DOCUMENT RESUME

ED 036 052 EF 001 838

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TITLE HIGHER-EDUCATION FACILITIES IN MAINE.
INSTITUTION ACADEMY FOR EDUCATIONAL DEVELOPMENT, INC., NEW YORK, N.Y.
PUB DATE SEP 66
NOTE 22P.

EDRS PRICE EDRS PRICE MF-$0.25 HC-$1.20
DESCRIPTORS COLLEGE HOUSING, *COLLEGE PLANNING, *ENROLLMENT, *FACILITY EXPANSION, *FACILITY INVENTORY, FACILITY UTILIZATION RESEARCH, *HIGHER EDUCATION, LABORATORIES, UNIVERSITY LIBRARIES

ABSTRACT

THIS REPORT IS CONCERNED WITH THE EXTENT AND CONDITION OF ACADEMIC AND OTHER FACILITIES OF HIGHER EDUCATION INSTITUTIONS IN MAINE. INFORMATION BEARING ON THE USE OF THESE FACILITIES AND THE PLANS OF INSTITUTIONS FOR ENROLLMENT AND PLANT EXPANSION IS INCLUDED. A NUMBER OF RECOMMENDATIONS ARE MADE CONCERNING THE FUTURE ROLE AND LOCATION OF PUBLIC HIGHER EDUCATION INSTITUTIONS IN MAINE. VARIOUS DEVELOPMENTS AND APPROACHES WHICH THE INSTITUTIONS SHOULD EXAMINE ARE INTRODUCED. ADDITIONAL OBSERVATIONS ARE MADE ABOUT SPECIFIC TYPES OF FACILITIES (LIBRARIES, LABORATORIES, AND COLLEGE RESIDENCES). (FS)

AED

Higher-Education Facilities in Maine

Academy for Educational Development

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HIGHER-EDUCATION FACILITIES IN MAINE

A special report to the Maine State Commission for the Higher Education Facilities Act of 1963. This report was taken from *The First Business of Our Times,* a comprehensive study of higher education in the state of Maine.*

Prepared by a Consultant Panel appointed by the Academy for Educational Development:

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September 30, 1966

*Copies of the complete comprehensive report are available from the Advisory Commission for the Higher Education Study, State of Maine, 1 College Street, Brunswick, Maine 04011.

ACADEMY FOR EDUCATIONAL DEVELOPMENT, INC.
1180 AVENUE OF THE AMERICAS NEW YORK, NEW YORK 10036

September 30, 1966

Mr. William O. Bailey
Chairman
Maine State Commission for the
Higher Education Facilities Act of 1963
State House
Augusta, Maine 04330

Dear Mr. Bailey:

The Academy for Educational Development, as part of its comprehensive study of higher education in Maine, agreed to collect from the higher-education institutions data concerning the extent and condition of academic and other facilities, as well as information bearing on the use of these facilities and the plans of institutions for enrollment and plant expansion during the next few years.

As the Consultant Panel responsible for the Academy's study of higher education in Maine, we are pleased to provide you with this special report which has been taken from our comprehensive report to the Advisory Commission for the Higher Education Study.

Attached to this report are several volumes of materials describing the extent, condition and use of the various facilities at the higher-education institutions in Maine. These data were supplied by the institutions since the scope of the study did not permit an institution by institution survey by the Academy staff or consultants. Compiling these data required a great deal of extra work by the institutions and we would like to take this opportunity to express our appreciation to them for their assistance.

As a result of this study, the respective institutions and your Commis-

sion have considerably more information about the extent, condition, and use of facilities than is the case in many other states. We hope this information is helpful in furthering the much-needed development of higher-education programs in the state of Maine.

