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ABSTRACT

This is a selective review of the literature in regard to economic, social-psychological and organizational aspects of institutional size. The introduction contains some tables noting the increased size of individual institutions and the magnitude of changes that have taken place in the number of students enrolled in the nation's institutions of higher learning between 1937-38, 1950-60, and 1967-68. The first and second sections are devoted to a discussion of the various economic and social-psychological aspects of institutional size. The third section examines an alternative to the traditional form of university organization, the cluster college, as a possible organizational adaptation that might allow institutions to grow larger while still providing unique, small, and personalized educational environments. The concluding statement points to the lack of a definitive, widely applicable answer to the question of how big a given college or university should be and summarizes important points to be considered in decisionmaking about questions of size. (Author/AF)

FAMILIES SIZE

SOUTHERN REGIONAL EDUCATION BOARD

CAMPUS SIZE

A SELECTIVE REVIEW

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130 Sixth Street, N. W.
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FOREWORD

Vast increases in the number of students enrolled in institutions of higher education and accompanying increases in institutional size have heightened interest in the question of how big a college or university should be. In response to a request of the Southern Regional Education Board executive committee, the SREB research unit has undertaken this selective review of the literature in regard to economic, social-psychological and organizational aspects of institutional size. The review highlights points which have emerged from research and discussion related to this topic.

Obviously such a review cannot be all-inclusive. Persons interested in questions of institutional size are referred to two additional documents. Perhaps the most extensive treatment of the topic is offered in a publication released in August, 1970, entitled *How Big?: A Review of the Literature on the Problems of Campus Size.*[1] An article entitled "How Big Should a University Be?" by Porter and McMurray of the Iowa Board of Regents also provides a valuable general discussion of the question.[2]

The present review draws upon many of the sources noted in the above publications and cites additional material. In the introduction, a number of tables are presented for the purpose of noting the increased size of individual institutions and the magnitude of the changes which have taken place in the number of students enrolled in the nation's colleges and universities.

The first and second sections are devoted to a discussion of the various economic and social-psychological aspects of institutional size. The third section examines an alternative to the traditional form of university organization, the cluster college, as a possible organizational adaptation which might allow institutions to grow larger while still providing unique, small and personalized educational environments. The concluding statement points to the lack of a definitive widely applicable answer to the question of how big a given college or university should be and summarizes important points which should be considered in decision-making about questions of size.

Winfred L. Godwin
President

INTRODUCTION

Higher education enrollments have mushroomed in the last three decades. Enrollments in colleges and universities increased by 155 percent in the 22-year period 1937-1959[3] (Table 1). In the following eight years, the number of students in higher education institutions more than doubled, from 3.4 million in 1959 to 6.9 million in 1967. If the preliminary estimates of fall, 1970, enrollments made by the U.S. Office of Education are correct, the three-year period 1967-1970 will show an enrollment increase of almost 24 percent, from 6.9 to 8.6 million students.[4]

Table 1
Enrollment Classified According to
Size of Student Body: 1937-38, 1959-60, and 1967-68

Size of Student Body	NUMBER OF STUDENTS					
	1937-38		1959-60		1967-68	
	N	%	N	%	N	%
2,500 and Over	659,476	48.9	2,329,095	67.7	5,474,304	79.2
1,000-2,499	251-266	18.6	597,931	17.4	898,560	13.0
500- 999	193,674	14.4	303,845	8.8	387,072	5.6
250- 499	157,979	11.7	148,864	4.3	117,504	* 1.7
Under 250	85,034	6.3	62,919	1.8	34,560	** 0.5
	1,347,429	100.0	3,442,654	100.0	6,912,000	100.0

*Number and percent in institutions enrolling 200-499 students.
**Number and percent in institutions enrolling under 200 students.

Even within a 30-year period, vast changes have taken place in the type of experience provided for the clientele of higher education institutions. Whereas in the academic year 1937-38 approximately 18 percent of all students were attending institutions with student bodies of less than 500, by the academic year 1967-68 only a little more than 2 percent of all students attended these institutions. Conversely, in the same period, the percentage of students enrolled in institutions with enrollments of more than 2,500 had increased from a little less than 50 to almost 80 percent. More important than the increase in the number of students enrolled, at least to state legislators—as evidenced by the occasional establishment of arbitrary enrollment limitations for public universities—has been the average increase in the size of individual institutions. The feeling grows that institutions may become too large to be manageable, that established institutions may develop to undue proportions at the expense of other regions within the state and that the impersonal character of large institutions might be related to student disturbances.

Moreover, concern over the expanded size of colleges and

universities is not without foundation as the growth of institutions of higher education has been well documented. The average size of colleges more than doubled between 1940 and 1960.[5] In the period 1960-69, average institutional size increased from 1,828 to 3,146 students per institution, an increase of about 72 percent.[6] The vast changes in the distribution of institutions by size of enrollment are reflected in Table 2.[7]

Table 2
Percent Distribution of Institutions,
by Size of Enrollment and Region, 1950, 1960, 1969

Region	PERCENT OF INSTITUTIONS WITH ENROLLMENT OF: Less than 1,000			1,000-4,999		
	1950	1960	1969	1950	1960	1969
All Institutions	76%	63%	48%	18%	28%	36%
New England	79	67	51	16	26	40
Mideast	74	63	46	19	28	37
Southeast	79	69	53	18	26	35
Great Lakes	77	62	51	17	27	32
Plains	84	74	60	12	21	29
Southwest	70	57	38	24	33	41
Rocky Mountains	69	54	33	23	35	44
Far West	66	48	34	27	38	36

Region	PERCENT OF INSTITUTIONS WITH ENROLLMENT OF: 5,000-9,999			10,000 and over		
	1950	1960	1969	1950	1960	1969
All Institutions	3%	5%	9%	2%	4%	7%
New England	3	5	5	1	2	4
Mideast	3	4	11	4	5	6
Southeast	3	4	8	·	2	4
Great Lakes	3	6	8		5	9
Plains	2	3	6		2	5
Southwest	5	6	11	1	4	9
Rocky Mountains	8	6	14	-	6	8
Far West	4	9	14	2	5	15

Most notable is the decrease in the percentage of colleges and universities enrolling less than 1,000, from three-fourths of all institutions in 1950 to less than one-half in 1969. At the same time, the percentage of institutions in the 1,000-4,999 category doubled—from 18 percent to 36 percent. The relative percentage of institutions in the larger categories of 5,000-9,999 and 10,000 and over, each increased more than threefold. It is also apparent that institutions enrolling less than 1,000 students are most common in the Plains states. Conversely, institutions enrolling 10,000 and over are less common in the Southeast and New England and, also in the Plains, than in other areas of the country.

The data in Table 3 illustrate the changes in the distribution of

institutions over an extended period of time. Of interest is the decrease in the percentage of institutions enrolling less than 500 students, from more than two-thirds of all institutions in 1937-38, to slightly more than one-fourth of all institutions in 1967-68.

