A STUDY TO DEVELOP A COST ACCOUNTING MODEL FOR IMPROVED DECISION-MAKING IN HIGHER EDUCATION

by

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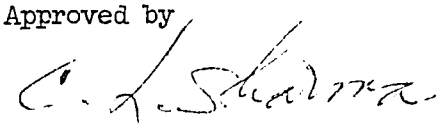

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ABSTRACT

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It was the primary purpose of this study to develop a cost accounting model designed to generate increased awareness of costs by college and university administrators and to provide them with an improved basis for decision-making. A further purpose of the study was to demonstrate the facility with which the cost accounting data may be accumulated and applied to each academic unit without disrupting the institution's normal accounting system. The academic unit used in the study as a focal point for the costs was the student credit hour.

The development of the model was initiated by an in-depth analysis of the annual costs and expenses in an independent four-year college with an enrollment of 1100 full-time equivalent students served by a faculty of 60 full-time members. The required data were obtained primarily from interviews and from the analysis of records and reports of the college.

Operating expenses were obtained from the annual financial statements of the college and were classified as direct or indirect operating expenses. The direct operating expenses were applied directly to the instructional departments on the basis of the administrative records of the college. The indirect operating expenses were allocated to the instructional departments on the basis of student credit hours or

on the basis of building space used by the departments, depending on the nature of the expenses.

Recognizing that capital outlays constitute a major portion of an institution's total expenditures, it was felt that annual capital costs should be included in any meaningful cost study. Since capital outlays are not depreciated in most colleges and universities it would be difficult to obtain these costs from the records. As a practical alternative, estimated annual rental charges were used in this study to represent the annual expired cost of buildings. Conventional depreciation accounting was used, however, to calculate the annual expiration of the other capital outlays.

A summary of the College's costs by instructional departments and by student credit hours permitted an in-depth analysis of the costs of each department on a common basis. The evaluation of these costs facilitated a comparison of departmental operations and pointed up significant differences. The cost accounting model produced in this study, when applied to two colleges of similar size and complexity, provided a basis for further comparison of costs, and demonstrated the practical utility of the model.

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

Recognizing that the major purposes of an educational institution are instruction, research, and public service, the necessity for maintaining and reporting accurate cost accounting data may not be as obvious as in a profit-oriented organization. Although educational administrators are not required to measure profitability, they should be seriously concerned with the detailed costs incurred in the operation of the institution. In order to survive, if for no other reason, these administrators must control their total costs to the extent that they not exceed revenues. More importantly, a thorough knowledge of the institutional costs will permit the administrators to make more meaningful evaluations of performance and to ensure more intelligent decisions on which to base current and future plans. It would therefore appear that the necessity of cost accounting data as a management tool is no less important for educational institutions than for commercial organizations. Unfortunately, as will be reported in subsequent paragraphs, the majority of the institutions of higher education do not perceive the significance of cost accounting as an aid in decision-making.

Most accounting systems and techniques used in private industry can be used effectively in institutions of higher education. However, because the purposes and activities of educational and profit-oriented organizations differ appreciably, a comparative analysis of costs is not always appropriate. In industry, costs may be reduced or eliminated

to provide increased profits, often without any detrimental effects on operations. On the other hand, an indiscriminate reduction of costs in a college may have adverse effects on the educational process and on the community which it serves. In spite of this difference in the approach to costs, both industry and higher education leaders should concern themselves with the efficient utilization of scarce resources and make complete and proper use of accepted accounting principles.

Current Situation in Higher Education

Much has been written in the 1960's and the 1970's about the changing conditions in colleges and universities. Enrollments have increased sharply throughout the country in most institutions. Economic conditions have caused institutional expenditures to inflate in greater proportion than enrollments in some cases. This, coupled with decreases in public grants and private donations, has caused a financial crisis, particularly in the private institutions that must depend to a large degree on private sources of revenue.

According to the Carnegie Commission on Higher Education (1972), higher educational institutions have been shaken by an unprecedented financial crisis during the past few years. The Commission attributed this crisis to such things as 1) the rapid increase in enrollments and the related costs, 2) the increased research and public service performed by the institutions, and 3) the public resentment of student unrest and the consequent reduction in contributions.[1]

Enrollments in higher education have risen from 2.8 million students in 1955 to 7.8 million in 1970, with an expected increase to 11.5

million by 1980, according to a report by Bowen and Douglass (1971). They further state that during the same period (1955-1970), the total expenditures of colleges and universities increased fivefold, from $4.1 billion to $22.5 billion, while grants from government and private sources proved increasingly difficult to obtain. The authors point out that the result has been "financial stringency"as evidenced by the increasing deficits in many private institutions. They suggest that the solution lies in improving efficiency through the reduction of the ratio of costs to output.[2]

Educational institutions have failed to utilize fully the financial data available to them for making sound decisions. According to the handbook edited by Knowles (1970), "...educational institutions have not subjected themselves to cost analysis procedures." He further states that cost analysis can be a useful tool for future internal planning and for external comparisons, and thus avoid misleading comparisons.[3]

A recent evaluation of educational financing by James (1969) was succinctly stated as follows:

> The new emphasis on efficiency is challenging our historic preoccupation with minimum standards, equality, and the pursuit of excellence. The politician of today is unimpressed with demands for more money to schools...The politicians want specific and quantitative information on the school's output and on how much better the schools will be -- a type of information that is not available to school officials from school records as they are now kept.[4]

Although James was referring to public-financed institutions, the problem is equally evident in private institutions in their quest for additional sources of revenue.