Sincerely,

James C. McCain (Chairman)
Norman P. Auburn
Oliver C. Carmichael
Harold B. Gores
Lawrence L. Jarvie
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HIGHER-EDUCATION FACILITIES IN MAINE

If the decisions are made and the actions taken which we have recommended in this report, higher-education enrollment in the state of Maine could more than double in the next 10 years. This possibility means that during the next 10 years the public and private higher-education institutions in the state of Maine must try each year on the average to accommodate 3,000 more students than the previous year in full- and part-time undergraduate and graduate oncampus and offcampus programs which have yet to be designed, the faculty for which has yet to be hired, and programs to be devised. Furthermore, many of the facilities — libraries, classrooms, laboratories, student centers, faculty offices, dormitories, dining halls, student unions — needed to support the total program have yet to be planned and built.

If higher-education construction is viewed as a long-range investment, its cost, compared to the cost of providing instruction and research, does not loom large. Indeed, for most academic buildings the original cost is repeated approximately every four years in the cost of conducting the programs in it. Over the 60-year life of a well-planned, well-constructed building the cost of construction may, according to the Educational Facilities Laboratories, average out at less than one-fifteenth of what will eventually be spent on what goes on in the building, in educational programs and research. To put it another way, the cost of construction of an educational building may be as little as 6 per cent of the total cost of the educational program offered in the building during its lifetime. Therefore, it behooves higher-education institutions to seek quality in the original construction, to plan programs carefully, and, if necessary, to pay higher initial costs to achieve facilities which, over the life of the building, will maximize the productivity of the other 94 per cent of the expenditure associated with it.

The Academy asked all the public and private higher-education institutions in the state of Maine to study and report on the extent, condition, and use of their present educational and auxiliary facilities and their needs and plans for new construction during the next five years. While oncampus surveys, institution by institution, would have been preferable to asking each institution to establish its own needs, the scope of this study did not permit this more thorough approach.

These studies by the institutions were, of course, made without knowledge of what the Consultant Panel's recommendations would be with respect to organization or future institutional roles. The completed reports received plus various summaries of them, for each institution reporting, have been made available to the Maine State Commission for the Higher Education Facilities Act of 1963. From the reports received and the comments of our consultant, the Consultant Panel observes that:

1. In the fall of 1965 about 75 per cent of the assignable square footage in the buildings housing the classrooms, libraries, and laboratories used for instructional purposes in Maine higher-education institutions was generally of good quality requiring, over the next 10 years, only normal maintenance to assure continued utilization. However, most institutions reported that some facilities will require minor or major remodeling and in a few instances plans have been made to eliminate some facilities presently being used because of their location, condition, or age.

The completed and usable reports received from 20 of the 25 institutions in this study show that in nine institutions there is needed remodeling or replacement of 30 per cent or more of the assignable square footage presently used for instructional purposes. Reporting such needs were:

a. Aroostook State College, where over 40 per cent of present assignable area in academic facilities requires remodeling or elimination;
b. Farmington State College, where over 30 per cent of assignable area in academic facilities requires major or minor remodeling;
c. Washington State College, where over 50 per cent of the assignable area requires minor remodeling;
d. St. Francis College, where 30 per cent of assignable area

presently being used is not part of the college's long-range plan but may be used for at least 10 years;

e. Thomas College, where 40 per cent of assignable area presently being used requires minor remodeling or replacement;
f. Westbrook Junior College, where over 90 per cent requires extensive remodeling or replacement;
g. the University of Maine at Orono, where a total of 32.5 per cent of the present assignable area requires remodeling or replacement — 24 per cent requires extensive remodeling, 3.5 per cent minor remodeling, and about 5 per cent requires replacement;
h. the Northern Maine Vocational-Technical Institute, where all the present facilities are reported to require remodeling or replacement; and
i. the Southern Maine Vocational-Technical Institute, where 80 per cent must be replaced or remodeled.

2. Dormitory and feeding facilities of the higher-education institutions in Maine are of generally better quality than are the academic facilities. However, in contrast to academic facilities (which appear in many cases to be underutilized), dormitory and feeding facilities are today filled to capacity and there is little likelihood that additional students could be accommodated in existing facilities at either public or private institutions unless a decision was made to exceed their designed capacity.