Table 3

Changes in Number and Size of Institutions: 1937-38, 1959-60, and 1967-68

Size of Student Body	NUMBER OF INSTITUTIONS					
	1937-38		1959-60		1967-68	
	N	%	N	%	N	%
2,500 and Over	95	5.6	316	15.7	615	25.9
1,000-2,499	161	9.5	387	19.2	591	24.9
500- 999	276	16.3	426	21.1	532	22.4
250- 499	438	25.9	407	20.2	344	* 14.5
Under 250	724	42.7	480	23.8	292	** 12.3
	1,694	100.0	2,016	100.0	2,374	100.0

*Number and percent of institutions enrolling 200-499 students.
**Number and percent of institutions enrolling under 200 students.

I. Economic Aspects of Institutional Size

From an economic standpoint, the question "How big should a college or university be?" is one which is receiving increased attention from persons with varied interests in higher education.

To state higher education planning boards, institutional size is of concern from the standpoint of seeing that higher education opportunities are provided for all the people of a state and that unnecessary duplication of highly specialized programs is minimized. A decision by these boards to create a new institution may at the same time be a decision *not* to increase the size of an existing institution. To the state legislator guided by the desire "to get the most educational value for each dollar expended" the question of ideal institutional size may be primarily one of finance and economy of operation.

The administrator in a small college wants to know how many students must be enrolled if the institution is to break even. In the larger university the problem is one of determining marginal costs of operation and of accommodating rapidly rising enrollment increments in an orderly manner.

Historically, there has been little interest on the part of economists in examining the economic aspects of higher education. Economists have generally justified their lack of interest in such problems by noting that the volume of funds expended for higher education has had at best only a limited effect upon the allocation of resources within the economy. With an increase in expenditures for higher education, from $1 billion in 1945-46 to $16.6 billion in 1969-70, however, interest has grown and the economics of higher education has also captured the attention of social scientists, and educators.[9]

A second reason for not exploring the economic aspects of institutional size is the fact that economic analyses of colleges and universities and other such nonprofit organizations are difficult to apply. But as the magnitude of the higher education enterprise increases, the necessity of applying the tools of economic analysis becomes more and more apparent and lack of precedent becomes less of a barrier to initiating progress.

Preceding attempts to look at economic aspects of institutional size *per se* has been a general interest in examining the economic efficiency of higher education institutions. Most provocative in the development of this concern were the thoughts of Frederick W. Taylor, as reflected in such volumes as Clarence Birdseye's *The Reorganization of Our Colleges* (1909)[10] and Morris

Cooke's *Academic and Industrial Efficiency* (1910).[11] Efforts to Taylorize higher education resulted in part from the dominance of representatives of business and industry on boards of trustees during the period 1890-1930.

Taylorization encouraged the belief that academic efficiency could be improved by employing the cost effective methods of industry, thus leading to the development of quantitative standards for higher education institutions by accrediting agencies. These standards specified the number of academic departments, faculty, or library books required for accreditation and made some allowance for differences in enrollment.

Perhaps the first systematic attempt to relate size and costs was the examination of the relationship between the size of an institution and the amount of money expended per student made by Russell and Reeves in their study of higher education finance which was published in 1935. Part of a twelve-volume series focusing upon such areas as higher education organization, administration, staffing, and physical plant entitled *The Evaluation of Higher Institutions*, the volume on finance provided a series of corrective weightings which permitted institutions enrolling less than 1,000 students to compare their per student expenditures with those of larger institutions enrolling 1,000-3,500 students. Expenditures per student were represented as varying inversely with the size of the institution.[12]

Smaller Institutions

The added complexity of institutions with large enrollments in terms of curriculum organization and staff has complicated efforts to obtain comparative data for large multipurpose institutions. Thus the preponderance of cost studies have been aimed at identifying economies of scale in smaller institutions. The findings of several of the more widely circulated studies of smaller institutions, conducted primarily in liberal arts colleges, are noted.

Perhaps the best known studies of cost in the liberal arts college are the series of two studies, known as the "Sixty College Studies," initiated in 1953-54,[13] and repeated in 1957-58.[14] They investigated common patterns of fund sources and expenditures among institutions enrolling 200-600; 601-1,000; 1,001-1,400; and 1,401 or more students. Total educational and general expenditures were found to have increased by 37 percent in the four-year period between the initial study and the restudy. However, the percentage distribution of the eight categories into

which education and general expenditures were subdivided *did not vary by more than a single percentage point* in the significant areas, and rarely more than that in the less significant ones.[15] In addition to establishing that median or average percentages of classes of income and expenditure were reliable as guides, the studies affirmed, more basically, that patterns of sources and expenditures of funds could be identified and compared across institutions.

"The Sixty College Studies" did not make comparisons of unit costs among colleges with varied curricula and size but did point out several relationships between institutional size and the percentage of funds allocated in particular fund groupings. Most notable were the following tendencies:

1. Increased dependence upon student fees as a percentage of educational and general income as enrollment increased from 200-600 to 1,401 or more.
2. Increased dependence upon gifts and grants as an average percentage of educational and general income as enrollment decreased from 1,401 or more to 200-600.
3. Increased percentages of funds expended for general administrative services as enrollment decreased from 1,401 or more to 200-600.
4. Increased percentage of funds expended for instructional purposes as well as departmental research and specialized educational facilities as enrollment increased from 200-600 to 1,401 or more.[16]

A series of studies, representing an extension and considerable modification of the "Sixty College Studies," is being completed by Jenny and Wynn. In a preliminary report issued prior to the completion of the project, the authors examined the nature, structure, growth, and interconnectedness of key college income and expenditure components in 31 small, private liberal arts colleges for the period 1959-60 and 1967-68.[17]

Jenny and Wynn found that tuition inflation was steeper in institutions where growth rates were small. Because marginal full-time equivalent student (FTES) costs were higher in slow rather than rapid growth institutions, these institutions tended to pass added costs onto students in the form of higher tuition, running the risk of pricing themselves out of the market. The authors concluded:

> The most significant finding in this study centers on the effects on FTES costs of varying rates of enrollment growth. The data

suggest—subject to further testing—that there may be a distinct advantage in enrollment growth. In several long range planning schemes with which we have worked there has been concrete evidence of this advantage. Other things being equal, the higher the rate of enrollment growth, the smaller seems to be the marginal addition to FTES cost. This fact has important implications for long range tuition prospects. On balance one would suspect that the higher enrollment growth institutions—other things being equal—will experience a flatter tuition inflation than the colleges with lower enrollment growth rates.[18]

In the first in a series of final project reports, entitled *The Golden Years,* Jenny and Wynn concluded that in the most general sense, among the 48 colleges in the expanded study, there can be an economic advantage in enrollment growth, with the limits of the advantage being determined college by college. Colleges with a high dependence upon endowment and gift income to cover operating expenditures, however, were likely to find enrollment growth associated with rapidly accelerating tuition increases.[19]

Also in *The Golden Years,* Jenny and Wynn made several generalizations about the relationship between the absolute size of enrollment and the growth of income and expenditures in the expanded group of 48 liberal arts colleges in the study. They noted:

