

# THE STORY OF CO-OPERATIVE EDUCATION IN CANADA

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The story of co-operative education in Canada is a very new one indeed. Until very recently it began and ended with the University of Waterloo -- itself one of Canada's newer universities. In fact, it could be said that the story of co-operative education was, until very recently, the story of the University of Waterloo for our co-operative programs have contributed far more than any other single factor to our phenomenal growth thus far.

Waterloo had its beginnings in 1957 when 74 engineering students enrolled, all under the co-operative timetable. In the intervening eleven years it has grown to approximately 8,500 full-time students, more than 4,000 of whom are enrolled in co-operative programs. These 4,000-plus, co-operative students represent considerably more than fifty per cent of the total undergraduate enrollment.

Waterloo has, today, the largest engineering undergraduate student body of any university in Canada . . . and by far the largest number of undergraduates specializing in mathematics, many of whom are also on the co-operative system.

The words "until very recently" are used above advisedly, for following the remarkable results achieved under the co-operative system on the Waterloo campus, a number of other Canadian universities have become interested. Two years ago the French-language University of Sherbrooke, in the Province of Quebec, initiated co-operative engineering and business programs. This fall, Memorial University in the Province of Newfoundland launched its first engineering programs on a co-operative basis (a former Waterloo engineering professor, Dr. Angus Bruneau, has become Memorial's first dean of engineering). We understand that the Regina campus of the University of Saskatchewan is also contemplating co-operative engineering courses at the moment. Within the Province of Ontario a number of recently established "community colleges of applied arts and technology" -- post-secondary institutions specializing in practical and technological education -- are at the moment contemplating co-operative programs.

The extension of the co-operative system to other universities and tertiary-level institutions was perhaps only to be expected in view of the substantial success it has enjoyed at Waterloo. Perhaps a brief summary of the founding of the University of Waterloo might not be inappropriate at this time.

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As stated, Waterloo is still a very new university. Its nucleus was two small liberal arts colleges -- each affiliated with an outside university -- which existed within the community for many years prior to 1957. The administrative leaders within one of these colleges, along with some of the community's most distinguished industrialists and financial people, had begun to sense a need for a technologically-oriented teaching facility. There has been considerable industrial development in Canada during and after the second world war and this, coupled with the well-known "brain drain" to the United States, was bringing about an acute shortage of engineers. In addition, intensified economic competition, stimulated by the post-war development of Western Europe and many countries in Asia, had begun to create new pressures on Canadian business and industry to become more efficient through computerization, automation and other programs which again created a further need for increasing numbers of technologically-trained personnel.

The extent of the pressure is indicated by the fact that while there were only two engineering programs in Ontario universities in 1954, there were eight by 1957. Waterloo was offering one of the six new programs, but Waterloo's was to prove by far the most successful.

The possibility that a co-operative system could meet with considerable success was grasped from the outset by our President, Dr. J. G. Hagey. Dr. Hagey was drawn to the idea of a co-operative program because it seemed to offer some significant advantages to the students. He rightly felt that it would permit the rapid development of a viable engineering program -- in contrast to usual difficulties in connection with establishment of such programs in Canada, which had almost invariably proved severe.

Co-operative education was not, of course, a new idea either on this continent or in Europe . . . but it had never before been tried in Canada.

Dr. Hagey and a group of influential townspeople set about investigating the possibility of organizing a new engineering school, however, and one of the proposals they began to consider was a plan whereby a program of co-operative studies would be developed on a two-level basis. The first two years would be devoted to technological training and the final four years to university-level engineering studies. The scheme was referred to as a "co-operative plan of education for technicians and engineers." While the split-level feature of the plan fell by the wayside, the co-operative feature did win acceptance.

Before classes could get under way, however, a good deal of research and preparatory work had to be carried out. One of the first

projects consisted of visits paid to a number of United States colleges and universities to study co-operative programs in action. Antioch, Northeastern, Illinois Institute of Technology, University of Cincinnati and University of Detroit were included in these visits and a great deal of information was gathered. While much of it was helpful and valuable, it soon became quite evident that because of the Canadian academic setting and other significant factors -- Canada's widespread geography and the limited financial resources of a new university -- modifications would have to be made, particularly in connection with the distribution of students on their work assignments.

Among the vital problems to be solved were the development of a curriculum and the recruitment of faculty, of course, but more than that -- it was felt that from the outset Canadian employers must be encouraged to participate in the program. To this purpose a meeting was called, well before the first classes began, which was attended by representatives of one hundred major Canadian companies. The meeting sought their reactions to the idea of a co-operative engineering program. It was sponsored by the Canadian Engineering Institute, the National Conference of Canadian Universities and the Education Committee of the Canadian Manufacturers' Association. Thus the link between the academic world and the employer community was established from the very first. It continues to this day and is unquestionably vital to the success of the entire program.

Even following the meeting, however, representatives of the forthcoming university continued to make calls on potential employers of students and, in fact, courses were not begun until satisfactory placement of students were clearly indicated.