In a research report on private colleges, Arthur (1973) states that in realizing the value of education, we have "over-indulged" and that we must now question if we can afford such a massive education system. He also notes that our rapidly rising expenditures are not being supported by an equal rise in contributions, and some of the burden has fallen on the students in increased tuition. As a remedy, he suggests that private colleges obtain better information on which to plan their financial commitments in order to survive the challenge.[5]

There is one encouraging report by Cheit (1973) which pointed out that between 1971 and 1973 there had been a reduction in the rate of increase of college costs. Cheit found in his follow-up study of 41 colleges and universities in 1973, of a study originally made in 1971, that the institutions had gained increased stability. The reductions in costs were attributable however to the elimination of entire instructional programs and departments, and to the increase of student-faculty ratios.[6] It seems to this researcher that a continuation of such drastic reductions could result in a measurable loss in the quality of education in the colleges involved.

Statement of the Problem

The purpose of the study was to develop a cost accounting model which will serve to generate increased awareness of an institution's costs and, in turn, provide a basis for improved decision-making. A further purpose of the study was to demonstrate the facility with which the cost accounting data may be accumulated to provide the cost per student credit hour without requiring a change in the existing accounting system.

The study also sought answers to the following questions:

Is the record-keeping function adequate and in sufficient detail to permit the ready accumulation of cost accounting data?

Are costs and revenues recorded on the accrual basis or on the cash basis?

Are financial reports prepared on a monthly or yearly basis?

Are the costs of buildings and major equipment included in the records?

Definition of Terms

Accrual accounting is the process of recording expenses as they are incurred, and of recording revenue as it is earned, without regard to the disbursement or receipt of cash.

Capital outlays (or capital assets) are those resources that have been acquired for the benefit of the institution and are expected to last more than one year. They consist of such things as land, buildings, and major equipment.

Cost accounting is that form of accounting or record-keeping which is designed to provide the data necessary to calculate the costs of a unit or a department.

Depreciation is a system of allocating the expired costs of capital assets over their estimated useful lives.

Direct costs are the costs incurred in the operation of an instructional department and not including the general and administrative costs of the institution.

Fixed costs are costs that do not tend to vary with the number

of units (student credit hours) and remain relatively stable within a relevant range of units.

Indirect costs are those costs incurred in the operation of an institution with the exception of direct instructional costs.

Instructional costs are the costs incurred within a teaching department and are directly related to the function of instruction.

Unit costs are the total direct and indirect costs of an instructional department related to the student credit hours of instruction provided in the department.

Variable costs are costs that tend to vary in direct proportion to the quantity of units (student credit hours).

Delimitation of the Study

The scope of this study was confined to the development of a cost accounting model based on data obtained from an independent four-year college with an enrollment of approximately 1100 full-time equivalent students. The model was subsequently applied to the data of two other colleges of similar size and complexity for comparative purposes.

CHAPTER I

FOOTNOTES

[1]Carnegie Commission on Higher Education, The More Effective Use of Resources, (New York: McGraw-Hill Book Company, 1972) p. vii.

[2]Howard Bowen and Gordon K. Douglass, Efficiency in Liberal Education, A Report Issued by the Carnegie Commission on Higher Education, (New York: McGraw-Hill Book Company, 1971) p. 2.

[3]Asa S. Knowles, ed. Handbook of College and University Administration, (New York: McGraw-Hill Book Company, 1970) p. 194.

[4]H. Thomas James, The New Cult of Efficiency and Education, Horace Mann Lecture, (Pittsburgh: University of Pittsburgh Press, 1969) p. 19.

[5]William J. Arthur, A Financial Planning Model for Private Colleges: A Research Report, (Charlottesville: University Press of Virginia, 1973) p. 3.

[6]Earl Cheit, The New Depression in Higher Education-Two Years Later, (Berkeley: The Carnegie Commission on Higher Education, 1973) p. v.

CHAPTER II

REVIEW OF THE LITERATURE

Early Cost Accounting Efforts in Higher Education

In the early 1900's the Carnegie Foundation was the leading advocate of the utilization of cost accounting data in colleges and universities. The Carnegie Report of 1907 set the stage for the need for cost accounting as follows:

> It is clear that this question of cost and efficiency has a very close connection with the whole matter of college and university organization...Clear conceptions of the work of a college and of a university are directly related to these questions of efficiency and cost.[1]

In 1917, William H. Allen, a disciple of Frederick W. Taylor, the "father of scientific management," undertook the study of costs in colleges and universities in Wisconsin. In his report, Allen set forth numerous questions that he felt vitally affected education. The questions related to such significant inquiries as, 1) is there a separate account for each major activity? 2) are job and unit costs shown? 3) are costs and revenues accrued? 4) is there a recording of depreciation? and 5) are monthly financial reports prepared?[2]

The above questions indicate an advanced perception of the value of cost accounting in higher education in the early part of the twentieth century. Unfortunately, many of the concepts of accruals, depreciation, and unit costs are still not used in colleges and universities in the 1970's.

A pioneer study of unit costs in higher education was undertaken

by Stevens and Elliott (1925) for the purpose of "...developing a simple common method for the calculation of annual per-student costs of instruction in higher institutions." Although the authors based their study on tax-supported institutions, they felt that the results could be readily applied to all educational institutions of higher education. The study includes the following findings: 1) there is a need for systematizing the accounting method of higher education, 2) the purpose of unit costs is to make more effective the work of higher education, 3) there is a need for standardizing the financial accounting in order to make possible satisfactory cost comparisons, and 4) that unit costs are needed for presentation to the public.[3]

Lindsay and Holland (1930) recommended that educational administrators take an interest in the problems of unit cost accounting, and that they furnish periodic cost statements by department and by unit. In discussing excessive costs, the authors noted that universities utilize available floor space less than 50% of the time, and that "...in no other type of human activity...would such a condition be tolerated."[4]

In 1935, the National Committee on Standard Reports for Institutions of Higher Education was commissioned to make a comprehensive study of current costs in colleges and universities. The Committee concluded that unit costs could be of value in determining student fees, in preparing budgets, and in determining any possible reorganizations. Unit costs could not be used, according to the Committee, in the comparison of institutions unless the institutions were of a comparable size and

complexity. The Committee report was extremely detailed regarding each type of costs and the methods to be used in the allocation of costs to departments. For example, the report proposed the use of a total of 102 separate forms in the preparation of financial data, with 51 of these forms for calculating and allocating costs to departments and to units.[5] Because of the length and complexity of the Committee proposals, it is not surprising that so few colleges and universities have followed the recommendations.