> . . . first, the smallest colleges in the group tend to have high full-time equivalent student (FTES) costs; thus one must be able to afford to be very small. Second, the overall FTES cost curve for the sample seems to be mildly downward sloping. Third, colleges with enrollments of 1,300 and more students seem to have below average FTES costs. Fourth, enrollments of 1,500 or more seem to produce both relatively low FTES costs and ample budgets, and we could view these colleges as economically more efficient. A larger sample might have produced a different result.[20]

Among the 48 colleges which in 1960 ranged in enrollment from 257 to 2,156 and which by 1968 enrolled from 476 to 2,513 students, several differences were noted:

> As a unit the four largest colleges in 1968 had the lowest growth rates for major expenditure components, enrollment, and faculty. The 11 smallest colleges had the highest FTES Educational and General and FTES Total Expenditures. In both groups there occurred a moderate increase in the student-faculty ratio.[21]

Furthermore, the 12 colleges in the second largest enrollment group appeared to have the lowest FTES costs and a declining student-faculty ratio as well as mean tuition and fees and total student charges which were the lowest of any group in both 1960

and 1968.

A well known study which also clearly deals with the question of institutional size is Ruml and Morrison's *Memo to a College Trustee,*[22] an investigation completed for the Fund for the Advancement of Education in 1959. Noting that expenditures for educational and general expense represented the single largest expense category, the authors laid out several "models of the possible." The models indicated how institutions enrolling 800, 1,200, or 3,000 students could, by allocating a certain amount of money from each student's tuition, raise faculty salaries and provide curricular diversity by offering only a set number of courses with varied enrollments. The importance of Ruml and Morrison's treatise lies in the fact that it demonstrates that virtually *any* enrollment from 800 to 3,000 can be "ideal" for a given institution provided that prior planning has indicated how revenues derived from a specified enrollment are to be allocated in a manner likely to result in the achievement of institutional purposes.

A study by Hungate, Meeth, and O'Connell suggests that economies of scale might best be effected in liberal arts colleges with appoximately 2,000 students, as class size is also generally larger in these institutions. After examining the curricular offerings of 25 independent accredited liberal arts colleges granting only the bachelor's degree and ranging in size from 468 to 2,115 students, the authors concluded that "average class size increases with increased enrollment up to about 2,000 at which point the relationship levels off."[23] If this is true, as the data in Table 4 seem to indicate, it would suggest that liberal arts colleges with enrollments of approximately 2,000 students have the greatest potential for achieving economies of scale in regard to curricular costs.

Table 4

Class Size in Relation to Institutional Size in Twenty-Five Independent Liberal Arts Colleges in 1962-1963

Enrollment	Number of Colleges	Average Class Size
400- 599	2	17.1
600- 799	3	18.9
800- 999	6	20.6
1,000-1,199	6	21.8
1,200-1,399	5	21.3
1,400 and Over	3	24.6
Total:	25	
Mean: 21.01		

With expenditures for instruction, departmental research, and specialized educational activities representing approximately 50 percent of all expenditures, as reported by the "Sixty College Studies," potential savings could be quite significant.

In summary, research on the economic aspects of smaller liberal arts institutions has failed to yield any clear-cut indications as to just how small an institution may be and still remain economically viable. Nevertheless, although the bases for their recommendations have not in some instances been entirely clear, several economists have noted that a minimum of approximately 1,000 students is necessary if a college is to maintain economic viability. Thus, Harris notes that "A college with less than 1,000 students is likely to be a high-cost operation."[24] Similarly, Drucker indicated that "a minimum of between 1,000 and 1,500 [students] probably closer to the latter," is necessary if a college is to have a firm economic base.[25] In addition, Clark Kerr has recommended 1,000 to 2,000 students as the optimum size range for liberal arts colleges.[26]

Some progress has been made in demonstrating that different rates of expenditure per student and different patterns of fund allocation exist in institutions of varied size. Similarly, progress has been made in demonstrating that institutions enrolling 1,500-2,000 students may achieve economies of scale in regard to class size and that, regardless of size, colleges may be able to achieve their objectives, if adequate planning has taken place.

Larger Institutions

On the other hand, the search for the upper limit of ideal institutional size, due mainly to the greater degree of organizational complexity and curricular diversity, has been inhibited by the unavailability of comparative data which could point to possible means of achieving particular economies of scale. The question of how big a university can be and still remain effective thus remains largely unanswered.

A tentative answer has, however, been offered by Arthur Browne in Illinois who states that the optimum size of an institution in terms of unit costs is between 12,000 and 15,000 students. Browne observed:

> When institutions expand beyond that figure [12,000-15,000] they usually strive to become comprehensive Universities with extensive doctoral programs and research units. Beyond this point, the university changes its complexion. Divisions become professional schools or colleges. Several libraries break out among these profes-

> sional schools instead of housing all volumes under one roof. Public service and extension activities escalate. The more expensive habits of the more prestigious universities are required . . . The moral: you must commence new institutions to siphon off enrollments when existing institutions reach 12,000 students or else you have another large, comprehensive, highly competitive university on your hands which competes with the "dominant" or established university for supremacy on the academic totem pole.[27]

Perhaps with the exception of Browne's work, discussions in regard to the question of enrollment limitations have, for the most part, been qualitative in nature. The Wisconsin Coordinating Council for Higher Education, having given substantial attention to the question, has indicated eight important factors to be considered in projecting maximum enrollments. The factors include:

(1) Mission of the university
(2) Size of the community
(3) Campus-community relationships
(4) Expansion potential of campus
(5) Enrollment potential of campus
(6) Availability of other higher educational opportunity
(7) Efficiency at assigned maximum
(8) Existing enrollment[28]

Harris's observation that "the time required to move from one class to another, if excessive, may ultimately require dropping one class period per day or lengthening the teaching day" adds yet another factor to be considered.[29]

> In a recent speech, Clark Kerr has expressed the belief that: beyond a certain start-up size, as you add so many more students and work with your formula on so many more square feet and so many more faculty, *et cetera,* you save nothing in cost per student.[30]

A strong proponent of having a fairly large number of campuses growing at moderate rates rather than a small number forced to grow at a rapid rate and becoming exceedingly large, Kerr recommended enrollment ranges of 2,000 to 5,000 for community colleges, 5,000 to 10,000 for comprehensive colleges, and 10,000 to 15,000 for universities.[31]

A serious problem exists, however, when one attempts to translate the qualitative discussion of appropriate enrollment factors into quantitative enrollment ceilings. Cases in point are the efforts of various California coordinating boards to project maximum optimum sizes of enrollment.[32] Here, it is clearly evident that increases in recommended limits for enrollment at the

University of California campuses from 20,000 as recommended by the Strayer Report in 1948 to 27,500 as noted in the Master Plan drawn up in 1960 or from 6,000 to 20,000 for the State Colleges are based on little more than the recognition that prospective enrollments are rising rapidly and must be accommodated. The recommended maximum enrollments are far from "hard" ceilings.