Though a great deal of detailed data about each institution reporting has been supplied to the Maine State Commission for the Higher Education Facilities Act of 1963, it should be noted that:

a. there is some indication that the capacity of the dormitories at Orono is being exceeded, at least at the beginning of the year; and
b. Maine Maritime Academy is presently housing its freshman and sophomore classes on their training ship which is on loan from the Federal government; the uncertainty and the unsatisfactory nature of this arrangement suggests that adequate dormitories to house these students should be constructed.

3. Utilization of available space in the academic facilities of higher-

education institutions in the state of Maine, as measured by the "capacity/enrollment ratio", is not high at the present time. For example:

a. capacity/enrollment ratios in Maine today range from 172 to 1,285 with a median of 431;

b. for comparison purposes, in the state of New York the ratios for public and private institutions range from 95 to 606 with a median of 310; and

c. institutions with ratios of more than 300 can usually, our consultant reports, make better use of their existing space by various practices some of which are discussed later in this report.

4. Another and more valid indicator of the extent of space utilization is the "space factor." The space factor indicates the assignable square feet of space available in a classroom or laboratory per student clock-hour taught in this space. The advantage of the space factor is that it combines into one factor the number of hours the room is scheduled, the size of the student stations in the room, the percentage of stations which are actually used when classes are scheduled, and the number of student station hours taught in the room. For example: a room or laboratory would have a space factor of .83 (the classroom space-utilization standard used in the California, Illinois, and Oklahoma master plans) when each student station averaged 16 square feet, the room was used 32 hours per week, and on the average 60 per cent of the student stations were being used when the room was scheduled (the lower the number, the higher the utilization). Our consultant reports that today in Maine higher-education institutions:

a. classroom space factors for public higher-education institutions range from 1.07 to 6.77 with a median of 1.53;

b. space factors for classroom use in private higher-education institutions range from 1.01 to 2.82 with a median of 1.32; and

c. in the state of New York the median space factor for community colleges is .62; for private two- and four-year colleges it is 1.2.

5. With respect to the effective use of space in laboratories, the reports

again indicate that the utilization in Maine higher-education institutions is considerably below that expected in other states where studies have been done and standards have been established. For example:

a. space factors for laboratory use in public higher-education institutions in Maine range from 3.22 to 13.03 with a median of 7.4;
b. in private institutions the range is from 3.33 to 30.68 with a median of 13.10; and
c. in Illinois, California, and Indiana the space factors used as standards for allocations for new laboratory space for public institutions range from 2.9 to 4.6.

6. In the opinion of many experts today a laboratory space factor of 3.0 is appropriate for liberal-arts or teacher-education institutions. In universities, with offerings in technical and agricultural fields, a laboratory space factor of 4.5 is considered reasonable. Although there are exceptions, it appears from the data we were able to assemble and analyze by these two different methods that the utilization of existing academic space is not as high as is being achieved in other states by public and private institutions and, we would suspect, not as high as the institutions in Maine would themselves like to see it.

7. The greatest limitation to the better utilization of classroom and laboratory space in higher-education institutions in the state of Maine at the present time is the extent to which institutions are attempting to offer diversified programs with very low enrollment. Today, all but four institutions have an enrollment under 1,000, a figure which is generally considered the necessary minimum in order to offer a diversified quality liberal-arts or teacher-education program with any reasonable chance of achieving good utilization of space.

As has been stated elsewhere in this report it is the Consultant Panel's belief that enrollment in higher-education institutions in the state of Maine could more than double during the next 10 years if decisions are made promptly to follow the various recommendations we have made. The present situation with respect to the condition of facilities and their utilization suggests that many of the institutions have an unusual opportunity (especially if efforts are made right now to better utilize present space while increasing enrollment) to engage in more careful planning

for future facilities and for their program use than has been possible in the past.

While on the surface and in the aggregate the urgency for substantial expansion does not seem evident, a rapid increase in enrollment, which is likely especially in public institutions, could alter very quickly what appears to be in the year 1965-1966 relatively inefficient use of existing academic facilities in many of the institutions. Of course, a number of institutions have indicated that a substantial percentage (over 30 per cent) of their academic facilities require remodeling. In the process of remodeling, improvements can be made that will enhance the efficiency with which such facilities can be used.

