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ABSTRACT

The Operating Grants Formula of the Provincially-Assisted Universities of Ontario has as its purpose to provide an objective mechanism for determining the share of the total Provincial operating grant to be allocated to each university. Use of the formula for such distribution presupposes that the amount available will be sufficient, together with other major sources of income, to enable the university system to continue to function at least at its present level of excellence. This document presents a discussion of the structure and operation of the formula, some changes to the formula, some effects of operation of the formula, and some possible future developments in the formula. (Author/HS)

BRIEF OF THE STRUCTURE AND OPERATION OF THE OPERATING GRANTS FORMULA FOR THE PROVINCIALLY-ASSISTED UNIVERSITIES OF ONTARIO 1967-68 THROUGH 1969-70

The initial version of the formula for operating grants to provincially-assisted universities in Ontario was prepared by a joint committee of representatives of the Committee on University Affairs and the Committee of Presidents of the Universities of Ontario and approved by the Minister of University Affairs in November 1966 for calculation of operating grants in 1967-68. The original document describing the operation of the formula was released concurrently and subsequently amended in January 1968. The formula has been applied, with some important changes, to the determination of operating grants in the subsequent years of 1968-69 and 1969-70. These changes, plus changes which appear imminent in future years will be detailed later in the text.

Purpose of an Operating Grants Formula.

The text of the DUA document states that the general purpose of the formula is "to provide an objective mechanism for determining the share of the total Provincial operating grant to be allocated to each university". It goes on to say that "use of the formula for such distribution presupposes that the amount available will be sufficient, together with other major sources of income, to enable the university system to continue to function at least at its present level of excellence". While I think we might have difficulty disputing this statement about the level of excellence of the entire system, certainly individual universities which are constrained from

growth either through limitations on the types of courses they conduct or by self-imposed limitations on size, might choose to disagree. The formula is geared to growth in student enrolment or changes in the mix of student enrolment. There are other specific purposes of the formula which are cited but which will be analysed later in this paper.

Structure and Operation of the Formula

A table of categories was established (Table 2 attached) which lists eight categories and programs within each of the categories. Each category has a weight with the weight assigned to the category being a cost-coefficient roughly corresponding to the relative cost of conducting the program in the category as related to the costs of the programmes within the other categories.

The formula operates in this way: Basic operating income is determined by summing government grants and standard fees. First, student enrolment is weighted according to the weights shown in the Table of Categories and the numbers of weighted students in the various university programs are summed to yield a total weighted student enrolment for the university. This total weighted enrolment is multiplied by the amount established by the Government as the value of the basic unit for the budget year. Standard fees (usually the median of university fees for a programme) are established for each programme for the same year. The number of students enrolled in a programme is multiplied by the standard fee. The products of students and standard fees of all programmes are summed to yield total standard fees. This total is subtracted from basic operating

income to yield the amount of the government grant. The actual fees received by a university may then be added to government grants to yield total basic operating income exclusive of income from other sources. An example follows:

Assume, number of full-time equivalent students = 10,000, weighted student enrolment = 20,000, value of the basic income unit = $1450, standard fee income = $5.4m and actual fee income = $5.6m. Then,

Basic Operating Income	= Weighted Enrolment x Unit Value
	= 20,000 x $1450 = $29.0m
Government Grant Income	= BOI - Standard Fees
	= $29.0 - $5.4m = $23.6m
University Total Operating Income from Fees and Grants	= Government Grant + Actual Fees
	= $23.6m + $5.6m = $29.2m

In addition to the government grants determined by formula, special grants are paid for support of emerging universities, emerging sectors of established universities e.g., new faculties of medicine and dentistry, special features not common to all universities such as the Royal Ontario Museum. A special guideline formula for extra support to emerging universities has been established based on the development of synthetic models and an analysis of historical support for new universities. This special formula for emergence incorporated the methodology of the experience or learning curve and is still undergoing development.