The 27,500 figure for university campuses refers to full-time students, while the 20,000 maximum figure for state college campuses refers to FTE enrollment from 8 a.m. to 5 p.m. Depending on curricular mix and the number of additional evening and/or part time students, the latter FTE figure could equate to as many as 32,000 head-count students. The recommended enrollment limits, in view of the great stress placed upon provision of facilities, appear to be "facility or capital budget driven" with little or no regard for marginal costs of operating various curricular programs.

In small colleges, the rate of growth was found to be crucial in determining the rate of tuition inflation. With larger institutions, a controlled growth rate is important if the necessary academic planning, recruitment of faculties and acquisition of libraries and facilities are to take place prior to the appearance of students on campus. Most notable in this respect are the recommendations of a special committee appointed by the Illinois Board of Higher Education to investigate issues related to the questions of institutional size and capacity. The committee recommended that:

> the Board of Higher Education not permit any State college or university to plan for a growth of more than 1,000 F.T.E. students per year. It is further recommended that an institution not be funded for growth that exceeds the 1,000 F.T.E. figure. Moreover, any excess growth that may occur in a given year should be deducted from the growth permitted in the following year.[33]

Also in this regard, although the bases for the recommendations made in the University of California's *Plan for Growth* were not made clear, the more liberal growth rates noted in Table 5 warrant careful attention.[34]

Table 5

Assumed Growth Rates That Allow for Academic Planning, Recruitment of Faculties, Acquisitions of Libraries and All Other Facilities Which Must Precede the Admission of Students

Enrollment	Growth
2,500 and Below	400 Per Year
2,400- 5,000	750 Per Year
5,000-10,000	1,000 Per Year
10,000-20,000	1,500 Per Year
20,000 and Over	2,500 Per Year

In addition to the consideration which has been given to enrollment limitations in larger colleges and universities, studies by Metz and by Dahnke and Mertins have touched upon issues which have also been related to the economy of operations in larger institutions.

Metz's study, conducted in the period 1961-64, is notable for the fact that it examines and compares fund expenditures for each of four basic categories among 390 member institutions of the Southern Association of Colleges and Universities of varied size, these colleges and universities offering instruction at the junior college, bachelor's, master's and doctoral levels.[35] The author demonstrated (1) that the offering of higher degrees is associated with higher expenditures per student, (2) that larger enrollments are associated with lower expenditures per student, provided the highest degree level of institutional offerings is the same, and (3) that these two factors counteract each other. Thus, no overall relationship was found between enrollment and expenditure when all institutions were included in the same analysis.[36] These findings require considerable amplification, however, if they are to be useful in pointing toward possible economies of scale which might be effected in given instances.

Dahnke and Mertins' study entitled *Distribution of Physical Facilities Among Institutions of Higher Education Grouped by Level, Control, and Enrollment Size* is valuable in that it notes the relationship between size and the allocation of space in an institution's physical plant. The report indicates that public and private institutions generally do not commit themselves to providing extensive scientific laboratory facilities until enrollment begins to exceed 2,500. At this point, the percentage of space allocated for laboratories and for offices increases markedly in comparison to the percentage of space allocated for similar purposes in smaller institutions. A notable increase in the percentage of space allocated for laboratories and offices takes place again in institutions enrolling 5,000-9,000 students.[37]

The manner in which institutions allocate the space of their physical plant indicates, to some extent, the types of curricular decisions which have been made. Thus the findings of Dahnke and Mertins would suggest that institutions enrolling less than 2,500 students have not found it economically feasible to offer programs in the sciences which require laboratory facilities. The increase in space for offices in institutions of 2,500-4,999 and 5,000-9,999 also suggests the probability of lighter teaching loads in larger

institutions which would be more likely to offer graduate programs and would therefore require a relatively greater number of faculty members.

Regardless of absolute size, it would appear that colleges and universities should strive to identify growth modules which allow for an orderly expansion of enrollments. Likewise, prime attention should be given to determining the marginal costs of program operations in specified areas. Until institutions develop adequate management information systems, however, little significant progress may be expected in arriving at an economic definition of ideal size for a given institution.

II. Social-Psychological Aspects of Institutional Size

As the mid-sixties approached, the spectre of an antihumanitarian multiversity was increasingly invoked. Particularly since the Berkeley disturbance of 1964 and subsequent campus disorders, the question of the social-psychological problems imposed upon individual students by larger institutional size has received increased attention.

Those in favor of the advantages thought to be offered by large institutions assert that the multipurpose university is really a full blown community, claiming that it harbors a few of all kinds of students who contribute to the educational climate and provide a variety of experiences. However, the president of a large university who receives letters from students who sign only their student numbers is quick to detect the impersonality with which the institution is perceived.

Opinions are not lacking as to the desirability of certain aspects of intellectual and social life found in large and small institutions. In an attempt to provide a substantive base for the expression of opinion, this section notes some of the correlates of institutional size, some of the virtues attributed to small institutional size, some of the effects of size upon learning environments, and some of the relationships between institutional size and the amount of student dissent. As Barton notes, however, the social-psychological implications of institutional size are far from conclusive:

> Size is a major but ambiguous attribute of the social structure of organizations. Size itself has certain necessary, formal consequences for the possible range of interpersonal relations, of communication links, and of levels of authority as conditioned by spans of control. In any given study, classifying organizations by size also classified them by certain kinds of communication, authority, and social relations patterns which are its consequences and in turn have other effects; it is by no means easy to say what intervening variables or incidental correlates size indicates.[38]

Correlates of Institutional Size

One would anticipate that changes in organization within the university, supposedly one of the most rational institutions, would take place in a logical, orderly manner. Keeley's examination of administrative structures in large state universities indicates, however, that university structure, perhaps in the majority of instances, emerges without an overriding rationale.[39] Additional investigations by Boland[40] and by Gross and Grambsch[41] have noted

effects which institutional size has upon a university's organization and goals respectively.

In his survey of 53 state universities enrolling more than 10,000 students, Keeley reported that only nine were able to give an affirmative response to the question "Can you state some principle or set of criteria which might be employed to arrive at a rational and judicious decision on the optimum number of colleges into which a university might organize?" Twelve additional respondents were able to give a qualified "yes" while 22 responded to the question with an unqualified "no." Size of the college and commonality of interrelationships of programs and philosophies were listed most frequently as applicable criteria. Administrative efficiency, economy of operation, the need to preserve academic unity and prevent the fragmentation of knowledge, effectiveness in attaining university goals, and the need for autonomy on the part of certain programs were also indicated.[42]

Keeley also had a difficult time in detecting the rationale upon which university colleges of arts and sciences were divided into departments and divisions. In 48 such colleges, the number of departments ranged from 8 to 41 with three-quarters of the colleges comprising between 15 and 29 departments. Divisional organization was reported to be more common in institutions enrolling less than 20,000 students although the pattern of divisional organization varied markedly.[43]

Boland attempted to determine if size made a difference in the ways in which 115 institutions of higher learning were structured. Rather than examining the probable effects upon organizational structure attributable primarily to differences in technology or environment, Boland limited himself to considering the probable effects which organizational size had in understanding organizational structures and processes.