8. The institutions have tentative plans to undertake considerable construction during the next five years. We asked the institutions to report their plans (which in detail have been turned over to the facilities commission) for improving and increasing academic and auxiliary facilities through 1970. The reports received indicate that:

a. the public higher-education institutions presently plan to spend $57 million on new construction during the next five years — $29.1 million on academic facilities, $23.4 million on residential buildings, and $4.5 million on other facilities; and

b. private institutions plan to spend about $27 million — $8.6 million on academic facilities, $13.9 million on residential buildings, and $9.3 million on other facilities.

We asked our consultant to comment on these plans and to suggest how the projected construction might be financed if maximum use was made of Federal and other funds. In his memorandum to us our consultant noted that most institutions, but especially the private ones, are somewhat indefinite about these short-range plans and where the capital is to come from to support them, suggesting that the institutions could make better studies of their needs and on a more formal and continuing basis than the time for this study permitted. With respect to financing the construction of academic facilities, he reports that:

1. Federal grants to Maine under Title I of the Higher Education Facilities Act of 1963 might during the next five years total at least $12.5

million (a conservative estimate)*, which to be fully utilized would require matching funds of $25 million for a total possible expenditure of $37.5 million. The University of Maine will also be eligible for grants under Title II of the Higher Education Facilities Act of 1963 to enlarge graduate facilities. Actually, the institutions which reported to us plan to spend just about this amount for academic facilities during this period.

2. Matching funds ($25 million) would have to be financed by Federal loans, state appropriations, private loans, gifts, and grants.

3. Of the $25 million required for matching, it would be possible to get almost $16 million of the total amount in Federal Title III loan funds at 3 per cent interest, which is a lower rate than that of any other loaning agency at the present time.

4. The remaining 25 per cent (about $9 million) would have to be provided by state appropriations to state institutions and, in the case of the private institutions, by private loan funds, by gifts and grants from individuals, or from other resources which the institutions may have available.

With respect to residential and auxiliary facilities, our consultant noted that:

1. The institutions plan to spend a total of $37.3 million for residential facilities with public institutions accounting for $23.4 million and private institutions $13.8 million. The public institutions in this case plan to finance residential facilities through revenue bonds provided by the state of Maine. The private institutions indicate that they will be able to finance their residential facilities through a number of sources which include the use of gifts and grants, investment funds, and the Housing and Home Finance Agency College Housing Program.

2. It should be noted that the Federal H.H.F.A. College Housing Program provides loans for the construction of residential facilities, dining halls, and student unions at 3 per cent interest. This percentage is less than any other comparable state or private loan fund available to insti-

*Congress may authorize $453 million in fiscal 1967, $700 million in fiscal 1968, and $900 in fiscal 1969. There is some support also for changing the Title I grant formula so that four-year institutions could get up to a 50 per cent grant and two-year institutions up to 60 per cent.

tutions of higher education at the present time. In most cases, it is indicated that the residential facilities will be provided by the use of self-liquidating funds derived from fees charged to students for room and board.

3. A small number of auxiliary buildings are included in the long-range plans. These are student centers, chapels, and other buildings which are not directly related to the academic program or to the residential facilities. In most cases, these facilities will be provided by gifts and grants to the institutions from alumni and other sources. The student centers, however, may be financed using a combination of Housing and Home Finance Agency loan funds and private gifts.

4. In summary, it appears that the long-range planning of capital construction by institutions in the state of Maine is quite indefinite and that most institutions need to make studies of their needs on a much more formal basis than has been the case up to the present time. The need for funds projected, however, appears to be a need which can be met through good use of Federal grant and loan funds, modest state appropriations (for the public institutions), and revenue bonds either through state authorities or through private lending institutions.