In a paper presented to the General Education Board in 1939, Arnett produced statistical data regarding expenditures in higher education for the years 1927 through 1937. The author found in private colleges the following average percentages of costs by categories: instructional costs 55.2%, plant maintenance 14.5%, administrative and general 15.2%, student aid 7.4%, and other 7.7%. Later similar studies do not differ materially from these early statistics.[6]

Cost Accounting and Unit Costs

In general, the accounting function of any organization is charged with the responsibility of recording, summarizing, reporting, and analyzing the transactions of the organization. Cost accounting specifically is an extension of accounting which is designed to furnish detailed information for the determination of the cost of output or units. Cost accounting is a recognized "tool of management" in most manufacturing, retail, service, or governmental organizations.

It should be noted at this point that the determination of unit costs is often a process of approximation which involves the exercise

of judgment in the accumulation and analysis of the data. This is particularly evident in the selection of the methods to be used in the valuation or allocation of costs. It is therefore important that the approach used in determining costs be practical and comprehendible in order to provide meaningful results.

The distinction between general accounting and cost accounting was further emphasized by Scheps and Davidson (1970). "Expenditure accounting is concerned with funds paid out without reference to the work performed. Cost accounting attempts to relate costs to the units of work."[7]

Robert Williams (1965) stated that "...the calculation of cost is no longer one of the playthings of the educational research worker..." He also stated that some states had laws requiring state-supported institutions to report their costs by academic level, and at least one state required costs to be reported as a ratio to full-time-equivalent students.[8]

In the past there has been some variation in the selection of the academic unit to be measured. According to Witmer (1974), some authorities have considered the unit to be a full-time faculty member, others have used the contact hour, still others have used the class hour or the credit hour.[9] For the purposes of this study it was felt that the student credit hour was the most equitable unit which facilitated the allocation of costs to instructional departments.

Classification of Costs

The value of cost accounting as an effective tool of management

depends to a large degree on the method by which costs are recorded and classified. The record-keeping function must permit the ready accumulation of costs for salaries, supplies, services, and capital outlays. Through the proper classification of costs it is possible to reflect accurately the direct and indirect costs involved.

As early as 1939, Arnett proposed a classification of current expenditures which grouped the following categories of costs: 1) instructional costs, for teaching, research, library, and laboratories, 2) plant maintenance, for operating, repairing, and maintaining the physical plant facilities, 3) administrative and general expenses for overhead of the institution, 4) scholarship and student aid, and 5) other costs.[10] It should be noted that the author did not consider the costs of capital outlays for buildings and major equipment in his analysis of costs.

The classification of costs by Robert Williams (1965) provided greater detail of costs in proposing the following classifications:

Direct instructional costs: faculty salaries, departmental administrative salaries and supplies.

Indirect costs: library, museum, research, registrar, admissions, student services, student aid, public service, general and administrative, plant services, and employee fringe benefits.[11] It was not clear in this report if, or how, the author proposed to classify and allocate the cost of capital assets.

In 1971 O'Neill surveyed the costs of higher education for the years 1930-1967 and reported the following percentage distribution of costs of private colleges and universities (Percentages were rounded to the nearest whole per cent):

	1930	1940	1966	1967
Direct Costs	42%	42%	26%	27%
Indirect Costs	23	25	22	22
Organized Research	2	2	24	22
Auxiliary Services	24	21	16	15
Non-Educational Costs	9	10	12	14

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On the basis of the above data, the most significant change in cost distribution occurred in the expenditures for direct costs for instruction which showed a decrease from 42% in 1930 to 27% in 1967. A simultaneous increase occurred in the expenditures for organized research, from 2% in 1930 to 22% in 1967. This increase in research further supports the previously noted findings of the Carnegie Commission that research costs have increased and that research costs have contributed to the financial crisis now facing many colleges and universities.[13]

It was also noted in the report by O'Neill that the author recommended the inclusion of capital costs in the calculation of unit costs in higher education. Capital costs were defined as the depreciation costs of capital assets and the "foregone interest" which is the income that the assets would bring in alternate uses.[14]

With respect to one major category of costs there appears to be a lack of agreement among the authors reviewed. A few of the authors have included depreciation of capital outlays in their studies, but the majority of writers omit these costs. Since capital outlays constitute a major segment of the total costs of an institution, they deserve additional consideration.

In his report of costs in higher education, Witmer (1974) stated that the costs of capital assets have traditionally been considered

in total costs.[15] There is little evidence to confirm this statement since most writers do not consider capital costs in their studies. Tomlinson and Rzonca (1971) excluded capital costs in their analysis of program costs in junior colleges.[16] Similarly, Cage and Fowler (1971) did not include the cost of capital outlays in determining cost differentials in colleges.[17]

In the study previously cited by Stevens and Elliott, the costs of capital outlays were considered in the total costs of the institution, and the depreciation of the buildings and equipment was included in the unit costs.[18]

A detailed analysis by the National Committee for Standard Reports emphasized the necessity of including "accrued economic costs" in any cost study of higher education. Included in the economic costs were the interest on the funds invested in capital outlays and the depreciation charges on the assets.[19]

The National Association of College and University Business Officers (1974) stated that depreciation expenses of physical plant assets should not be recorded in the records nor reported in the financial statements of colleges and universities. The Association justified its stance on the basis that it is the purpose of higher education to disclose revenues and expenditures rather than net income realized. The Association did further state, however, that this should not preclude the use of expired capital costs in evaluating performance or as a basis for management decision-making.[20] In view of this restrictive policy of the National Association of College and University Business Officers it is unlikely that many colleges would have the

data readily available to compute the expired capital costs.