Changes to the Formula

The formula has been in operation since 1967-68. There have been several changes of substance during this period. (1) Some programmes

in the table of categories were added after the initial table was established and were subsequently included in the January 1968 revision of the Formula. (2) This same revision contained some statements which change the original draft document substantially. Whereas the original document had specified that students would be counted once during the year as at December 1, the revised document specifies that students in Categories 6, 7, and 8 are to be reported on a trimester basis. The net effect of this change is to reduce the income for the programs in question. A simple example will suffice: Assume 100 students are enrolled in Category 6 at nominal weight 3. A count of these 100 students on December 1 would show 100 students. Income units for Category 7 on this basis would be 100 x 3 = 300. A trimester count of students might show 100, 90, and 60 for the Fall, Winter and Spring semesters at weight 1 each yielding (100 x 1) + (90 x 1) = (60 x 1) = 250 income units. This would seem reasonable to the casual observer but several members of the university system see this as a unilateral change which denies the original cost calculations in the determination of weights (relative annual costs were compared in establishing the weights) and an attempt to incentivize the system to year-round or trimester operation. In any case, this is a very contentious issue and the results of the unilateral action by government are not being accepted gracefully. (3) The weights for Medicine, Dentistry and Veterinary Medicine were changed from 3 to 5 and medical and dental interns from 1.5 to 2.5 for computing government grants in

1969-70. These changes in weights were to reflect differences between operating support required and actual costs and in lieu of what had been special grants in previous years for support of these programs at universities.

Effects of Operation of the Formula

The value of the basic unit was set at $1320 in 1967-68, $1450 in 1968-69 and $1530 in 1969-70. The value of $1320 was a very critical value for the universities because it established the base on which additional increments would be built in future years and I might say the universities were very disappointed when this value was announced. The unit value is equated to a weight of 1 and may be interpreted as a rough measure of the average annual cost of educating a general arts student through all years of a general arts programme. Some consideration was given to weighting by year of programme but this was rejected in favor of a common weight for all years of a programme.

Table 1 is an analysis of the effects of operation of the formula for the period 1966-67 through 1969-70. A base was derived by the writer for 1966-67 from data contained in the Report of the Minister of University Affairs although the formula was not in operation that year. Data for subsequent years are supplied by DUA with the 1969-70 values projected from the summations of university estimates and the announcement by the Minister on March 4, 1969 about the operating grants for 1969-70. The inferences that may be obtained about the effects of the formula on the university system from this tabular analysis are as follows:

1) Unit value (Lines 4 and 5) has increased but at a decreasing rate. The increase in unit value in 1969-70 approximates the estimated increase in the cost of living. At the same time, increases to teaching staff will average better than 10% in 1969-70. The difference between the two values must be obtained either from cutting back on increases to other components of university expenses or from increasing the staff-student ratio. Certainly, the latter is taking place. And it is probable that the decreasing rate of increase will have some effect on other expense components.

2) Increase to basic operating income (Lines 6a, b, c) is leveling off. The 69-70 projection is very conservative (I will have more to say about this later). The Province is applying the brakes on increases in the unit value for next year. But the brakes cannot be kept on too long without causing the system to halt. In future years the Province could only keep down increasing costs by dropping the unit value increase below 5% (which would not cover the effect of inflation) or by limiting access to universities thereby limiting growth in units.

The change to trimester reporting is an example of one way to limit universities' income. It is no secret that setting limits on intake of graduate students into the system is another way. Setting limits on undergraduate students would not appear to be an attractive alternative.

3) Fees per student (Line 12) as a percentage of the cost of education is on a steady downtrend from about 22.2% in 66-67 to about 17.4% in 1969-70.

4) The increase in total grants (Line 11) of $39m projected for 69-70 shows a sharp reduction over the increases for previous years. This sharp reduction is reflected also in the increase in grants per student (Line 13) and per unit (Line 14) which are just slightly over 2% in 1969-70.

We may speculate further about the effects of these moves by government on the university system. First, staff-student ratios will undergo degradation and this has already started. Second, the trends to a system orientation particularly in graduate education and in library and computer resources will be intensified simply because of the constraints on total resources.