In a brief summary of this kind it is impossible to reflect adequately all the problems and plans of each institution. Neither is it possible to put complete confidence in the data that was reported. Many of the institutions had never undertaken a study of their facilities; in many cases institutional records are out-of-date or incomplete, as were a number of the reports submitted. Consistency in institutional evaluating and reporting of space conditions and use is of paramount importance in such a study, but the lack of experience of the institutions and the limited time for the study made such consistency impossible to achieve. Of necessity, the institutions stated their plans in terms of their present view of their role and scope without benefit of the Consultant Panel's recommendations for the future. In spite of these limitations, there is in the state of Maine today, as a result of this study, more data, and in the institutions a better introduction to the need for and concepts of long-range facilities planning than is the case in the majority of the states in the nation.

If there can be any one over-all conclusion to this part of our total study, it is that the individual institutions in the state of Maine, collec-

tively and singly, could be greatly benefited by a continuing series of management studies and seminars aimed at acquainting presidents, deans, business managers, and faculty with the latest ideas and practices in institutional management, and in academic programming and its relationship to facilities planning. Such an undertaking could be a valuable intial effort by the proposed Maine Higher Education Association, aided by outside consultants.

Elsewhere in this report the Consultant Panel has made a number of detailed recommendations concerning the future role and location of public higher-education institutions in the state of Maine. In these recommendations we have specified that:

1. The University of Maine should assume statewide responsibility for all public higher education and within this statewide university system:
   a. Portland, Auburn, Augusta, Machias, Bangor (Dow), and Fort Kent should have university community centers offering terminal and transfer general, technical, and vocational programs for largely a commuting population;
   b. the vocational-technical programs offered at South Portland should be moved to the Portland campus and the South Portland facilities sold for industrial use;
   c. the vocational-technical programs developing in Bangor should be moved to the Dow campus and be combined with the technical programs to be moved from the Orono campus;
   d. the university campus in Presque Isle should be on the site of the state college to which the programs at the Northern Maine Vocational-Technical Institute should be moved as soon as possible;
   e. four-year undergraduate and graduate programs offered in Portland should be moved to Gorham where additional graduate and undergraduate programs should be developed;
   f. consideration should be given to moving the law school to Gorham; and
   g. the Orono campus should increasingly restrict its freshman and sophomore enrollment and take in an increasing number of students as transfers from the university community centers, concentrating more of its work at the advanced undergraduate and graduate level.

The Consultant Panel is not unmindful that in making recommendations as extensive as these, major changes will be required making obsolete the present program and facility plans and projections of the public institutions. Perhaps this is so, but we believe that the arrangements proposed promise a more meaningful, efficient, and exciting public higher-education system for the state of Maine than if present arrangements were simply projected into the future. The Consultant Panel also believes that with the consolidation of facilities and the development of a single structure for public higher education, better plans for the future are not only possible but probable.

We can at best only estimate what the capital costs of effecting these public higher-education arrangements might be over the next 10 years. If the decisions are made to accept these recommendations, we would expect that the University of Maine could within a year develop rather good estimates. Assuming that all needed construction of academic facilities (including classrooms, faculty offices, gyms, libraries, research space) is undertaken on the basis of 120 assignable square feet per full-time equivalent student at an estimated 10-year average construction cost of $30 per square foot, high-quality academic facilities could be provided for about $100 million.

In residential and dining facilities — ass ıming a reduction in the number of resident students in the public institutions from the present overall figure of 62 per cent to 40 per cent because of the increased availability of program and facilities and transportation arrangements — spaces would be needed for 2,400 students at an estimated cost of $5,000 per student or $12 million. Remodeling and renovation costs would be in addition. Assuming that 600,000 square feet should be renovated during the next 10 years at an average cost of $12 per square foot, these costs would be just over $7.8 million. While these are very gross figures and the possibility of error is great, they suggest that for about a total of $120 million in capital costs — if imaginative plans are developed and good space utilization is achieved — the state of Maine could have within 10 years a modern plant for its statewide system of public higher education.