Today, close to one thousand Canadian employers are participating in the training of our undergraduates through the co-operative system. So satisfactorily is the system operating that thus far we have not been affected by the summer job shortage which this year plagued Canadian university students on regular non-co-operative programs from coast to coast in Canada.

A factor contributing to its success has been the co-ordination service provided by the University through its Department of Co-ordination and Placement. This department serves as a liaison agency between students and their employers.

The objective of Waterloo's co-operative programs is to so arrange the timetable for the students to ensure that academic studies are combined with relevant work experience. The academic terms are, of course, devoted to fundamental and theoretical studies.

Initially, the co-operative programs were operated on a quarter system, with students admitted four times during the year. This was found to be unsatisfactory and the program was changed to a trimester system with all first year students enrolling in September.

The work-studies sequence is arranged as shown below:							
	1968 Fall	Winter	1969 Spring	Fall	Winter	1970 Spring	Fall
Stream "A"	First Term	Second Term	Work Period	Third Term	Work Period	Fourth Term	Work Period
Stream "B"	First Term	Work Period	Second Term	Work Period	Third Term	Work Period	Fourth Term

  

	Winter	1971 Spring	Fall	Winter	1972 Spring	Fall	1973 Winter
Stream "A"	Fifth Term	Work Period	Sixth Term	Work Period	Seventh Term	Work Period	Eighth Term
Stream "B"	Work Period	Fifth Term	Work Period	Sixth Term	Work Period	Seventh Term	Eighth Term

All first year students are now admitted in September, spending the first fall term together on campus, as indicated by the chart above. They also complete their courses and graduate together.

Between the first and last terms, however, each class is split into two approximately equal groups or "streams" for continuity of employment opportunity. Both groups, of course, have the same total time on campus and in their work situations -- one group having a double academic term at the start of the course and the other having a double academic term at the end of the course. The division at the end of the first term of studies is based upon student preference, financial considerations of students, and so forth.

The University's co-ordinators are responsible for making sure there will be places in industry for students as they come to the end of each academic term -- places that will be relevant to their education and development. (Relevance in this context does not necessarily imply that the work be directly related to academic programs but rather that it be challenging to the students -- in fact, it may be regarded as useful experience if the students are forced to adapt to entirely new work situations.

A part of the co-ordinators' task has been to spread the gospel of co-operative education . . . convincing the employers and prospective employers that the co-operative system is of benefit to them as well as to their students. Initially, industry in Canada was skeptical.

There was, as stated, no previous experience with the system in the country. We also had problems with the Association of Professional Engineers of Ontario whose members had to be persuaded that this new departure in technical training was viable.

From the outset, however, we came into contact with a number of people who were responsive to the idea; some of them had graduated from co-operative programs in the United States, others had come from "sandwich" courses in the United Kingdom.

Out of our early contacts came the inevitable conclusion that some mechanism would have to be developed through which we would be able to keep our co-operating employers in contact with the campus on a continuing basis. This mechanism proved to be our Industrial Advisory Council, composed of employers' representatives. The Council holds regular meetings on campus which provide opportunities for employers to sit down with faculty, and share problems. The Industrial Advisory Council has worked remarkably well and is vitally important to the smooth running of our co-operative programs. It has, in fact, done much to make the system more acceptable to faculty . . . and the creation of academic acceptance has also been vitally important to the success of the system on the Waterloo campus.

Because the liaison work between the University and the employer group has been so vitally important to the success of the program, the problem of finding staff -- co-ordinators -- to handle this work has also become of considerable significance.

The development of the Department of Co-ordination and Placement has presented a number of problems some of which are felt to be uniquely Canadian. For example, because of the considerable distances between the campus and our working students (the University community is of modest size and cannot begin to absorb the thousands of students now enrolled in our co-operative programs) we have found it necessary to locate co-ordinators off campus. We therefore divide the co-ordinators' work loads geographically, rather than according to academic discipline. The same man may, and in some cases does in fact, handle the liaison in connection with students in chemical, mechanical, civil and electrical engineering.

From the outset we have sought, as our co-ordinators, people who knew the profession and the needs of industry, rather than academically oriented personnel, professional vocational counsellors or guidance people. Thus our engineering co-ordinators are professional engineers who have had several years' industrial experience. They speak the language of business -- but they must also be interested in young people, able to identify with the problems of the undergraduates, and they must find the academic atmosphere congenial.

The policy of seeking professional people who have been active in the field has continued as the University has grown and as the co-operative systems were extended beyond the initial area -- engineering. Today we also have co-operative students in such fields as applied mathematics, applied physics and chemistry, physical education and recreation, architecture and applied graduate psychology. We have a registered architect serving as co-ordinator of the co-operative architecture students; our mathematics co-ordinators have either had extensive computer training and/or teaching experience at the secondary school or college level and our physical education people have been in the field of recreation.