Turning now to the effects on the individual universities, I would like to recall the method of formula financing. Total operating income for a university is determined as shown before in this paper and then distributed to the university as a block grant. The money may be spent by the university in any way it wishes. In the allocations of the grants within the universities there are differences between income earned by the formula and departmental funds budgeted by the university. Certain departments are becoming quite expert in detecting these differences and pointing them out in no uncertain terms if the difference is not in their favour. This pressure from departments is causing examination of the differences and will force universities to either move toward allocation along

the lines of the operating grants formula (thereby surrendering all control of their own development) or to develop internal formulae which rationalize the transfers of funds from income account to expenditure account. The ultimate outcome of this will be a modified form of a program budget within each university which will serve to proceduralize some aspects of the budget-making. The obvious parameters to use would be class size by year within department, student contact hours per instructor, class contact hours per instructor, graduate students per instructor, supervision load, etc. But it is essential to consider also the benefits in qualitative terms, to bring excellence into the equation. Costs per student by programme will begin to be developed so that relative programme costs may be compared. A vocal minority of students will view this as another unpalatable aspect of the new industrial state but university administrators will find themselves hard put to do otherwise in their attempts to rationalize expenditures in the face of financial constraints. There is evidence of these developments now proceeding in various universities in the system. Personally, I tend to view some aspects of this as very healthy. The formula, in its present form, allows each university to spend its money the way it wishes but the pressure is on internally to rationalize the entire budget-making procedure toward programme planning and review and measurement of costs, outputs, and benefits. This seems to me to be the attractive middle ground between the one extreme of having our boards of governors begging money from the government and the other extreme of having our funds channelled by government into

specific discipline areas. If the university is to survive as a university it must be very aware of the dangers inherent in precise top-down programme budgeting.

Impressions of Some Other Effects of the Formula

The formula is having a stimulating effect on the development of the university system in other ways. When the writer came on the scene in 1966 the CPUO Secretariat consisted of the Executive Vice-Chairman part-time and a secretary. There was no collective submission by CPUO on what the total funding level ought to be. Research involving the collectivity was conducted by people from the different universities often overworked because of double-duty and always suffering from the lack of data bank from which the desired information might be extracted. Standing and ad hoc committees often met to discuss issues but with much consequent wheel-spinning again because of the lack of data. While we might look back with nostalgia at a time when a system was unnecessary and we might be inclined to view recent developments as an undesirable manifestation of Parkinson's law, I would maintain that, given the constraints on funds that we have seen, there is no other way of operating than through a proper articulation of universities with a university system. The development of the system is proceeding along many lines. It is now the practice of the universities to present their needs collectively in an annual submission requesting the increase in the value of the unit each year. It is likely that the requests for capital needs will be incorporated into that submission in the coming year. Developments in the formation of a bibliographic

centre are proceeding rapidly. A research component of CPUO has been authorized to begin work on the construction of a data bank beginning this summer. The use of the computer as a system or regional utility is undergoing definition. Discipline departments are meeting constantly to discuss a rational division of graduate responsibilities. There is a revised systems-oriented CPUO organization undergoing examination in the senates of universities.

At the beginning of this paper, I mentioned that the formula document cited other benefits to be served by a formula. Some of these were that (1) the independence of universities would be maintained and competition would be encouraged (2) it would provide a more certain basis for university planning (3) granting bodies could devote more attention and energy to major questions of overall support, the coordination of long-range planning, special needs of new institutions and consideration of support of new or special projects which may not be adequately sustained by the formula system (4) it would provide equitable treatment which is done and is seen to be done (5) ensure to private donors that gifts for operating purposes will be added resources to the university and not a substitute for public support.