A practical proposal by the Carnegie Commission on Higher Education (1972) was the suggested use of estimated rental charges to represent the utilization of depreciable capital assets. It was recommended that the estimated rent be allocated to departments based on square footage of the space used in buildings and on the actual utilization of the major equipment. The Commission also stated that rental charges would provide total costs rather than partial costs. The proposal justified the use of rental charges on the following bases: 1) they would provide better justification for budget requests on total costs, and 2) they would dictate more economical utilization of space and equipment.[21] The use of rental charges would provide a very equitable device for the distribution of costs and avoid the task of attempting to extract the costs of buildings and equipment from the records. Furthermore, buildings are often donated to the colleges and are hence not identified by cost. If the rental charges used are reliable, it is expected that the resulting costs will be realistic and practical.

The calculation of depreciation of capital assets has long been a requirement in industry as a means of allocating the expired costs of long-lived assets over the periods of their estimated useful lives, and thus providing a more equitable matching of costs and revenues. The concept of depreciation is new to higher education because it has not been deemed a necessary function in non-profit organizations. The magnitude of capital outlays, however, dictates that they should not be ignored in any cost calculation. The use of depreciation (or rental charges) would serve the purpose of adding the cost of capital outlays to the unit costs.

Cost and Quality

In his analysis of cost and quality, Clark (1963) anticipated that future increases in the quantity of education would result in a greater effort to increase the quality of education proportionately. The author stated that we could meet the quantity problem by spending more money. He also stated that "evidence...suggests that schools that spend more money get a higher quality education."[22] It should be pointed out, however, that Clark's analysis was based on evidence from public schools rather than from higher education.

Another study of cost and quality in education was made by Ikenberry (1962) in which he stated that institutions usually assumed that any attempt to lower instructional costs would eventually result in a decrease in instructional quality. The author commented, however, that a reduction of costs would not necessarily reduce quality. In considering how costs could be reduced without endangering quality, he presented three possibilities: 1) reducing faculty salaries,2) increasing the teaching requirements, and 3) increasing the student-faculty ratio. The author felt that the first two possibilities would both seriously jeopardize the quality of education. In the case of the student-faculty ratio, he cited current research that suggested that large group instruction was no less effective than small group instruction. He concluded by stating that class size was not a crucial variable in determining instructional quality, but it was crucial in the variation of instructional costs.[23]

The major thrust of this study was to promote a greater cost-consciousness among administrators and faculty of higher education

and to provide them with a model for analyzing costs at their institutions. It is felt that with the increased knowledge of costs, administrators and faculty will be able to make more judicious decisions in the effective use of institutional resources. This does not imply that costs should be reduced or changed merely to accommodate financial results. On the contrary, the major function of higher education is to advance knowledge, and any indiscriminate reduction of costs that might adversely affect the purpose of the institution should be carefully examined.

CHAPTER II

FOOTNOTES

[1]Carnegie Foundation for the Advancement of Teaching, Second Annual Report of the President and Treasurer (New York: Carnegie Foundation, 1907) p. 102.

[2]William H. Allen, Self-Surveys by Colleges and Universities (New York: World Book Company, 1917) pp. 132-133.

[3]Edwin B. Stevens and Edward C. Elliott, Unit Costs of Higher Education, A Report for the American Council on Education, (New York: The Macmillan Company, 1925) p. 4.

[4]E. E. Lindsay and E. O. Holland, College and University Administration, (New York: The Macmillan Company, 1930) pp. 101-121.

[5]National Committee on Standard Reports for Institutions of Higher Education, Financial Reports for Colleges and Universities, (Chicago: University of Chicago Press, 1935) pp. 177-247.

[6]Trevor Arnett, "Trends in Current Receipts and Expenditures and in Receipts for Capital Purposes of Endowed Universities and Colleges, and in Current Receipts of State Institutions," Occasional Paper No. 12, (New York: General Education Board, 1939) pp. 48-49.

[7]Clarence Scheps and E. E. Davidson, Accounting for Colleges and Universities, (Baton Rouge: Louisiana State University Press, 1970) pp. 297-298.

[8]Robert L. Williams, The Administration of Academic Affairs in Higher Education, (Ann Arbor: University of Michigan Press, 1965) p. 101.

[9]Donald R. Witmer, "Cost Studies in Higher Education," Review of Educational Research, 1974, XLII 1.

[10]Trevor Arnett, op. cit., pp. 48-49.

[11]Robert L. Williams, op. cit., pp. 101-112.

[12]June O'Neill, Resource Use in Higher Education, (Berkeley: Carnegie Commission on Higher Education, 1971) p. 17.

[13]Carnegie Commission, op. cit., p. vii.

[14]June O'Neill, op. cit., p. 33.

[15]David R. Witmer, op. cit., p. 108.

[16]Robert M. Tomlinson and Chester S. Rzonca, "An Exploratory Analysis of Differentiated Program Costs of Selected Occupational Curricula in Selected Illinois Junior Colleges," 1971 ERIC ED 047 679, p. 4.

[17]Bob Cage and Harmon R. Fowler, "Cost Analysis: First Step Toward Differentiated Funding," 1971 ERIC ED 048 863, p. 5.

