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ABSTRACT

Interdisciplinary policies and practices at the University of Montreal were studied to determine their effectiveness. The three study objectives were to: (1) determine the magnitude of the range set up by the department degree structure to give student majors an opportunity to take courses outside their basic discipline; (2) assess the degree of students' responsiveness to utilize course offerings outside their basic discipline; and (3) measure the ability of departments to attract students from related and foreign disciplines. The degree program structures of selected disciplines were analyzed over a three-year period. The magnitude of the range allowing for course work outside a student's area of concentration remained stable in most cases. Multidisciplinarity, or the potential utilization of various disciplines, is common at the University. Theoretical degree program structures welcome breadth through optional courses and electives, but depth prevails in most of the students' major curricula. It is concluded that multidisciplinarity is desirable to restrain curricular duplication and parochialism, but its limitations make it nonviable as a means to assure basic broad knowledge in the major forms of intellectual discourse. Minimum standards for breadth and maximum standards for depth need to be set in order to assure a basic understanding of knowledge acquisition in main branches of study and to guard against the dangers of overspecialization. An autonomous faculty group should be formed to represent interdisciplinary interests and to defend them politically. (SW)

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INTERDISCIPLINARITY: POLICIES AND PRACTICES

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Curriculum relevance was to the 1960's what interdisciplinarity has been to the 1970's in postsecondary education institutions. Although both words have been extensively used, there is a general sentiment that the concepts and realities they represent have remained largely misunderstood and difficult to implement on a practical level. In some way, interdisciplinary studies have been regarded as a fashionable panacea to the quest for curricular reform that would bring forth greater societal usefulness and cost effectiveness.

At the turn of the present decade, when the Université de Montréal moved to depart from the rigidity of the conventional distribution requirements to favor a more flexible curricular approach, it was thought that the new realignment would de-emphasize academic professionalism and disciplinary overspecialization. Degree program structures were organized in such a way as to utilize the different institutionally autonomous disciplines. In curriculum jargon, this potential utilization of various disciplines is usually referred to as collection curriculum or multidisciplinarity, a form of interdisciplinary movement. After a few years of policy formulation on that matter, many individuals as well as several committees within the institution had become inquisitive about the degree of effectiveness of those policies.

Therefore, the main purpose of this research report is three-fold:

1) To determine the magnitude of the range set up by departments in their degree program structures to give student majors an opportunity to take courses outside their basic discipline, be it in a related or foreign branch of study.

2) To assess the degree of students' reponsiveness to utilize course offerings outside their basic discipline.

3) To measure the ability of departments to attract students from related and foreign disciplines.

BACKGROUND TO INTERDISCIPLINARY STUDIES

Since its inclusion in the educational vocabulary, interdisciplinarity has encountered structural and human obstacles. Defined as the interaction among two or more disciplines, interdisciplinarity may range from simple communication of ideas to the mutual integration of organizing concepts, methodologies, procedures, epistemology, terminology, data and education in a fairly large field (CERI, 1972). The intensity of the interaction is really what accounts for the various kinds of interdisciplinarity, whether the label is multi-, pluri-, or trans-disciplinarity (Palmade, 1977).

Although disciplinary interaction has been of growing concern for the past two decades, there are current underlying incentives that have kept the movement in the mainstream. First, the rapid advancement of scientific research and knowledge has forced the sciences and other disciplines to converge in the face of complex technology (Swora & Morrison, 1974). In academic departments, this expansion of knowledge has made disciplines more specialized and created subdivisions of interests to the point where specialists within departments have oftentimes little interest in or knowledge of the work of their departmental colleagues (Strauss, 1973). These specialists have to cross disciplinary lines to pursue their research and exchange ideas with other scholars. Second, the general climate of limited resources in which North American educational institutions have been plunged since the beginning of the 1970's has constantly called for reducing the duplication of research, teaching and curricular demands (Pickar, 1970). Third, a need to answer student cries for relevance by providing them with a thoroughly adequate education, that is, "adequate as judged by societal standards, rather than by the more narrow professional standards" (Heaney, 1976, p. 440).