With regard to the first of these statements, the maintenance of independence, I would say that it is reasonably accurate; universities do not have their budgets closely scrutinized and are independent to the extent that constrained financial circumstances will allow them to be. I'm not so sure that the competition has been healthy. Any incentive must be held suspect which encourages

a university to take in more students than it should merely to gain income. Up to a certain point it may be salutary - beyond this point it is taxing to human and physical resources and reflects an income maximization objective which is not healthy. Associations of teaching staff are very sensitive to this feature of the formula system. On the second point, there is evidence that universities are doing much more planning - again resulting from being faced with constrained choices. But this task is made much more difficult by the changes to the formula - the additions to categories and the changes to trimester counting and medical weights during this period has made it virtually impossible for universities to plan their expenditures even for the next year. Consequently, the estimation of numbers of students, which are the determinants of income, is very conservative. A conservative budget is formed which must necessarily restrict increments to salaries of teaching staff as well as other accounts. Then, if the enrolment is substantially higher than anticipated as happened in several cases, the actual income is considerably more than forecast. This is certainly better than a difference in the other direction but unexpected income arriving late in the year is a mixed blessing - salaries are usually set at one time during the year and unless a minibudget is prepared the extra income does not find its way into salary accounts. Associations of teaching staff are very aware of this. Regarding the fourth point about equitable treatment here again is an area where qualitative factors must be brought into one's definition of equity, no matter how difficult this is

to do. For example, the London School of Economics would have reason not to view as equitable a system which leveled it to the status of other less well recognized schools in the British Isles. Staff at the established universities in Ontario have the same kinds of feelings about the so-called leveling effects of the formula. On the last point, there probably has not been as much increase in resource to private support as was hoped for by government. This is not strange because it takes some time for a historical relationship of complete dependence to shift to a new relationship. In any case, private support has never been high without strings tied to it for special purposes, i.e., money which may not be used for general operating purposes. Nevertheless, there is probably a great deal more that can be done for encouraging private support to special programmes and I would expect that universities will begin to exploit this source more vigorously.

Another aspect to be considered is the relationship between total funds available, the value of the unit and the number of income units. If Treasury Board projects total expenditures to university operating expenses into the future with little upward elasticity and the increase to the value of the income unit is pegged to inflationary factors then the simple formula relationship means that income units are fixed. Now we would not agree that we should accept any of these as being strictly bounded but all of the government's recent actions and the analysis of Table 1 suggest that we are going to have to plan forward and also make the case for the young people's educational needs.

One difficulty in altering the formula is changing weights. In the absence of good cost analysis it is difficult to show that the weight for a programme should be changed. Further, since total income is usually fixed as above, a weight change means that there will be transfers within the system. This means that some universities will lose income by a weight change and some will gain. This tends to reinforce the inertia against change, although experience shows that the universities can be trusted to accept change when the good of the system is involved.

A Look at Some Possible Future Developments in the Formula

Without in any way suggesting to government the ways to change the formula I see these as developments in the operating grants formula which are either undergoing examination now or appear to be desirable:

(1) Shifts to common weights for undergraduate programmes. Different weights for honours and general programmes tend to encourage universities to have such distinctions. The trend in structuring curricula is in the other direction.

(2) The setting of limits of entitlement of income derived from graduate students. In the undergraduate school the terms of study are more or less standard. In the graduate school a student may spend several years in obtaining a degree that could nominally be awarded in say 1 year, 2 years or 5 years. Both CPUO and CUA are aware of the necessity of establishing minimum and maximum limits for graduate programmes and joint

bodies of members from both organizations are examining the effects of imposing such limits prior to setting them.

(3) Alignment of programmes according to generic groupings of General Arts, Special Arts, General Science, Special Science, Health Sciences, Applied Physical Sciences and Engineering, Applied Social Sciences.

(4) Over the next several years attempts will be made to account for costs but it will be some time before the academic community agrees that costs can be accounted for precisely or that costing in itself is desirable in the university. It will be necessary to develop category descriptions which are qualitative in nature to aid the process of inserting new programmes within categories as they are formed. This will reinforce the trend toward realignment of programmes into generic groupings.

