,367
TOTAL	14,081	2,086	11,997	1,347	2,718	7,930	2,335	1,409	11,667

NOTE: (1) Difference between degrees awarded to students completing their education and degrees awarded to FT students completing their FT education.

(2) Differences are due to rounding.

APPENDIX TABLE B-4

COMPONENTS OF ADJUSTED SUPPLY BY MAJOR FIELD OF STUDY
GRADS - 1972

MAJOR FIELDS OF STUDY

	MINUS	EQUALS	MINUS	MINUS	EQUALS	PLUS	PLUS	EQUALS
DEGREES AWARDED	FOREIGN DEGREES AWARDED	DEGS. AW. TO STUDENTS REM. IN CANADA	DEGS. AW. TO STUDENTS CONT. FT EDUCATION	PART TIME STUDENTS (1)	DOMESTIC SUPPLY	CANADIANS RETURNING HOME	IMMIGRANTS	ADJUSTED SUPPLY
HEALTH	464	28	437	34	30	373	16	540
ENGINEERING	1,245	240	1,005	138	117	749	270	1,327
LIFE SCIENCES	836	93	743	113	50	580	188	922
PHYSICAL SCIENCES AND MATHEMATICS	1,481	196	1,286	181	85	1,019	214	1,552
HUMANITIES AND FINE ARTS	2,567	299	2,268	372	347	1,551	607	2,444
EDUCATION	1,830	163	1,667	153	596	919	111	1,157
LAW	38	4	34	1	9	24	1	39
COMMERCE	1,120	33	1,087	78	237	771	255	1,181
SOCIAL SCIENCES	2,411	254	2,157	268	276	1,612	370	2,358
TOTAL	11,992	1,310	10,684	1,338	1,747	7,598	2,032	11,520

NOTE: (1) Difference between degrees awarded to students completing their education and degrees awarded to FT students completing their FT education.

(2) Differences are due to rounding.

APPENDIX C

Undergraduate and Graduate Degrees
Awarded to Females By Discipline,
1972 and 1977.

APPENDIX TABLE C-1

UNDERGRADUATE AND FIRST PROFESSIONAL DEGREES AWARDED
TO FEMALES IN GENERAL ARTS AND SCIENCE

<u>FIELD OF STUDY</u>	<u>1972</u>	<u>1977</u>
Life Sciences ¹	1213	2838
Physical Sc. & Math. ²	768	831
Humanities & Fine Arts	5696	7445
Social Sciences ³	5088	7066
General Arts	3629	4175
TOTAL	16394	22355

NOTES: 1- Excludes Veterinary Medicine, includes Forestry
2- Excludes Computer Science, includes General Science
3- Excludes Social Work, Law, Commerce and Business
Administration

SOURCE: Data obtained from Education, Science and Culture
Division, Statistics Canada.

APPENDIX TABLE C-2

GRADUATE DEGREES AWARDED TO FEMALES IN GENERAL ARTS AND SCIENCE

<u>FIELD OF STUDY</u>	<u>1972</u>	<u>1977</u>
Life Sciences ¹	153	219
Physical Sc. & Math. ²	105	147
Humanities & Fine Arts	994	1113
Social Sciences ³	431	775
TOTAL	1683	2254

NOTES: 1- Excludes Veterinary Medicine, includes Forestry
2- Excludes Computer Science, includes General Science
3- Excludes Social Work, Law, Commerce and Business Administration

SOURCE: Data obtained from Education, Science and Culture Division, Statistics Canada.

APPENDIX TABLE C-3

UNDERGRADUATE AND FIRST PROFESSIONAL DEGREES AWARDED
TO FEMALES IN CAREER-ORIENTED FIELDS

<u>FIELD OF STUDY</u>	<u>1972</u>	<u>1977</u>
Health	1857	3198
Engineering ¹	80	224
Education	8702	12485
Law	260	757
Commerce	318	1603
Veterinary Medicine	17	72
Computer Science	128	184
Social Work	226	746
TOTAL	11588	19269

NOTE: 1- Includes Architecture

SOURCE: Data obtained from Education, Science and Culture
Division, Statistics Canada.

APPENDIX TABLE C-4

GRADUATE DEGREES AWARDED TO FEMALES IN CAREER-ORIENTED FIELDS

<u>FIELD OF STUDY</u>	<u>1972</u>	<u>1977</u>
Health	136	274
Engineering ¹	29	39
Education	482	1053
Law	6	16
Commerce	31	267
Veterinary Medicine	-	6
Computer Science	15	26
Social Work	312	250
TOTAL	1011	1931

NOTE: 1- Includes Architecture

SOURCE: Data obtained from Education, Science and Culture Division, Statistics Canada.