Conversely, there exist inertial forces that have prevented communication among disciplines from making further inroads. As Strauss (1973) has so aptly noted, "the departmental structure that was created to facilitate development and change has become, ironically, a major force in restricting, impeding, and, in some instances, actively resisting change" (p. 896). Because departments are the political bases of power for the disciplines they represent,

they find themselves competing for money, faculty, students, and a number of other resources; thus, this competition has a definite tendency to create barriers among disciplines. Another divisive force has been the traditional science-humanities dichotomy. Several writers have referred to these two branches of knowledge as the "two cultures" (Snow, 1965) of academia, as the "converger-diverger" world (Hudson, 1968), that is, the scientists and the humanists, or the "left hand-right hand" opposition (Bruner, 1962). There is little doubt that if the effects of parochialism and overspecialization are to be diminished, the barriers between these two formidable giants will have to be further lowered. Some opponents of disciplinary interaction have qualified the movement as being pure dilettantism and a catch to reverse a declining student clientele in the humanities. These criticisms have often been justified because some institutions have introduced the interdisciplinary idea without properly defining how it was constituted and what it entailed on the academic and political side (Doyal, 1974), while others brought it in for reasons whose legitimacy was questionable (Baum, 1975).

METHODOLOGY

There were three main steps involved in the collection and treatment of data used in this study. The first step consisted of selecting a number of disciplines (or professions) which would represent the five following branches of study: the health sciences, the humanities, the natural sciences, the social sciences and others; this last category included representatives of professions other than the health professions. Data were collected on four disciplines for each branch of study. Disciplines which were classified in the same branch of study were referred to as related disciplines whereas all others were labelled as foreign disciplines.

The second step necessitated a three-year analysis of each degree program structure to determine how much latitude departments were theoretically allowing for multidisciplinarity and whether that multidisciplinarity was

directed toward related or foreign disciplines. Since in most disciplines there existed more than one degree program, the structural analysis was conducted only on "specialized" bachelor's degrees or, in cases like Dentistry, Medicine, Pharmacy and Law, on the equivalent degree programs. When a discipline offered more than one orientation to choose from within its specialized degree program, the orientation judged as the most representative of the disciplinary core, and usually the one with a higher student enrollment, was retained. All degree programs were structured along the same lines, that is, compulsory courses, optional courses and free electives. Therefore, the objective of this second step was: a) to establish the proportions that existed among these three course clusters; b) to determine the lower and upper limit of the multidisciplinary range built in each degree program; and c) to find out to what extent provisions made for multidisciplinarity were channelled toward related or foreign disciplines.

In the third step, an induced course load matrix (ICLM) was used to determine in which departments or disciplines student majors were taking their course work. This information led to comparisons between theoretical degree program structures and actual student course preference. The array of coefficients obtained on each row which represented a discipline showed to what extent majors were using multidisciplinary provisions and whether they had a tendency to go out of their branch of study. The ICLM vertical coefficient values were similarly utilized to determine the departmental contribution to other department majors. This flow of credit hours from departments to student majors gave a measure of the degree of service and attractiveness of a discipline to each type of major; it also allowed to establish the relationship between the degree of service or attractiveness of a discipline and the branches of study from which these students were coming from.

ANALYSIS OF THE RESULTS

As mentioned in the previous section, degree program structures of the selected disciplines were analyzed over a three-year period. It was observed that the magnitude of the range allowing for course work outside a

student's area of concentration remained stable in most cases. A very slight increase was noted for Biology, Dentistry and Medicine, while the reverse trend took place for French and Social Work. Therefore, the range established in 1976-1977 was retained as the comparison standard. Table 1 shows the extent to which student majors were provided with the opportunity to go out of their respective departments. The upper limit of the multidisciplinary range varied from a low of 4% (Medicine) to a high of 67% (Biology). For analytical purposes, disciplines were categorized into three groups. The first group represented the disciplines whose upper range limit went from 30% and higher; the second group gathered the disciplines with an upper range limit extending from 20% to 29%; and the third group contained the disciplines allowing from 0% to 19% of outside course work.