These costs might be reduced considerably if careful planning was done and maximum utilization of space could be achieved. There are many excellent ways to help reduce the cost of construction, to enhance the short- and long-range usefulness of the facilities and to improve the

use of existing space. (Many large institutions have developed special offices to handle planning, scheduling, and other arrangements designed to increase the use of space.) The Consultant Panel believes that the University of Maine, in carrying out its statewide responsibilities for all public higher education, must use these approaches to the fullest extent possible; it should do no less than its counterparts are doing throughout the nation to assure quality education at the lowest possible cost to the taxpayer. Among the developments and approaches which the university should examine and, where practicable, apply are:

1. *Utilizing standardized building components in the construction of academic buildings.* The Educational Facilities Laboratories (a Ford Foundation-supported organization) has sponsored experiments and studies in California, Ohio, Pennsylvania, and in other states on the use of standardized building components for structure, heating, ventilating, air conditioning, lighting, ceilings, and partitions. These standardized components make it possible to build better buildings for schools and colleges more economically and more rapidly, and still with great freedom of exterior design. Not the least of its virtues is the forestalling of educational obsolescence and the premature abandonment of a building which is still structurally serviceable.

In Maine and throughout New England public higher-education institutions and public elementary and secondary schools face large bills for building in the next two decades. It would be useful to investigate whether interstate cooperative efforts in the use of standardized building components could be achieved. Considerable savings to the taxpayers of these states would not be the only by-product; a whole new industry could be created with possible benefits to the economy of each of the states.

2. *Increasing enrollment without increasing space.* It is amazing what an institution of higher education can do when it is forced to look for ways to improve the utilization of space. It is an axiom that a four-year institution of higher education with less than 1,000 enrollment will have a difficult time making good utilization of academic space.

3. *Equating class size and room size.* An institution must look at the size of its classes. On the basis of the information available in this study, it appears that the average classroom in Maine has twice the number of chairs necessary to seat the average class.

4. *Equating stations' size and the cost of square footage.* Few institutions know how much space the function of a student station in a given class or program requires. For example, a seminar room with tables and chairs can be planned for less than the common standard of 25 square feet per student station. Planners should think twice before designing laboratories with both laboratory and classroom type space for occasional lectures. The laboratory generally will not be scheduled as a classroom. It is possible to design a laboratory table so that each student may see the lecturer or audio-visual screen, and take notes without providing separate space for tablet-arm chairs.

5. *Designing an even schedule.* Utilization can be improved immensely by attempting to use the total hours available per week for classes on an even basis, whether it be 30, 35, 40, or 65 hours per week. That is, schedule classes evenly throughout the day and the week. An hour at 4:00 P.M. on Friday should receive as much use as an hour at 10:00 A.M. on Monday, or 11:00 A.M. on Wednesday, or 1:00 P.M. on Tuesday, etc. Stop scheduling on a declining week and providing days with afternoon siestas. Use the evening hours, too.

6. *Using the hour and a half class period.* A curriculum with many three-hour courses can use the 80-minute period to good advantage. Some faculty will complain about the length of the class until they realize that a class scheduled from 8:00 A.M. to 9:20 A.M. on Tuesday and Thursday actually produces 160 minutes a week and the 9:00 A.M. Monday, Wednesday, and Friday class period provides 150 minutes.

7. *Scheduling laboratories in the morning and classrooms in the afternoon.* Laboratories and classrooms can be scheduled in both mornings and afternoons. The traditional afternoon laboratory is becoming extinct. Schedule evenly and fairly.

8. *Eliminating the privileged hour.* Many institutions reserve one hour a week (such as 10:00 A.M. Wednesday chapel service or convocation) for an activity for the entire institution. Do not take these hours out of the heart of the day; put them at the beginning or end of the day and schedule four hours of classes around them.

9. *Scheduling classes on the half-hour rather than the hour.* A stu-

dent will rebel at a 7:00 A.M. class, but can at least be coerced into a 7:30 A.M. class. This schedule will add an hour to each day. Thus a 7:30 A.M.-4:30 P.M. day gives nine hours for scheduling against the 8:00 A.M.-4:00 P.M. schedule of eight hours.

10. *Scheduling through the noon hour.* Most institutions serve noon meals on the cafeteria system. A student with a 11:30 A.M. class can go to lunch at 12:30 P.M. A student with a 12:30 P.M. class can go to lunch at 11:30 A.M. In this way the cafeteria can serve three different shifts of students in the 11:30 A.M.-1:30 P.M. time period.