Increasing size was regarded as a necessary condition for the realization of faculty self-government and collegial authority. Thus the author hypothesized and his data tended to confirm that as size increased: (1) a center would develop which would specialize in mediating in external relations crucial to the maintenance and development of institutional legitimacy and material support and (2) faculty "senates" would become more powerful, with subject matter departments possessing greater autonomy over matters of particular concern to them.

The presence of independent faculty members in departments with relatively high degrees of autonomy who were able to sustain

themselves in the academic market place allowed Boland to characterize larger institutions as "loosely integrated federations of administrative and faculty units." Universities, according to Boland, are characterized by an umbrella structure which is capable of accommodating itself to any number of differing styles of organization.[44]

Gross and Grambsch in their study *University Goals and Academic Power* found that as size of the full-time teaching. research, and administrative staff increased, faculty and administrators reported that different institutional goals were emphasized. Thus, the larger the university, the greater the emphasis which was given to doing research, disseminating new ideas, and keeping up to date, while lower emphasis was assigned to developing pride in the university. Increased enrollment was also found to be associated with slightly greater emphasis upon providing cultural leadership to the community and carrying on applied research.[45]

The Virtues of Small Size

The great bulk of the social-psychological literature focusing upon institutional size appears to favor the environments associated with the smaller institution. Just how small "small" is, however, is generally undefined. Sociologist David Riesman states that an institution is too big when the students look at the faculty and say "they" and the faculty in looking at the students does likewise.[46] In terms of the "we-they" problem, then, the optimum size of various settings is just before the difficult-to-define point beyond which one party can view another party only as "they." Social-psychologist Nevitt Sanford also declines to note specific size categories which are "too big." Ideal institutional size to Sanford is relative, varying inversely with the variety of students admitted. He adds:

> If the group is heterogeneous, a smaller number would allow people to get to know one another more easily; but if it is less various, a larger number would help to increase the diversity. Similarly, if all students share a single curriculum, the institution can safely be larger than if they do not, for a core of common learning tends to pull them together. What the student needs is the social support of a group that is sharing his attempt to re-examine values and to entertain ideas seldom thought about—or even opposed—back home.[47]

Hodgkinson acknowledges that large colleges and universities are commonly thought to provide more options for individual participation. However, he also notes that a number of studies of size in schools, factories, public agencies, task forces, and

discussion groups have indicated a negative relationship between size and individual participation, involvement and satisfaction. Hodgkinson favored a smaller setting where, he concluded, individuals generally experience greater motivation and satisfaction in belonging to the small group.[48]

A recurring theme among those who write about the small liberal arts college is the impact which such institutions have upon the personal development of their students. In his much quoted volume entitled *Changing Values in College*, published in 1957, Jacob concluded that the impact of the college experience was one of socialization (so that the individual could fit comfortably into the ranks of college alumni) rather than liberalization of student values.

Jacob's specific purpose was to see what changes occurred in students' patterns of value during college, and to what extent such changes stemmed from exposure to various types of social science instruction in the general part of the curriculum. Although the question of the impact of institutional size upon student values was not of prime concern, Jacob found that some generally small liberal arts colleges, taken as a whole, had a distinctive atmosphere or a "climate of values" producing a "peculiar potency" for change.[49]

More recently psychologists, particularly Chickering, have adopted the position that institutional size, *per se*, is a prime factor which may enhance a student's personal development.[50] Specifically, institutions enrolling less than 1,000 students are regarded as much more likely to provide a clarity of purpose as well as opportunities for personal participation, involvement and satisfaction which will aid a young adult in managing emotions, establishing identity, freeing interpersonal relationships and developing competence, autonomy, purpose, and integrity.

Chickering's basic point is that any given campus has only a given number of behavior settings which provide opportunities for growth. Leaning heavily upon Barker and Gump's research at the secondary level, as reported in *Big School, Small School*,[51] Chickering notes that although larger schools are likely to have twice as many settings, they may also have 60 times as many students. Having too many people for too few positions is what Chickering terms "redundancy" which is likely to result in decreased opportunity for self-development in a number of different areas.

The Learning Environment

Another aspect of institutional size in which social scientists have shown interest is the probable effect which size has upon the learning environment. Discounting the perennial question of the effect of class size upon student learning, McKeachie and Bordin have dealt instead with the negative effect which they maintain large institutional size is likely to have upon a teacher's enjoyment of his profession.[52] The authors note that increased class size, which Hungate, Meeth and O'Connell found to be associated with increased institutional size, limits the professor's choice of techniques as well as his ability to select the method best suited to his objective or to vary his methods, thus reducing his satisfaction in teaching.

With regard to the quality of the student's learning environment, McKeachie also much preferred the small institution or at least homogeneous grouping of students with similar intellectual interests. He hypothesized that:

> Size of an educational institution has a very similar relationship to the quality of education students receive from one another. The large institution with a student body of heterogeneous background offers students an opportunity to gain breadth, tolerance, and new perspectives from their contacts with one another. But large size is likely to reduce educational values by reducing intellectual interchange between students. There is certainly no reason that a student at a large college could not discuss with his professors an interesting problem raised by one of his professors. But, he is probably more likely to do so if he is living near another student who is also familiar with the problem and concerned about it. In a large college, the statistical chances that another student in the same class will be in the same living group are smaller than in a small college. Students in a large college with many courses, and even many sections of the same course, have few common intellectual experiences. Consequently it is difficult for them to communicate about intellectual problems outside of class, and the common concerns which become the basis of social communication are football, the student newspaper, dating, and the dormitory food. With such barriers to interstudent education the professor misses the good feeling one experiences when he finds that his teaching has provided an intellectual stimulus reaching far beyond his classroom.[53]

Bowers found a direct relationship between institutional size and the proportion of colleges with high levels of cheating. This might be explained in terms of the lack of any overall identification with the institution or its code of ethics on the part of students in larger institutions. Bowers attributed his findings

primarily to the fact that anonymity of numbers helped to provide settings which facilitate the promotion of deviant behavior of this and other types.[54]

Finally, in regard to the learning environment, Brown maintains that institutional size has a very definite effect. Smaller size, according to Brown, is associated with student responses to learning stimuli which were direct, informal, and free in comparison to responses to learning stimuli in larger institutions which were characterized by dependence upon conformity, required procedures, and one-way transmission of approved knowledge. Brown concluded that while closed-circuit television, language laboratories, programmed instruction, visual aids, and computers offered valuable supporting mechanisms, they fell short of providing an effective substitute for "the kind of educational process which is the central concern of the liberal university."[55]

Student Protest and Institutional Size

Since the demonstrations which took place at Berkeley in 1964-65, the volume of literature which has touched, however tangentially, upon the relationship between institutional size and student protest of one form or another has increased dramatically.