B. L. Hansen,
15 May, 1969.

TABLE 1

ANALYSIS OF INCREASES TO OPERATING
INCOME IN ONTARIO UNIVERSITIES 1966-67 THROUGH 1969-70

LINE	ITEM	1966-67 DERIVED BASE	67-68 ACTUAL	1968-69 ESTIMATED ACTUAL	1969-70 PROJECTED
1	Students (FTE)	68,000	81,000	95,000	110,000
	(a) Increase in Students No.		13,000	14,000	15,000
	%		19.1%	17.3%	15.8%
2	Basic Income Units	116,000	138,000	164,000	188,000
	(b) Increase in Units No.		22,000	26,000	24,000
	%		18.9%	18.8%	14.6%
3	Units per Student	1.70	1.71	1.71	1.72
4	Unit Value	$1150	$1320	$1450	$1530
5	Increase in Unit Value ($)		$ 170.	$ 130	$ 80
	(%)		14.8%	9.8%	5.5%
6	Basic Operating Income	$133m	$182m	$238m	$288m
	(a) Increase ($)		49m	56m	50m
	(b) From Increased Units		25.5m	34.5m	34.0m
	(c) From Increased Unit Value		23.5m	21.5m	16.0m

TABLE 1 (Continued)

LINE	ITEM	66-67	67-68			68-69			69-70		
		DERIVED BASE	ACTUAL	INCREASE AMT.	%	ACTUAL	INCREASE AMT.	%	ACTUAL	INCREASE AMT.	%
7	Basic Operating Income	$ 133m	$ 182m	49m	36.8	$ 238m	56m	30.8	$ 288m	50m	21.0
8	Standard Fees	32m	38m	6m	18.8	46m	8m	21	53m	7m	15.2
9	Formula Grants	101m	144m	43m	42.6	192m	48m	33.3	235m	43m	22.4
10	Special Grants	12m	20m	8m	67	23m	3m	15	19m	-4m	-17.4
11	Total Grants	111m	164m	53m	47.7	215m	51m	31.1	254m	39m	18.1
12	Standard Fees Per Student	$ 470	$ 470			$ 483			$ 485		
13	Grants per Student	$1630	$2020	390	23.9	$2260	240	11.9	$2310	50	2.2
14	Grants per Unit	$ 960	$1185	225	23.4	$1320	135	11.4	$1350	30	2.2

TABLE 2

TABLE OF CATEGORIES FOR DETERMINING BASIC INCOME UNITS

UNDERGRADUATE, DIPLOMA AND FIRST DEGREE

Program Number	Category 1	Weight 1
1	All General Arts[1]	
2	All General Science	
3	All Pre-Medicine	
4	All Pre-Business Administration[2]	
5	All Pre-Commerce[2]	
6	All Journalism	
7	All Secretarial Science	
8	All Social Work	
9	First Year Honours Arts and Science	
10	Technology (Lakehead University)[2]	
11	All Undergraduate Diploma Courses, other than those specifically listed[2]	
	Category 2	Weight 1.5
12	Upper Years Honours Arts (including "make-up" year and "four-year major" programmes).[1]	
13	All Commerce	
14	All Physical Education	
15	All Law	
16	All Library Science (including "make-up" year)	
17	All Fine and Applied Arts	
18	All Physical and Occupational Therapy - both degree and diploma	
19	Medical Interns and Residents[2] [3]	
20	Art as Applied to Medicine - diploma course[2]	

(1) Includes all faculties and departments which are normally considered to be within the Faculty of Arts but which may have a separate organizational identity.

(2) Added in the January 1968 revision.

(3) Changed to weight of 2.5 in announcement of 1969-70 operating grants.

	Category 3	Weight 2
21	Upper Years Honours Science (including "make-up" year and "four-year major" programmes)	
22	All Nursing	
23	All Engineering	
24	All Food and Household Sciences	
25	All Pharmacy	
26	All Architecture	
27	All Forestry	
28	All Agriculture	
29	All Hygiene and Public Health	
30	All Music - both degree and diploma	
31	Dental Hygiene - diploma course[2]	
32	Public Health Nursing - diploma course[2]	
	Category 4	Weight 5[4]
33	All Medicine	
34	All Dentistry	
35	All Veterinary Medicine	

GRADUATE

	Category 5	Weight 2
	Master's Level (and First-Year Ph.D. direct from Baccalaureate)	
36	- Commerce and Business Administration	
37	- Social Work	
38	- Hospital Administration[2]	
39	- Public Administration[2]	
40	- Journalism[2]	
	Category 6	Weight 3
	Master's Level (and First-Year Ph.D. direct from Baccalaureate)	
41	- Humanities	
42	- Social Sciences	

[4] Changed from weight 3 to weight 5 in announcement of 1969-70 operating grants.