11. *Projecting course enrollments.* Predicting course enrollments for one year in advance will assist in the development of the master schedule. Then use class size predictions to assign rooms which relate to class size. Faculty are known to be optimistic in anticipating the size of their classes. An administrator or registrar using past experience in class sizes can provide much more reliable projections.

12. *Scheduling small classes in offices.* A class of five or less students can often be taught in a faculty office, or a class with fewer than 10 students may be taught in a conference or seminar room rather than in a formal classroom. Both the student and faculty member benefit from the easy access to the materials available in the office of the faculty member.

13. *Revitalizing the curriculum.* A study should be made of all undergraduate courses regularly enrolling less than 10 students to see if the course should be taught each year, taught every other year, or taught at all. The fewer the courses the larger the class size with much greater opportunities for better utilization of space.

14. *The calendar.* The quarter system, the trimester, or other arrangements make possible a fuller use of the campus throughout the year. Each institution must develop its own calendar. What will work for one institution may, or may not, work for another. But the summer has been wasted in the past. The trimester can increase income while much improving the use of facilities providing the enrollment is adequate.

15. *Using convertible classrooms.* If small classrooms are needed, build them but with a removable wall so that two classrooms designed for

20 students can become one classroom for as many as 50 students should class size change in the future. In such rooms, the wall between two rooms must be nonloadbearing and contain no utilities so that it can be removed in the future.

16. *Using multiple laboratories.* Laboratories for the basic sciences can be designed to serve more than one discipline and multiple courses within one discipline. The required services are provided in the benches and each student is provided with a basket or drawer which he "plugs in" to the laboratory table during his laboratory session with the necessary equipment and elements or specimens. At the end of the laboratory session the student returns the drawer to a movable truck which is wheeled to the preparatory or storage room.

17. *Using partitioned auditoriums and gymnasiums.* A large room used only a few hours a week such as an auditorium, or a large room used many hours a week for a few students can be subdivided into smaller rooms for better utilization by installing operable partitions. The cost of operable partitions has dropped substantially in recent years and their capacity for stopping sound has reached the level of permanent masonry walls. In auditoriums their use can raise utilization from the usual 10 per cent to 90 per cent.

18. *Improving space use through remodeling.* In many old buildings classrooms have been subdivided into offices. As enrollment expands, these old spaces can be remodeled back into classroom space in the heart of the campus and be updated at a low cost to provide better service than improvised offices with poor ventilation, lighting, and no privacy. When a dormitory has become surrounded by academic space, the old dormitory rooms can be converted into office space. This improves the use of space and provides new academic space at a low cost, while new dormitories can be self-amortizing and are more attractive to the student.

19. *Scheduling classrooms by computers.* The St. Louis Junior College District used computers to develop a master plan for classroom scheduling, and estimates that it will save $10 million in construction costs over the next few years through greatly-improved space utilization. Stanford University's computer center was able to obtain a one-third greater room occupancy by computer scheduling of the classes at a high

school in Portland, Oregon (where academic programs have less diversity than could be expected in a junior college). Stanford's program was so successful that 22 schools in the western states contracted for computer scheduling for the fall of 1964. Computer scheduling of classes is also well advanced at Purdue University and at the Massachusetts Institute of Technology.

20. *Awarding college credit by examination.* Students whose education has been obtained through home study, television courses, adult-education courses, or courses offered by industrial or commercial firms or other organizations and agencies not part of an established public or private college or university, should be given appropriate credit if they can pass suitable examinations. Since 1962 the New York State Board of Regents has provided such examinations for teacher certification and for college credit generally. More than 100 colleges and universities in New York now accept the results of these examinations for credit in 22 academic areas as evidence of academic accomplishment. Hundreds of teachers and other students have taken the examinations and the program is considered extraordinarily economical for both the student and the state.