Over a seven-year period, the types of protest activity investigated have changed. In the immediate post-Berkeley period, student protest studies focused upon those "planned public expressions of disapproval on the part of groups" which then occurred and which were primarily peaceful in nature. Beginning in 1968-69, research on student activity has focused upon those protests that were either "violent or disruptive." For the most part, recent research conducted in the last year or two has attempted to examine a number of variables which may be related to the occurrence of violent protest or serious disruption in hopes of discovering one or more causal factors.

Institutional size has been a prominently mentioned factor in discussions of student protest. Because the general topic is complex, the spate of articles and reports which have come to view vary in emphasis and in definitions of student protest. Confusion in the interpretation of these studies has inevitably resulted.

Often the results of studies which have encompassed peaceful, nonviolent demonstration of protest activity over a wide variety of issues have been lumped in the public's mind with those which have examined the attitudes of faculty or students toward violent

or disruptive protest activities.[56] On occasion the research which has been reported, has itself been vague in defining the types of activities which have fallen under the rubric of protest activity.[57]

Without attempting to note the methodologies various researchers have employed in their investigations, it is possible to reflect some of the principle points which have evolved in the discussion of the relationship between institutional size and student protest.

In general, most early investigations have noted that the largest number of peaceful, violent, or disruptive protest incidents have taken place in the largest institutions. This should not be surprising as more of most any type of activity might be expected to occur in larger institutions.

Most recently, researchers have begun to point to other factors which have correlated more highly with protest activity than institutional size. Thus Peterson reported that the institutions most prone to violent or disruptive protest were the "federal grant institutions," receiving more than $14 million in federal funds during 1968-69.[58] In addition, Bayer and Astin found that private institutions with particularly high admission standards were about twice as likely to experience major violent or disruptive protest incidents as public institutions. The authors concluded that "the institution's size is related to the occurrence of both violent and disruptive protest but the relationship is confounded by type of control and by level."[59]

Whereas many of the earlier studies simply noted the generally positive relationship between institutional size and the amount of undifferentiated protest activity, more recent, more sophisticated studies have looked at the relationship between the size of institution and particular protest issues. Thus Peterson found non-violent protest activity to be tied more closely to the issues involved than to the size of enrollment.[60] In this regard Astin and Bayer have speculated that the presence of a critical mass of individuals attuned to a particular issue was more important in determining violent or disruptive protest activity than the sheer size of an institution.[61]

Additional investigations have asserted that the rates of undifferentiated protest incidents per 1,000 students or per 10,000 students are no higher in larger than smaller institutions.[62] Alternative hypotheses in regard to the incidence of violent student protest involving such factors as institutional complexity, bureaucratic atmosphere, and degree of selectivity remain to be

explored. Until these and other factors are examined further, it is hoped that attempts to set enrollment ceilings because of the perhaps premature assumption that larger institutions *per se* are more prone to violence will be curtailed, thus allowing discussion of the relationship between institutional size and violent protest activity to proceed on a more enlightened basis.

III. An Alternative Form of Organization: The Cluster College

> It's a question of what functions are going to be served there and what kinds of people will be served, how big classes should be, what the typical experience in class should be and so on. The size of the aggregate doesn't interest me at all. I believe our problems are not total size, but internal organization.[63]
>
> — Roger Heyns

> The *absolute* size of colleges and universities can be misleading, for the effect of size on interpersonal relations and student culture changes markedly with the nature of the organization substructure.[64]
>
> — Burton R. Clark

Beginning in the early and mid-1960s, the American university rediscovered the concept of collegial organization which had its genesis in medieval England with the founding of Oxford University in 1249. Gaff's recent volume, *The Cluster College* (1970) provides a thorough analysis of the cluster college movement which constitutes the American university's attempt to "appear smaller while growing larger."[65]

The first major form which cluster college organization took was the federated or cooperative college approach; it appeared initially at the Claremont Colleges in 1925 and was adopted by the Atlanta University Center of Higher Education in 1929. To date, however, cluster college organizational innovation has been dominated by the subcollege structure—the presence of smaller, semi-autonomous colleges within a larger university. Montieth College of Wayne State University was the first to adopt this subcollege structure in 1959 while Justin Morrill, Lyman Briggs, and James Madison Colleges at Michigan State University also serve as examples of this type of organization.[66]

The motivating factors behind the decision to establish cluster or federated colleges vary widely. Kells lists several of the most important reasons including (1) survival, (2) economy, (3) a more personal environment, (4) a greater chance for innovation, (5) remedy for isolation, (6) seeking coeducational opportunities.[67]

Additional but not mutually exclusive advantages noted by proponents of subcolleges are: (1) the total environment is small enough to be operative on each student; (2) they provide diverse educational experiences within a heretofore monolithic institution, (3) they offer an opportunity for innovation and experimentation, thus constituting a field laboratory for the testing of methods, techniques and philosophical approaches to education,

and (4) smaller subcolleges profit from shared access to academic and library facilities, financial and administrative services, extracurricular activities and the student personnel services of the larger university.[68]

By itself, subcollege collegiate organization represents form without content. The content has been characterized by such academic innovations as independent study, student initiated seminars, tutorials, community government, interpersonal relationships with the students and faculty, and by variations in residential and calendar year arrangements. Organizationally, some universities have chosen to divide the entire institution into subcolleges as at Santa Cruz or San Diego while elsewhere—as at Wayne State and Hofstra—the intent is to provide experimental units.[69]

Curricular organization is usually highly varied, focusing upon a particular area of knowledge such as humanities, social science, or natural science, particular interdisciplinary provinces of knowledge such as "Mind and Spirit," or important social problems. Regardless of how knowledge is organized, however, emphasis is placed upon providing holistic alternative models to the oftentimes irrelevant departmental mode of operation whereby each department assumes responsibility for only a part of one's mind with faculty leaving the rest to professors in other disciplines and to student initiative.

Cluster colleges to their proponents—particularly Martin—represent an attempt to break the academic organizational and educational lock step. Combatting the weight of institutional inertia through structural diversity requires a certain degree of autonomy or freedom from overall university regulations. Of greater importance, however, is a certain value distinctiveness which requires a commitment to creating a special climate of learning. Learning experiences are deeply personal which implies the necessity for making a number of value judgments.[70]

The question of ideal size in regard to cluster colleges is as open to debate as is the question of optimal size for a single unit institution. Gaff reports that the size of various cluster colleges ranges from 200 to 3,000.[71] Martin, however, recommends a limit of 500 to 800 students because "it is impossible for the average faculty member or student to establish his presence in a larger setting." He notes further, "if the faculty is too large for members to know each other by name, there may be no name calling, but neither will there be much personal involvement."[72] Dividing the total population of an institution by the optimal size of the

interpersonal environment provides a quantitative guideline for determining the ideal number of cluster colleges or subunits in a college or university.