43	- Mathematics	
44	- Law	
45	- Fine and Applied Arts[2]	
46	- Library Science (other than "make-up" year[2]	
47	- Physical and Health Education[2]	
48	- Physical and Occupational Therapy[2]	
49	M. Phil	
50	Other Graduates (including all specialist graduate diploma courses)	
	Category 7	Weight 4
	Master's Level (and First-Year Ph.D. direct from Baccalaureate)	
51	- Psychology	
52	- Geography	
53	- Engineering	
54	- Science	
55	- Medicine	
56	- Agriculture[2]	
57	- Architecture[2]	
58	- Forestry[2]	
59	- Food and Household Science[2]	
60	- Hygiene and Public Health[2]	
61	- Music[2]	
62	- Nursing[2]	
63	- Pharmacy[2]	
64	- Child Study[2]	
65	- Dentistry[2]	
66	- Veterinary Medicine[2]	
67	- Urban and Regional Planning[2]	
	Category 8	Weight 6
68	All Ph. D. (except First-Year Ph.D. direct from Baccalaureate)	

Notes on the Table of Categories

1. In determining full-time equivalent enrolment, the following definitions should be used:

   i Full-time equivalent enrolment of students on "Co-operative" and "Trimester" programs shall be one-half the sum of the semester registrations.

   ii Full-time equivalent enrolment of Federated and Affiliated Colleges shall be that share of total enrolment as reflected by that portion of the teaching service performed by the university.

2. Students in the upper years of Honours undergraduate work in Psychology, Geography and Mathematics shall be included in Category 3. Costs of undergraduate Honours work in these subjects appear to be on the average similar to costs in Honours Science. At the Master's level, however, Mathematics would seem to be more appropriately grouped with the humanities and social sciences, while Psychology and Geography, because of laboratory and field work requirements, remain with science and engineering.

3. "Other Graduates" as shown in Category 6 includes all graduate degree and diploma programs not specifically covered in the descriptions of other categories.

4. The following conclusions regarding categories and weights for part-time students were reached:

   i Part-time undergraduate students (including extramural students) working towards a Baccalaureate degree, -be taken

on a full-course registration basis divided by six and the full-time equivalent counted in the appropriate undergraduate category.

ii Part-time graduate students (doing course work) - to be taken on a full-course registration basis divided by five and the full-time equivalent counted in the appropriate graduate category.

iii Part-time graduate students (actively doing dissertation under continuing supervision) - be assigned a Weight of One.

5. Preliminary Year students have been excluded from the Table. This is a special type course which does not fit in with the general pattern of categories and weights established. However, for purposes of calculation it is felt that a provisional weight of .7 (seven-tenths) should be assigned to this group.

6. Special problems arise in connection with summer sessions and/or year-round programs at the graduate level. They are further complicated because the intention is that students in Categories 6, 7 and 8 should be counted only once in a given 12 month period. This intention can be preserved while greatly facilitating the reporting of enrolments, by arranging to count graduate enrolments on a trimester basis (in the fall, winter and spring semesters). Two semester enrolments would be required for the completion of a "year" for students in Category 5, while three semesters

would be required for each full"year" in Categories 6, 7 and 8. As a result, enrolments in Category 5 will have a weight of one for each semester enrolment, enrolments in Category 6 will also have a weight of one for each semester enrolment, enrolments in Category 7 will have a weight of one and one-third for each semester enrolment and enrolments in Category 8 will have a weight of two for each semester enrolment. This interpretation would seem to make for convenience in reporting and should provide, as well for a fair treatment in the case of factional years.(2)