[18]Edwin B. Stevens, op. cit., p. 47.

[19]National Committee on Standard Reports, op. cit., p. 189.

[20]National Association of College and University Business Officers, College and University Business Administration (Washington: NACUBO, 1974) p. 179.

[21]Carnegie Commission on Higher Education, op. cit., p. 121.

[22]Harold F. Clark, Cost and Quality in Public Education, (Syracuse, N.Y.: Syracuse University Press, 1963) p. vii.

[23]Stanley Ikenberry, "Instructional Cost and Quality," College and University, Spring 1962, XXXVII 3, pp. 243-245.

CHAPTER III

PROCEDURES OF RESEARCH

Selection of the College to be Studied

It was the plan of this study to develop a cost accounting model based on the accounting and administrative records available at an independent four-year college. The selection of the college which was used in this study was determined from the response to letters sent the presidents of six colleges in the Piedmont area of North Carolina. Recognizing that some colleges may be reluctant to reveal some of the data necessary for this study, the letter was designed to seek the willingness of the presidents to cooperate. (A copy of the letter is included in the Appendix.) Favorable responses were received from three of the colleges, and one of them was chosen for the study. The remaining two colleges were used as a basis for the later application of the model.

Selection of the Instruments

The data pertinent to the study were acquired through personal interviews, questionnaire, and from examination of documents, records, and reports. Personal interviews were conducted with the president and with the vice president of finance of the college. The initial interview with the president was significant in that he was informed of the purpose and scope of the research and he, in turn, indicated his support of the study by granting permission to this researcher to work with the vice president of finance.

Collection and Analysis of the Data

During the first interview with the vice president of finance the purpose and the scope of the study were further discussed and tentative plans were made for the acquisition of the necessary statistics. In the several subsequent meetings with the vice president he provided the requested information from the records and financial reports of the college, including copies of some of the financial statements, insurance reports, and reports on building facilities. During the interviews the vice president answered, among other questions, the following:

> Question: Are costs and revenues recorded on an accrual basis?
> Answer: No, they are recorded on the cash basis, but they are adjusted to the accrual basis on the year-end reports.
> Question: Are financial statements prepared monthly?
> Answer: No, they are formally prepared only on an annual basis.
> Question: Are costs recorded by department?
> Answer: No, costs are recorded by the various funds.
> Question: Are capital outlay costs depreciated?
> Answer: No, we formerly used an estimated depreciation system but it was discontinued in 1974 at the request of our outside auditors.

The information provided by the answers to the above proved to be essential in the accumulation and analyses of the costs of the college.

The head of each instructional department was requested to furnish the information in response to the following questionnaire for each faculty member in his department:

PLEASE INDICATE IN THE SPACES PROVIDED, THE APPROXIMATE TIME SPENT IN THE SERVICES LISTED

INSTRUCTION (including class time, preparation, and counselling with students)	____%
RESEARCH	____
ADMINISTRATION	____
PUBLIC SERVICE	____
TOTAL	100 %

The purpose of the above questionnaire was to ascertain if the faculty members performed functions not directly related to the operation of the instructional department. The responses by the department heads reflected a negligible amount of time of non-instructional activity of the members of the faculty of the college under study. For this reason it was not necessary to provide for any adjustments to the departmental costs provided. It is possible that in some colleges, and particularly in larger colleges and universities, faculty members devote substantial amounts of time to public service and to institutional research and administration, in which cases this questionnaire would be relevant.

The research conducted at the college involved a thorough review of all the costs incurred at the college during the academic year ended May 31, 1975. At the time of the study, the financial statements for the 1976 academic year were not completed, and it was felt that the more recent data would not appreciably enhance the results of the study. The total operating expenses of the college were accumulated, analyzed, classified, and allocated to the various instructional departments. The accumulation of the costs of the

capital outlays was more difficult because of the lack of recorded costs and the necessity of acquiring alternative sources of data. Once the capital costs were obtained, the annual expiration of these costs was calculated and allocated to the instructional departments. A summary of the total expenses and the costs by department and by student credit hour was then prepared.

The majority of the data required for the study was obtained from a series of discussions with the vice president of finance and from the source materials provided by him and his associates. A detailed description of the preparation of the cost accounting model is presented in the following pages.

CHAPTER IV

COST ACCOUNTING MODEL

The college selected to be used as the basis of this study is a coeducational, independent, four-year institution with an enrollment of approximately 1100 full-time equivalent students served by 60 full-time faculty members. The college physical facilities consist of 37 buildings with 312,500 square feet of usable space of which 72,500 square feet are used for direct instructional purposes such as classrooms, laboratories, and departmental offices. The remaining 240,000 square feet are used for libraries, dormitories, auditoriums, gymnasiums, residences, warehouses, recreation, and for plant operations and maintenance.

The average annual revenues of the college during the past two years were $3,000,000 of which 50% was obtained from student tuition and fees with the remainder from auxiliary enterprises (25%), gifts (15%), endowments (5%), and investment income (5%). The auxiliary enterprises include the cafeteria, dormitories, bookstore, and intercollegiate activities.

Based on the audited financial statements of the college for the year ended May 31, 1975, the college appears to be in sound financial condition. The college accounting system is focused on "fund accounting" in which revenues are classified in accordance with the objectives of the donors, and the operating expenses are charged directly to the appropriate funds for which the expenses are incurred.

As will be demonstrated in the following pages, the development of the cost data necessary to calculate departmental and unit costs did not require any revisions of the existing accounting system. For the purposes of this study, cost accounting will involve essentially the compilation and classification of reported operating expenses and the annual costs of capital outlays and the application of these costs to the instructional departments in the most equitable and practical manner.