A Different Clientele

Studies focusing upon cluster college students generally indicate that clientele of these colleges, which thus far have necessarily been experimental, have tended to differ from students in more conventional institutions in a number of ways. Noting a tendency for self-selection, Heist and Bilorusky reported that cluster colleges attract an atypical high school graduate who brings with him greater motivation for academic pursuits. According to the authors, cluster college students tended to be ". . . more open to change, more tolerant of ambiguities, less authoritarian, less religious, more inclined toward intellectual involvement, and more likely to de-emphasize the vocational and certification aspects of college than are their peers in traditional institutions."[73]

In another study, Newcomb found that residence college students at the University of Michigan, compared with a matched control group not enrolled in residence colleges, showed more personal growth and more satisfaction with faculty, administration and fellow students.[74]

In addition to students, Martin and Wilkinson also found the faculty in cluster colleges to be a distinctive group. Faculty as well as students in cluster college settings were found to be more concerned and knowledgeable about the institution's educational philosophy, more open to challenging conventional approaches to liberal education, more apt to indicate the importance of interdisciplinary courses and of faculty contacts across disciplinary lines than faculty in traditional settings. Cluster college faculty were less inclined than their counterparts within more conventional structures to regard the concept of *in loco parentis* as undesirable or unnecessary and more inclined to feel that a greater effort should be made to bring students and faculty together in unstructured situations.[75]

With cluster college faculty and students differing markedly from their counterparts in conventional institutions, it is not surprising that cluster college environments should be perceived as much different than the environments in the larger "parent" institutions. Thus Gaff, through use of the College and University Environment Scales (CUES), found the environment at Raymond College to be characterized by a much greater perception of

community awareness and scholarship and a significantly lower perception of practicality than in its "parent" body, the University of the Pacific.[76]

Gaff found the intellectual climate at Raymond to be strong. However, on a group basis, a number of values appeared to be lacking, including discipline and order, respect for and commitment to institutions, patience and a future time orientation, sympathetic tolerance for the failing of others, humility about one's own ideas, and a sense of practicality.[77]

Gaff's findings at Raymond tended to support those of Olsen at Michigan State, who also reported that vocational subcultures within the cluster college were virtually nonexistent.[78] These findings are most significant in light of Clark and Trow's contention in their excellent discussion of the relationship between size and complexity that the routinized processing of large institutions does not encourage a serious concern with ideas, thus leading to a consumer orientation to college and the promotion of vocational subcultures.[79]

In summation, it seems probable that, as Martin and Wilkinson concluded, differences between the values, attitudes, interests, and endeavors of faculty and students attracted to cluster colleges as opposed to their colleagues in more conventional academic structures, were generally so great that these differences, perhaps more than details of the programs or size of the subunit, did more to account for variations between cluster colleges and traditional liberal arts colleges than any other factor.

Costs of Cluster College Operation

Efforts to evaluate the economies to be achieved through cluster college operations are hindered by the fact that no systematic studies on *any* major aspect of cluster college programs, including the economic aspect, were started until 1965.[80]

Perhaps, the only extensive look at the relative costs of specific services in individual cluster colleges (the Claremont Colleges) as compared to similar costs in comparable independent liberal arts colleges was taken by Stewart and Kells for the period 1964-67. The authors sought to investigate both the cost and the level of service rendered with regard to library, business office, health and medical services, psychological and counseling center, and maintenance and repair operation in cluster and noncluster colleges.

The authors found that the cost of library operations in the

comparison colleges decreased as the size of the student body increased, at least up to about 1,000, where the trend reversed. A similar trend was found to exist with regard to expenditures for books.

With regard to the cost of business office operations, although no clear pattern of costs developed, Stewart and Kells concluded that "overall the central (business) operation appears to have a financial advantage over the individually operated college business offices of comparison institutions." Health services in the Claremont Colleges were found to provide cost savings and to present a more favorable situation than at most individual colleges.

In such additional areas as the psychological clinic, counseling center, maintenance and repair, the wide range of services available and incompleteness of cost information made it impossible to determine if there were any cost advantages accruing to cluster or non-cluster college operations.

Although Stewart and Kells noted that more extensive studies were needed and that more meaningful cost and service measures needed to be developed, the authors concluded that the Claremont experiences have demonstrated that privately controlled cluster colleges can work together to achieve a level of economy and service which is much needed by many isolated colleges experiencing financial difficulties.[81]

Problem Areas Associated with Cluster College Operations

As numerous authors have noted, cluster colleges offer many positive features. Among the general positive aspects most frequently noted are that they bring flexibility to universities, provide the benefits of a large diversified institution while reviving the humanistic values traditionally associated with small liberal arts colleges, or that they provide a mechanism for promoting innovative programs expressing distinctive educational philosophies.

Despite the several generally recognized advantages, the problems of small size, as noted by Martin, can rival those of bigness.[82] Three main problem areas emerge. The first problem area pointed out by Martin focuses upon a syndrome of potential difficulties which may result from placing undue stress upon personal involvement. A second problem area centers upon the difficulties associated with what is sometimes referred to as the resistance to change syndrome. Such problems are commonly encountered by almost all programs which are innovative in

nature. A third problem area, related to the second, stems from the cluster college's dependence upon the parent institution for faculty who find their promotions dependent upon performance criteria associated with the research orientation of the larger university or academic disciplines rather than upon their interest and skill in teaching, which may initially have led them to the small college setting.

Potential difficulties may, however, be analyzed endlessly. With proper foresight and planning many potential problems need not actually occur. Until, however, we begin to develop some answers to the types of thoughtful questions raised by Kells concerning the cluster college[83] and until we have some idea as to the kinds of impact subcolleges have upon their parent institutions, judgments regarding the cluster college will have to be made with caution.

The cluster college in the several forms which have been adopted in recent years does not represent the only possible alternative for dealing effectively with the problems of great size. Functional differentiation through the establishment of multi-campus centers, graduate centers and upper-division colleges complemented by a greater number of junior colleges designed to handle the increased lower division enrollments represent additional organizational alternatives.[84] It must be noted that the prime rationale for creating these types of institutions, however, is not one of making a larger unit more responsive to educational needs, but is mainly one of rationally distributing educational services for a geographically defined population.

Perhaps the greatest potential benefit which makes the cluster college appear as a most viable alternative for effectively dealing with size is that, as Gaff suggests, it represents a promising means by which the undergraduate liberal arts curriculum, generally forced to play second or third fiddle to graduate instruction and basic research, can once again become the center of attention.

Conclusion

What is the optimal size of an institution? The question as stated is too broad to be answered. Those who ask "How big should a college or university be?" might better ask "What should a college or university be?" or "Whom should it serve in what manner?" Until the desired economic and organizational characteristics as well as interpersonal relationships between and among faculty and students are specified, there can be no "optimum" size which will be ideal for a number or group of institutions.

A college, as Chickering notes, should be "big enough to have a ball game and small enough so all can play."[85] On the other hand, a college or university should be large enough so as to encourage the development of high quality programs which are sufficiently diverse to enable an institution to raise both the quantity and quality of its student body. Quality in the intellectual endeavor should be conceived of as multi rather than unidimensional. It should take into account the height which the educational level rises above initial starting points rather than the achievement scores of students who have always performed well academically. What an institution does with what it has in terms of enhacing the personal and intellectual development of its students is more important than the absolute achievement level of its students on standardized exams. Attainment of the optimum size may only be measured in relation to and is dependent upon the prior existence of well-defined institutional purposes.