A point of interest arose when hypotheses of maximum consumption in a related or foreign branch of study were formulated. If one uses the first discipline of each grouping as illustrations, it can be seen that a biology major was given the chance to consume 67% of his/her course selection outside his/her department; if he/she so elected, he/she was at liberty to choose this full 67% in related or allied disciplines and only a maximum of 9% or 11% in so-called foreign branches of study. In sociology, the upper limit of the multidisciplinary range permitted up to 27% of nonconcentration courses; the sociology major could not take more than 20% of his/her course work in related disciplines while the same major had the freedom to enroll in foreign branches of study for up to 20% or 27% of his/her curriculum. Finally, a psychology major had no restrictions whatsoever imposed on his/her 10% multidisciplinary upper range limit. By and large, disciplines which exhibited a higher upper range limit did not leave more leeway to student majors to get acquainted with foreign disciplines. Their encouragement for multidisciplinarity seemed to be channelled toward closely related disciplines. In fact, a further analysis of the multidisciplinary courses contained either in the concentration requirement or in the optional course cluster revealed that, in many instances, these courses could be considered as core requirements or as "nesessary" courses to support the basic area of specialization. As for the academic majors listed in the last two groups of Table 1, their respective student majors could choose an equal percentage of course work either in their related branch of study or in any other branch; Dentistry was the only notable exception to that general statement.

TABLE 1

MAGNITUDE OF MULTIDISCIPLINARY RANGE AS ANALYZED THROUGH THEORETICAL DEGREE PROGRAM STRUCTURES

	Discipline or Profession	Branch of Study	Upper Limit of Multi-disciplinary Range %	Hypothesis of Maximum Consumptio	
				Related Branch of Study %	Any Other Br of Study %
1.	Biology	NAT	67	67	9-11
2.	English	HUM	50	50	20
3.	Nursing	HEA	45	22	0-13
4.	Physics	NAT	35	35	3
5.	Economics	SOC	33	16	16-33
6.	Elem. Ed.	OTH	33	33	26
7.	French	HUM	33	33	20
8.	Pharmacy	HEA	31	27	9-13
9.	Chemistry	NAT	30	30	3
10.	Sociology	SOC	27	20	20-27
11.	Dentistry	HEA	23	17	0-3
12.	Geography	HUM	23	20	20-23
13.	Social Work	OTH	23	13	13-23
14.	History	SOC	20	20	20
15.	Mathematics	NAT	20	20	20
16.	Philosophy	HUM	20	20	20
17.	Psychology	SOC	10	10	10
18.	Architecture	OTH	7	7	7
19.	Law	OTH	6	6	6
20.	Medicine	HEA	4	0	0-4

Table 2 presents a comparison between theoretical multidisciplinary provisions and actual percentages of student credit hour (SCH) consumption by student majors. Here again, disciplines were classified into three groups in accordance with the behavior patterns of actual percentages of SCHs consumed from 1974-1975 to 1976-1977. In the first four disciplines there was an upward movement of SCH percentages taken outside a student's main subject over this three-year period. Along with this rising trend it could also be observed that the percentages of SCHs consumed in related disciplines were also increasingly high. Physics can be singled out as being an academic major where multidisciplinary SCH consumption was totally concentrated in related disciplines Architecture was an obvious case of introversion in this group.

A SCH consumption stability was observed in the second grouping of disciplines. The previous comment made about Architecture was also applicable to Law, Medicine, and possibly Psychology. With regard to Nursing and Mathematic percentages of consumption were fairly equally distributed between related and foreign disciplines.

Finally, the group representing the majority of the disciplines revealed a decreasing trend of multidisciplinarity. Accompanying this downfall there was also a lowering of percentages of SCHs taken in related disciplines. Pharmacy, Chemistry, Elementary Education and French could be considered as being heavily oriented toward related disciplines. On the contrary, Economics, Geography and Social Work majors were standouts in terms of course preference in foreign disciplines. Economics and Geography have traditionally had a strong inclination toward the natural sciences, while Social Work, to no one's surprise, had an affinity for the social sciences.

A comparison between theoretical multidisciplinary ranges and actual percentages of SCH consumption indicated that, generally speaking, majors did take a percentage of outside course work about equal or lower to the percentage corresponding to the theoretical multidisciplinary middle range. There were more exceptions to that observation in 1974-1975. However, in 1976-1977, only Physics and French majors did not conform to that general rule.