Operating Expenses

Operating expenses represent the incurrence of expenses for the acquisition of goods and services which have been consumed through the operation of the college during the period being reported. The operating expenses for the college under study for the academic year of 1975 are shown in TABLE 1. The instructional expenses include the salaries and the fringe benefits of the faculty and the departmental staff personnel who are directly associated with particular instructional departments. Also included are the expenses for departmental travel, supplies, and faculty seminars and training. The non-instructional expenses include all other institutional expenses. In the original source data obtained, auxiliary enterprises earned revenue of $795,000 and incurred expenses of $749,000 in 1975 for the operation of the dormitories, dining rooms, and the bookstore. For the purposes of this study it was decided that since auxiliary enterprises are self-sustaining functions, they should only be included on a net basis of revenue less the expenses. Thus, the net income for auxiliary

enterprises of $46,000 was deducted from the total operating expenses as shown in TABLE 1.

TABLE 1
ANNUAL OPERATING EXPENSES
For the Year Ended May 31, 1975

Instructional Expenses:	
Salaries	$ 849,000
Supplies	35,000
Other	10,000
	894,000
General Expenses-Student Services:	
Salaries	174,000
Supplies	54,000
Health Services	45,000
Other	33,000
	306,000
Publicity Expenses:	
Salaries	46,000
Alumni Office	33,000
Other	27,000
	106,000
General Institutional Expenses:	
Insurance	30,000
Telephone & Telegraph	14,000
Other	78,000
	122,000
Kindergarten	14,000
Plant Operations & Maintenance:	
Salaries and Wages	195,000
Utilities	135,000
Supplies, Repairs, etc.	101,000
	431,000
Library	108,000
Student Aid	339,000
General Administration	167,000
Less: Auxiliary Enterprises (Net Income)	-46,000
Total Operating Expenses	$2,441,000

The next step in the study was to summarize the operating expenses and to designate the expenses as direct or indirect operating expenses. In addition it was necessary to determine the methods to be used to

allocate the expenses to instructional departments. It was decided that the most equitable methods of allocation of indirect expenses would be based on student credit hours for the variable expenses and on building space utilization for the fixed expenses (See TABLE 2).

TABLE 2
BASES OF ALLOCATION OF OPERATING EXPENSES
TO INSTRUCTIONAL DEPARTMENTS

Direct Expenses: (Allocate on the basis of faculty department assignment	
Instructional Expenses	$ 894,000
Indirect Expenses:	
a) Variable Indirect Expenses: (Allocate on the basis of student credit hours)	
General Expenses	306,000
Publicity	106,000
General Institutional	122,000
Kindergarten	14,000
Library	108,000
Student Aid	339,000
General Administration	167,000
Less: Auxiliary Enterprises	- 46,000
Total Variable	1,116,000
b) Fixed Indirect Expenses: (Allocate on the basis of building space)	
Plant Operations & Maintenance	431,000
Total Indirect Expenses	1,547,000
Total Operating Expenses	$2,441,000

Although the total direct instructional expenses were readily available, it was necessary to review the administrative records to obtain the departmental classification of faculty members and the departmental staff personnel. The vice president of finance provided the departmental salary data in total by departments. Salaries represented 94% of the instructional expenses with the remaining 6% incurred for supplies, travel, and other. The non-salary portion of instructional

expenses was then apportioned to departments in direct proportion to the salaries. The results of the foregoing allocation of direct operating expenses are reflected in TABLE 3.

TABLE 3
ALLOCATION OF DIRECT INSTRUCTIONAL EXPENSES
TO INSTRUCTIONAL DEPARTMENTS

Instructional Department	Direct Expenses
Biology	$ 52,000
Business	86,000
Education	90,000
English	73,000
Fine Arts	95,000
Foreign Languages	62,000
Human Relations	20,000
Mathematics	46,000
Physical Education	53,000
Physical Sciences	48,000
Psychology	58,000
Religion	61,000
Social Studies	101,000
Sociology	49,000
Total Direct Expenses	$894,000

Most of the indirect operating expenses are of a general and administrative nature and are thus closely related to the number of students enrolled in the college. For example, the activities and expenses of the registrar's office, the admissions office, the placement office, health services, legal services, etc. tend to increase or decrease in direct proportion to the student enrollment and their involvement in the educational activities of the college. This is also true of the expenses of the library, student aid, and publicity. For this reason, all the indirect operating expenses, with the exception of plant operations and maintenance expenses, were allocated to the instructional departments on the basis of student credit hours as shown in TABLE 4.

TABLE 4
ALLOCATION OF INDIRECT VARIABLE OPERATING EXPENSES
TO INSTRUCTIONAL DEPARTMENTS

Instructional Department	Student Credit Hours		Indirect Variable Expenses
	Hours	%	
Biology	1,971	6.2%	$ 69,000
Business	3,127	9.9	110,000
Education	1,942	6.1	68,000
English	3,029	9.6	107,000
Fine Arts	2,517	8.0	89,000
Foreign Languages	2,355	7.6	85,000
Human Relations	492	1.5	17,000
Mathematics	1,479	4.6	51,000
Physical Education	2,364	7.6	85,000
Physical Sciences	1,445	4.6	52,000
Psychology	2,134	6.8	76,000
Religion	2,054	6.5	73,000
Social Studies	4,707	14.9	166,000
Sociology	1,938	6.1	68,000
Total	31,554	100.0%	$1,116,000

The expenses incurred for plant operations and maintenance include such major fixed items as utility costs for electricity, water, fuel oil, and natural gas. Another significant component of plant operations is the wages and supplies for the repair and maintenance of the plant facilities and for the college security force. The nature of these expenditures indicates that they are closely related to the utilization of building space and are considered to be fixed expenses that do not vary with student enrollment. For this reason, the expenses for plant operations and maintenance were allocated to instructional departments based on the estimated use of building space.