Similarly, with regard to size, what an institution does to deal more effectively with size in terms of providing environments for learning which are uniquely fitted to the needs of its students is more important than the absolute size of its enrollment. Recently the large institutions have, in the words of John Gardner "been much maligned." He adds further:

> I have been surprised by the censorious tone with which some critics now refer to large institutions, almost as though in growing to their present size these institutions had deliberately chosen to do an evil thing. This is ridiculous. The critics may, if they wish, attack the American people for being so numerous and fertile. They may, if they wish attack the society generally for holding such a liberal view concerning who should go to college. But they should not attack institutions that are simply trying to accomplish a well-nigh impossible task the society has handed them. The institutions being scolded for largeness today are the ones that have been most responsible to the American eagerness to broaden educational opportunities. We should have the grace to live with the consequences of our choices.[86]

It has been argued that "nobody knows how big a university should be, and at a time of vigorous experiment, nobody needs to."[87] However, institutions of higher education have not, with some notable exceptions, been known for their openness to experimentation. Because experimentation has thus far failed to aid most colleges and universities in arriving at a consensus in regard to optimum size, a summary of concluding thoughts stemming from literature in regard to various economic, social-psychological and organizational aspects of institutional size is provided.

Economic Aspects

Several economists have noted that a minimum of approximately 1,000 students is necessary if a college is to maintain economic viability. Thus, Harris notes that "a college with less than 1,000 students is likely to be a high cost operation."[88] Similarly, Drucker indicated that "a minimum of between 1,000 and 1,500 [students] probably closer to the latter" are necessary if college is to have a firm economic base.[89] In addition, Clark Kerr has recommended 1,000 to 2,000 students as the optimum size range for liberal arts colleges.[90]

For smaller institutions, there is some evidence that economies of scale stemming from larger average class size may be best achieved by institutions enrolling approximately 2,000 students. Additional research indicates that physical plant space allocated for laboratory and office space increases significantly when enrollment reaches the 2,500-5,000 range and increases significantly again when enrollment reaches the 5,000-10,000 category. This suggests that higher education institutions have found it uneconomical to offer extensive science programs unless enrollment exceeds a minimum of 2,500 students.

Whether additional economies of scale with regard to laboratory facilities are also achieved when enrollment reaches 5,000 and even heavier commitments is uncertain. Differing patterns of space allocation do, however, suggest that the instructional nature of higher education institutions changes perceptively as enrollment increases, with science programs receiving more emphasis and increased office space reflecting, in part, lighter teaching loads and heavier commitments to research.

In larger, primarily public institutions, which have been forced to accommodate increased enrollments, added attention is being given to the rate of growth rather than the absolute size of the

institution. The concern is that growth should take place in an orderly manner. Rate of growth in large and small institutions is also being examined in relation to its effect upon rising tuition. A rapid rise in enrollment, provided that it is controlled, has been found to increase the probability that marginal costs of various program operations may be reduced, thus diminishing the need for raising tuition. Eventual leveling off is, of course, inevitable.

Regardless of the size or growth rate of an institution, increased emphasis must be given to identifying modular growth units which will reduce the marginal costs of program operations. Progress in this regard necessitates the development of management information systems which will enable colleges and universities to adopt adequate planning, programming, and budgeting systems.

Social-Psychological Aspects

Colleges and universities should do all in their power to create environments which have positive effects upon learning and personal development. Environments which provide an opportunity for personal expression would do much to reduce the impersonality commonly thought to be associated with the large university. Emphasis should be placed upon grouping individuals in residence and academic units with similar intellectual interests so that they may interact with each other to a greater extent.

The sociological literature in regard to the effects of various peer groups on their members suggests that in the absence of faculty-student contacts, student-student contacts of more than a superficial nature have great potential for bringing about changes in attitudes and value expectations. If the college or university is to be primarily concerned with the development of an individual's intellectual capabilities, it would do well to study the findings of Clark and Trow which indicate that smaller environments are more likely to encourage the development of academic subcultures while larger, undifferentiated environments appear to encourage the development of vocational subcultures in which higher education is likely to be viewed more as a commodity than a developmental experience. Further research is needed which would indicate how knowledge of peer group interaction might facilitate the creation of more productive environments for learning and personal development.

With regard to the question of relationship between institutional size and the occurrence of nonviolent, violent or disruptive

protest activities, most studies of this question indicate that increased size is associated with a greater absolute number of demonstrations and/or disruptive activities. This should not be surprising as more of almost any type of activity may be expected to occur on a larger campus.

Recently a number of studies have indicated that the particular protest issues involved and the presence of a critical mass of individuals attuned to these issues may be more important in regard to the occurrence of violent or nonviolent protest than is size. "Federal grant institutions" and highly selective private institutions have been found to be particularly protest-prone, while some researchers have asserted that the rates of undifferentiated protest incidents per 1,000 or per 10,000 students are no higher in larger than smaller institutions. It is thus, at this point, difficult to say with any degree of finality that larger or smaller institutions *per se* are any more or less protest-prone.

In macrocosm, one way to deal with the question of institutional size is to establish a number of functionally differentiated institutions. The establishment of the upper division college, institutions offering only graduate or professional programs and the vast expansion of junior college lower division instruction has helped to diminish the number of functions served by the multiversity as well as its size.

In microcosm, within a single institution, the relatively small importance which absolute size has upon the functioning of a college or university is expressed in the statement, "It's not how big it is but whether the organizational and interpersonal environment is healthy or unhealthy." It is how the institution is put together and how the various organizational subunits serve the needs of their various constituents while at the same time serving identifiable institutional purposes which determines whether an institution is viable or not.

Real differences exist among institutions of various sizes, especially in terms of the increased emphasis which is placed upon research, both basic and applied, and in terms of the increased faculty influence and departmental autonomy found in larger institutions. These differences are reflected in organizational structure by the ever-expanding number of departments, institutes and research centers as well as the fragmentation of in-class instruction and its separation from extracurricular activity.

"Learning to live with size" is a matter of determining how to break up the overall university into manageable and meaningful

subunits. The relatively recent establishment of the cluster college represents perhaps the most innovative organizational and educational adaptation to increased size. The subcollege in the larger college or university enables an institution to "appear small while growing larger." Ideally, cluster or subcolleges combine the advantages of a smaller institution in terms of small class, close personal contact with faculty and students, a distinctive educational philosophy and a total living-learning environment with the advantages of access to the facilities and services of a large university.

Further research which focuses upon the impacts of such subunits upon their larger "parent" bodies should be conducted. Because the size of organizational subunits or of the entire institution is more dependent upon functions served, and because that which is optimal from one point of view may not be optimal from many other viewpoints, it is unlikely that further research will reveal a fixed "optimum" size for given departments, cluster colleges, or institutions. Additional research should, however, serve to clarify complexities and lead to a better understanding of the issues involved as well as uncover additional problems.

Footnotes

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