Finding the right man for the co-ordinator post has not always been an easy task. One faces the difficulty of making such a position financially attractive to good prospects. Of course the uppermost consideration in selection must be to obtain co-ordinators who will be able to develop a close and harmonious relationship with his students. At the outset the problem was particularly acute; many were skeptical about the feasibility of our entire program and others were reluctant to contemplate a return to the academic atmosphere. But over the years we have seen staff difficulties diminish and the role of the co-ordinator now constitutes an acceptable professional career in the eyes of many competent people.

Perhaps it should be pointed out that an integral part of the department is placement. Moreover, both our co-ordinators and our placement officers continually work very closely with the Counselling Services Department of the University. This reinforces our policy of job-related co-ordinator backgrounds.

It has already been noted that we have found it necessary to base the operations of most of our co-ordinators some distance from our campus -- notably in such major Canadian cities as Toronto and Montreal. Because they are involved in a considerable amount of travel the University provides co-ordinators with cars. They are also provided with dictating machines, the tapes from which can be mailed to the Department on campus for transcription. This latter service minimizes the amount of paper work required of an off-campus co-ordinator and it also provides a complete documentation of his calls on employers, including his interviews with students.

In spite of our geographical problems, we have from the beginning followed the policy of permitting both students and employers as much choice as possible in connection with their selections of each other. It is felt that freedom of choice is of significant benefit to both. The procedure of cross-selecting is arranged through the Department of Co-ordination and Placement. Interviews are held on campus prior to the end of each four month academic term; following

these interviews employers list by order of preference the students they wish to have; students do likewise with respect to employers. The matching-up is then done by computer. For details as to how this is carried on I would suggest you refer to the article "Computer Placement of Undergraduate Co-operative Students," by R. D. Eaton of our Department, in the May, 1968, issue of the Journal.

At Waterloo, satisfactory co-operative work assignments are a prerequisite to graduation and poor performance on the job is thoroughly investigated. No student may continue in a co-operative course if he is not capable of acceptable progress and conduct in his work assignments and if his "work reports" required for these assignments are unsatisfactory. As a general rule, however, our chief problem in this area concern students who perform well in the training portion of the course but less well in their studies, and this is a problem which will perhaps always remain with us.

The cost of our operation is not small -- slightly in excess of \$100 per registered student per year, in fact, for an established program. The cost is even higher for new programs. Our workload objective for our co-ordinators is 150 students per co-ordinator -- with 75 of these being on the job at any given time. The workload for co-ordinators involved with new programs must be lowered, however -- to approximately 100 students per co-ordinator. There are presently forty-five full time employees in the Co-ordination Department, of whom twenty-nine are professional personnel and the remainder, secretarial and stenographic staff.

As stated, we at Waterloo judge our co-operative programs to have been extremely effective. They have not only permitted the University to grow at an unusually rapid pace, they have helped it become renowned within the space of eleven years for academic innovation and leadership, as well as for research and graduate studies. Waterloo's engineering post-bachelor degree student body is already second largest in Canada; approximately \$3,500,000 in research grants have been awarded the University during the 1968-69 year.

It is interesting to note the impact of the co-operative system on our students. It appears to have given them an awareness of, and a confidence, in the opportunities available to them in their own country. As a consequence very few -- less than one per cent, in fact -- are lured by tempting offers from the United States. More than twenty-five per cent of our engineering graduates go on the post graduate work. Of those who enter industry, more than eighty-five percent take up employment with companies involved in the co-operative program and approximately fifty per cent of all graduates take up permanent work with employers for whom they previously work as co-operative students.

Co-operative students at Waterloo have frequently managed to be among the leaders in the extracurricular activities; they appear to have solved many problems which could be associated with continuity by forming twin branches of various student societies. Off-campus students are kept informed of events occurring on-campus through a monthly newsletter from the Department of Co-ordination and Placement and they also receive regular copies of the student newspaper which is published eleven months of the year.

For members of the academic staff the program also provides a number of advantages. Academic appointments carry a direct explicit commitment in responsibility for two terms a year, or a total of almost eight months of lecturing, academic supervision of students, setting and marking of examinations, general participation in University affairs, and other scholarly work. While there is no explicit commitment for the remainder of the year there is an implicit undertaking to pursue activities of a scholarly or professionally developing character. An interesting benefit of the system is the possibility of combining, in a two-year term, four terms of regular service and two consecutive uncommitted terms and every encouragement is given to a professor to spend such a period of time either in another university, in industry or in a government establishment. Many of the academic staff have, for example, held visiting appointments at other universities during these uncommitted terms.

During our early years we were perhaps fortunate that no serious economic recession occurred. Such a development could have provided us with a very severe crisis situation. It is reasonable to say at this point, however, that co-operative education in Canada is here to stay, and that while its overall effectiveness is very closely related to a continuing state of economic well being in this country, we have a considerable amount of strength and can face the future with confidence and assurance.