In order to allocate the plant operations and maintenance expenses it was first necessary to obtain the data regarding the usable square feet in each building and to ascertain the major use of the space. The preliminary data were available that reflected the usable space

for each building and the quantity used for instructional and non-instructional purposes. The source data regarding building space are discussed in greater detail in the "capital cost" section of this chapter. The direct instructional space of 72,500 square feet was listed by department, and the indirect space was allocated to instructional department on the basis of student credit hours as shown in TABLE 5.

TABLE 5
ALLOCATION OF USABLE BUILDING SQUARE FOOTAGE
TO INSTRUCTIONAL DEPARTMENTS

Instructional Department	Direct Space	Indirect Space	Total Building Space
Biology	4,210	14,900	19,110
Business	1,600	23,800	25,400
Education	3,340	14,600	17,940
English	2,980	23,100	26,080
Fine Arts	7,750	19,200	26,950
Foreign Languages	2,150	18,200	20,350
Human Relations	1,170	3,600	4,770
Mathematics	1,520	11,000	12,520
Physical Education	22,200	18,200	40,400
Physical Sciences	16,370	11,000	27,370
Psychology	2,180	16,400	18,580
Religion	3,200	15,600	18,800
Social Studies	2,380	35,800	38,180
Sociology	1,450	14,600	16,050
Total	72,500	240,000	312,500

From the data in TABLE 5, it was possible to allocate the expenses for plant operations and maintenance to instructional departments on the basis of the square footage of building space allocated to each department as shown in TABLE 6.

TABLE 6
ALLOCATION OF INDIRECT FIXED OPERATING EXPENSES
TO INSTRUCTIONAL DEPARTMENTS
(Based on Building Space)

Instructional Department	Building Space Square Ft.	Building Space %	Indirect Fixed Expenses
Biology	19,110	6.1%	$ 26,000
Business	25,400	8.1	35,000
Education	17,940	5.8	25,000
English	26,080	8.4	36,000
Fine Arts	26,950	8.6	37,000
Foreign Languages	20,350	6.5	28,000
Human Relations	4,770	1.5	7,000
Mathematics	12,570	4.0	17,000
Physical Education	40,400	12.9	56,000
Physical Sciences	27,370	8.8	38,000
Psychology	18,580	6.0	26,000
Religion	18,800	6.0	26,000
Social Studies	38,180	12.2	53,000
Sociology	16,050	5.1	21,000
Total	312,500	100.0%	$ 431,000

A summary of the operating expenses showing the direct expenses, the indirect expenses allocated on student credit hours, the indirect expenses allocated on building space, and the total operating expenses by department is shown in TABLE 7.

TABLE 7

SUMMARY OF TOTAL OPERATING EXPENSES
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Direct Expenses	Indirect Expenses Based On		Total Expenses
		Credit Hours	Space	
Biology	$ 52,000	$ 69,000	$ 26,000	$ 147,000
Business	86,000	110,000	35,000	231,000
Education	90,000	68,000	25,000	183,000
English	73,000	107,000	36,000	216,000
Fine Arts	95,000	89,000	37,000	221,000
Foreign Languages	62,000	85,000	28,000	175,000
Human Relations	20,000	17,000	7,000	44,000
Mathematics	46,000	51,000	17,000	114,000
Physical Education	53,000	85,000	56,000	194,000
Physical Sciences	48,000	52,000	38,000	138,000
Psychology	58,000	76,000	26,000	160,000
Religion	61,000	73,000	26,000	160,000
Social Studies	101,000	166,000	53,000	320,000
Sociology	49,000	68,000	21,000	138,000
Total	$894,000	$1,116,000	$431,000	$2,441,000

Annual Capital Costs

As indicated earlier, the most neglected portion of costs in higher education is the cost of capital outlays, or capital costs. The capital costs of a college or university consist of the long-lived physical assets such as buildings, major plant equipment, instructional equipment, and major items of furniture and office equipment. In this study consideration was given to the major assets including all buildings, major physical plant equipment, and instructional equipment for laboratories, gymnasiums, and other instructional items.

According to the literature previously cited, most colleges and universities do not compute the depreciation of capital assets, and they are not encouraged to do so by the National Association of College and University Business Officers nor by the American Institute of

Certified Public Accountants. However, in order to properly calculate unit costs and the costs by instructional departments it is necessary to include total costs in order to obtain meaningful results. Capital costs usually comprise a major segment of the total expenditures made by colleges and universities, and their annual expiration is significant.

In discussing capital costs with the president of the college under study, it was learned that the college had previously included estimated depreciation charges in its records and reports for several years. The president stated that he felt that the use of depreciation accounting provided him with a better concept of the performance of the college and it permitted the accumulation of funds for future repair or replacement costs. The depreciation accounting was discontinued at the college in 1974 at the request of the public accounting firm auditing the college's annual statements.

In industry, depreciation accounting is the normal procedure used to record the expired portion of the costs of capital assets and to properly match the costs of the period with the revenues received during the same period.

Due to the likely difficulty in obtaining the original cost data of the buildings at colleges and universities, it is suggested that estimated rental charges be used as an alternative method of determining the annual cost of buildings. Although sufficient information was available at the college under study to calculate the depreciation of the buildings, estimated rental costs were used in the study. For comparative purposes, the depreciation costs for the buildings were also computed and are included in the Appendix.

The first step in accumulating the building costs by instructional departments was to ascertain the usable space in each building and to classify the space as instructional or non-instructional. At the college under study there was an available report which presented all the space by major category of use. (If similar information is not available at other colleges, it will be necessary to request the data from the manager of buildings and grounds.) TABLE 8 shows the usable space at the college by building and purpose.