TABLE 2

ACTUAL PERCENTAGES OF SCH CONSUMPTION BY
MAJORS OUTSIDE THEIR BASIC DISCIPLINE
FROM 1974-1975 TO 1976-1977

Behavior Pattern of Actual SCH Consumption	Discipline or Profession	Branch of Study	Theoretical Multidisciplinary Range Min %	(Mid) %	Max %	Actual % of SCH Consumption 1974-1975 Total	Related Branch	1976-1977 Total	Related Branch
↑	1. English	HUM	13	(31.5)	50	26	(16)	27	(22)
	2. Physics	NAT	24	(29.5)	35	27	(27)	33	(32)
	3. Dentistry	HEA	23	(23)	23	19	(14)	23	(17)
	4. Architecture	OTH	0	(3.5)	7	1	(0)	2	(.5)
↔	5. Nursing	HEA	45	(45)	45	45	(26)	45	(24)
	6. Mathematics	NAT	0	(10)	20	10	(5)	10	(5)
	7. Psychology	SOC	0	(5)	10	4	(0)	4	(2)
	8. Law	OTH	0	(3)	6	0	(0)	0	(0)
	9. Medicine	HEA	0	(2)	4	0	(0)	0	(0)
↓	10. Biology	NAT	4	(35.5)	67	28	(16)	21	(8)
	11. Pharmacy	HEA	20	(25.5)	31	27	(25.5)	19	(19)
	12. Chemistry	NAT	20	(25)	30	24	(24)	22	(22)
	13. Economics	SOC	9	(21)	33	21	(1)	20	(1)
	14. El. Educ.	OTH	7	(20)	33	13	(13)	9	(9)
	15. French	HUM	3	(18)	33	26	(24)	19	(17)
	16. Sociology	SOC	3	(15)	27	16	(8)	12	(5)
	17. Geography	HUM	3	(13)	23	12	(1)	11	(1)
	18. Social Work	OTH	3	(11.5)	23	11	(0)	5	(1)
	19. History	SOC	0	(10)	20	15	(7)	8	(4)
	20. Philosophy	HUM	0	(10)	20	13	(7)	10	(7)

When data for departmental contribution to other kinds of academic majors across the institution were laid out, a new disciplinary grouping was achieved (Table 3). The first group gathered all departments whose relative percentage of SCHs contributed to other majors amounted to zero. A second group contained departments which showed a relatively decreased contribution to other majors over the past three years. The last two groups represented the disciplines which had exhibited an increased service contribution to other majors. Among the departments which intensified their service effort, it can be seen that a group showed a decreased number of SCHs contributed to department majors. What it boiled down to in most cases was an enrollment decline in the number of department majors. Mathematics, for example, had a relative percentage contribution ranging from 37% in 1974-1975 to 49% in 1976-1977. Although the Mathematics major enrollment declined considerably, thus accounting for a smaller number of SCHs contributed to the department majors, the department also increased its service to other majors in terms of SCH number. Finally, only five departments exhibited an increased number of SCHs contributing to other majors and to department majors. Because of this increase on both fronts, these five departments could be viewed as having made a true service effort to the student community.

As for the degree of attractiveness of certain disciplines, there was no doubt that the professions listed in the first group were totally closed to other majors. This finding raised the question whether they were closed to outside students because the discipline had no appeal, or whether it was a lack of interest or proper channels to receive students from departments other than their own. In all remaining disciplines appearing in the last three groups of Table 3, it was found that the upward or downward trend of SCH number contribution to other majors was directly related to the ability of the departments to attract students from allied fields of study.

INTERPRETATION OF THE RESULTS

There is little evidence to show that multidisciplinarity, a form of interdisciplinary movement, is a fait accompli at the Université de Montréal. On the contrary, facts seem to portray a situation where theoretical degree program structures welcome breadth through optional courses and free electives, but in fact depth overwhelmingly prevails in most student majors' curricula.

TABLE 3

PATTERN OF DEPARTMENTAL SCH CONTRIBUTION
TO DEPARTMENT MAJORS AND TO OTHER MAJORS
OVER A THREE-YEAR PERIOD.