We could find little evidence in Maine which would suggest that institutions were familiar with these many approaches to better utilization of faculty and facilities, let alone examples of serious efforts to apply them, or that such efforts were part of the future plans of institutions. The Consultant Panel believes that the citizens of the state of Maine, who must provide much of the money needed to expand the statewide university system, should expect efforts of these and other kinds in the future, and that they will want also to see evidence that such efforts have been made to provide quality education at the lowest possible cost.

The Consultant Panel believes these additional observations about various types of facilities are in order:

1. *Libraries.* Of all collegiate facilities, the library is undergoing the greatest change. As students are expected to undertake more independent study, as more storable knowledge is produced, as new media for storing and transmitting knowledge are invented, the library grows in size and potential expense. Indeed, unless the various branches and campuses of the statewide university system create a network for sharing library

resources (and possibly open this to the private colleges as well), the cost of supporting libraries capable of serving the needs of all students in the University of Maine, campus by campus, may very well consume money which could be spent on professors or research. With imaginative application of the new carriers of information — tapes, slides, television, and a host of audio-visual mechanisms — and new methods of storage and communication such as the computer, the university should be able to provide excellent library services to all students at reasonable cost to taxpayers.

2. *Laboratories.* Science, too, is in a state of flux. Not only is the subject matter changing rapidly but the lines between the disciplines are fast blurring. Any science building built today will obviously not fit the requirements of even a decade hence. Therefore, there is mounting pressure to design for flexibility and convertibility.

New science laboratories can be constructed to be convertible from chemistry to physics to biology, according to shifting registrations, subject by subject. Conversion can be made quickly from semester to semester and, if necessary, from day to day. A well-constructed laboratory can also be cleared of all equipment to restore the room to conventional classroom use. This is important for colleges offering science below the level of independent research. The laboratory of the future should be viewed as a volume of generalized space made special by its portable equipment. Equipment can be written off through the years as subjects and subject matter change, but the building itself should not have to be written off as unusable before well into the twenty-first century.

3. *College residences.* Colleges have built dormitories for over 300 years and except for improvement in the materials of construction, the dormitory has shown little change through the years. Harold Gores, president of the Educational Facilities Laboratories, in describing this situation, has said:

> "Under the pressure for reducing costs in recent years, the enchantment with cement block has demeaned the dormitory, especially those designed by public bodies, to an inhumane place of nocturnal storage."

Today many higher-education institutions are designing dormitories according to the age and academic status of the occupants. Colleges have suddenly realized that a 17-year-old freshman is vastly different from a college senior or graduate student. Accordingly, dormitories are now

being designed around the age or interests of the occupants, such as the Senior Center at Bowdoin College or the work in California under which, with the Educational Facilities Laboratories assistance, dormitories are being designed so that the interior space is alterable according to the maturity of students assigned to them. To achieve the flexibility desired, a modular system of construction is being used.

Most recently, the private corporations have discovered the American campus as a safe and useful place of investment. Any college or university contemplating new or additional housing today should determine the possibilities of avoiding capital outlay by exploring arrangements with private corporations. From the standpoint of welfare of students and faculty, the concentration of available capital on academic facilities may produce a better college than to have scarce capital diverted toward additional housing.

The image of privately-built dormitories has suffered from the fact that some of the early installations were shoddy. But the quality of design and construction can be dictated by the owner under lease-to-purchase arrangements which guarantee that when the ownership reverts to the college, the dormitory is worth owning.

Many colleges have the land for housing and further, they can guarantee a high rate of occupancy. These two factors are sufficient to entice private capital to fill the need.

Although the job of providing the necessary facilities and equipment for the future of public higher education in Maine looms large, it is not an impossible one. Facilities are an investment and, like any investment, they will only provide a maximum return if they are used to their fullest extent, and planned so that this can be done — today as well as 50 years from now. There are many ways of improving now the use of present facilities and of designing now new ones which will last well into the twenty-first century.

If Maine plans well right now in the context of a cohesive system of public higher education, it is quite probable that over half the cost of these needed facilities can be paid for by Federal grants and another 25 per cent by Federal loans. The state will have to put up its fair share — in appropriations and by assuming some long-term indebtedness — but this could be the most lasting and important investment which the state of Maine will ever make.