Discipline or Profession	Relative Percentage of SCHs Contributed to Other Majors 1974-1975	1976-1977	Pattern of the Number of SCHs Contributed To Other Majors	To Department Majors	Overall
1. Architecture	0	0	0	+	+
2. Dentistry	0	0	0	-	-
3. Law	0	0	0	+	+
4. Nursing	0	0	0	-	-
5. Pharmacy	0	0	0	+	+
6. Chemistry	26	19	-	+	+
7. Geography	10	3	-	-	-
8. El. Educ.	5	3	-	+	+
9. Mathematics	37	49	+	-	-
0. Physics	37	36	+	-	-
1. Psychology	23	27	+	-	-
2. English	15	24	+	-	-
3. Philosophy	4	6	+	-	-
4. French	0	3	+	-	-
5. Social Work	1	1	+	-	-
6. Medicine	23	26	+	+	+
7. Economics	24	24	+	+	+
8. Sociology	21	22	+	+	+
9. Biology	9	9	+	+	+
0. History	4	5	+	+	+

Reasons which could explain this state of affairs are numerous (CE, 1977) and intricate; they range from very practical implications such as changes in the present financing formula to philosophical considerations such as the relationship between curriculum content and disciplinary as well as professional function. Without underestimating the importance of the monetary aspect in this issue, it appears that the major building block rests above all on people. The real problem, said Frye(1970), "is not the humanists' ignorance of science or vice-versa, but the ignorance of both humanist and scientist about the society of which they are both citizens" (p. 48). Most faculty members follow a career within disciplines and their legitimate pride in their respective areas of specialization has a tendency to make them forget that social realities call for integration and not isolation. Therefore, those who have the ultimate responsibility for curriculum policies should not expect that the mere creation of flexible curriculum structures will produce the desired effects if there is no concurrent grass-roots campaign to change attitudes and to sensitize the academic community on the agreed-upon priorities.

The widely heterogeneous policies and practices exhibited through the analysis of the results bring into focus the fundamental principle governing the existing curricular arrangement. At the present time, it is clear that the strategy of the institution has been to emphasize the utilization of the various autonomous disciplines to provide students with a multi-perspective approach. Thus it was assumed that somehow different disciplines would make a significant contribution to the formulation and solution of a problem even though this scheme made little or no serious attempt to analyze and synthesize similarities and differences in structure and content among disciplines themselves. It seems that this kind of broad knowledge beyond one's major field and related branch of study was not directive and specific enough to reach the intended learning outcomes the institution had initially hoped for.

Whether academic officers want to take more drastic measures to assure a greater use of existing departmental courses outside one's discipline and related field of study as a way to get students acquainted with the major approaches to knowledge is a matter for them to decide. Even though this type of disciplinary interaction is desirable and necessary to complement the major

concentration areas, as well as to provide for minor concentrations and free electives, it is doubtful that a system based essentially on the autonomy of the disciplines will ever be an efficient vehicle to convey the fundamental broad knowledge, skills, and attitudes intended by curriculum management officials. It is the authors' modest opinion that breadth should be achieved through a scheme which does not necessarily presuppose either the utilization of existing departmental courses or the different institutionally autonomous disciplines. A new set of integrated courses which would expose students to the concepts and methodologies of the various forms of discourse would most likely make a valuable contribution to their specialized education (Harvard, 1978). In a small way, this interdisciplinary approach would transcend the traditional barriers among the disciplines.

FINAL OBSERVATIONS

The results of this study led to a certain number of observations that could be instrumental in raising the general level of understanding of curricular interactions and in reassessing existing policies. First, the present curricular arrangement leaves departments a great deal of flexibility in structuring degree programs; consequently, policies are vastly heterogeneous (Table 1) and do not give the impression of carrying any agreed-upon interdisciplinary priorities. Second, curriculum practices show a degree of incongruity that could hardly be explained just on account of licensure and certification requirements and disciplinary structures. Percentages of SCHs consumed outside majors' main subject ranged from 0% to 45% and indicated a decreasing utilization of out-of-department courses in the majority of the academic majors investigated over a three-year period. Third, there was a high relationship between the degree of multidisciplinarity achieved and the fact that outside courses were being taken in, and offered by, closely related fields of study.

The above observations led to the following considerations:

1) Although multidisciplinarity is desirable and necessary to restrain curricular duplication and parochialism, its limitations make it non-viable as a means to assure basic broad knowledge in the major forms of intellectual discourse.

2) Minimum standards for breadth and maximum standards for depth need to be set in order to assure a basic understanding of knowledge acquisition in main branches of study and to guard against the dangers of overspecialization. The minimum standards could be met through a set of integrated courses which would aim at attacking the traditional autonomy of the disciplines by comparing and synthesizing their different conceptual and methodological approaches.

3) If a similar scheme of integrated work is to succeed, it is imperative that an autonomous faculty group be formed to represent interdisciplinary interests and to defend them politically.

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