TABLE 8

USABLE BUILDING SPACE (Square Feet)

Building Use	Instructional Space	Non-Instructional Space	Total Space
Maintenance		300	300
Auxiliary Serv.	1,000	5,600	6,600
Gymnasium	2,300	8,800	11,100
Library		7,600	7,600
Library Addition		4,500	4,500
Fieldhouse		3,800	3,800
Classrooms	10,900	6,600	17,500
Dormitories (5)		61,500	61,500
Heating Plant		1,500	1,500
Auditorium	5,000	16,000	21,000
Classrooms	5,900		5,900
Gymnasium	20,900	400	21,300
Community Rel.		1,500	1,500
Dormitory		15,800	15,800
Warehouse		2,800	2,800
Classrooms	26,500		26,500
Residences (6)		20,700	20,700
Dormitory		24,000	24,000
Infirmary		4,400	4,400
Residence		4,800	4,800
Shelter		800	800
Student Center		33,600	33,600
Chapel		7,500	7,500
Residences (4)		7,500	7,500
Total	72,500	240,000	312,000

Prevailing rental charges per square foot for various types of space were studied, with particular assistance from a realty firm near the college. High and low estimates of rental costs per square foot per year were obtained. The average of these estimates was used in the study for each category of use. The following estimated rental costs were used in the study:

Estimated Annual Rental Costs Per Square Foot

Offices	$ 1.75 per square foot per year
Residences	1.35 " " " " "
Warehouses	1.10 " " " " "
Auditoriums	1.25 " " " " "
Gymnasiums	1.00 " " " " "
Classrooms	1.75 " " " " "
Maintenance	1.00 " " " " "

The next step in the development of the cost model was to calculate the estimated rental costs of the building space applicable directly or indirectly to the instruction process. The classroom space was obtained from enrollment records and class assignments for the beginning of the 1975 academic year. As shown in TABLE 9, total classroom space was 20,100 square feet, and other instructional space was 52,400 square feet for a total of 72,500 square feet. Other instructional space includes laboratories, offices, auditoriums and gymnasiums. The allocation of the total instructional space was available in the source material. Also shown in TABLE 9 is the allocation of the non-instructional space of 240,000 square feet to the instructional departments on the basis of the percentage of student credit hours for each department.

TABLE 9
BUILDING SPACE BY INSTRUCTIONAL DEPARTMENT
(Square Feet)

Instructional Department	Instructional			Non-Instructional	Total	% to Total
	Classroom	Other	Total			
Biology	1,260	2,950	4,210	14,900	19,110	6.1%
Business	1,310	290	1,600	23,800	25,400	8.1
Education	1,720	1,620	3,340	14,600	17,940	5.8
English	2,110	870	2,980	23,100	26,080	8.4
Fine Arts	2,200	5,550	7,750	19,200	26,950	8.6
Foreign Languages	1,030	1,120	2,150	18,200	20,350	6.5
Human Relations	630	540	1,170	3,600	4,770	1.5
Mathematics	630	890	1,520	11,000	12,520	4.0
Physical Education	1,310	20,890	22,200	18,200	40,400	12.9
Physical Sciences	1,260	15,110	16,370	11,000	27,370	8.8
Psychology	1,720	460	2,180	16,400	18,580	6.0
Religion	2,400	800	3,200	15,600	18,800	6.0
Social Studies	1,260	1,120	2,380	35,800	38,180	12.2
Sociology	1,260	190	1,450	14,600	16,050	5.1
Total	20,100	52,400	72,500	240,000	312,500	100.0%

In TABLE 10 the estimated annual rental costs are shown for each department. These costs were calculated as the product of the square feet of space and the estimated rental costs per square foot for each department. From this it was found that the total estimated annual rental costs for the instructional space was $107,500, and for the non-instructional space $276,300, for a grand total estimated annual rental cost of $383,800.

Another significant element of the costs of an educational institution is the cost of major equipment. For the purposes of this study, major equipment was defined as consisting of direct instructional equipment and other non-instructional equipment. Direct instructional equipment was considered to be such items as laboratory equipment, music and art equipment, and gymnasium equipment. The non-instructional equipment included furnaces, boilers, air conditioning units, large motors, and pumps. The cost values for the major equipment items were obtained from an annual insurance report dated May 30, 1975. The values in the insurance report were based on estimated replacement costs. Since insurance companies normally prepare similar reports, most colleges will probably have the data available to determine the major equipment costs. The direct instructional equipment was prorated to instructional departments based on the physical departmental location of the equipment. The non-instructional equipment costs were allocated to instructional departments on the basis of the use of building space in accordance with the space percentages from TABLE 9. The total major equipment costs for the college under study were $1,002,000 which were reduced to an annual cost of $50,100 using an annual depreciation

TABLE 10
ESTIMATED BUILDING RENTAL COSTS
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Instructional			Non-Instructional	Total
	Classrooms	Other	Total		
Biology	$ 2,200	$ 5,200	$ 7,400	$ 17,100	$ 24,500
Business	2,300	500	2,800	27,400	30,200
Education	3,000	3,000	6,000	16,900	22,900
English	3,600	1,600	5,200	26,400	31,600
Fine Arts	3,800	6,200	10,000	22,100	32,100
Foreign Languages	1,800	2,100	3,900	21,000	34,900
Human Relations	1,100	500	1,600	4,100	5,700
Mathematics	1,100	1,500	2,600	12,700	15,300
Physical Education	2,300	20,900	23,200	21,000	44,200
Physical Sciences	2,200	26,500	28,700	12,700	41,400
Psychology	2,900	900	3,800	18,800	22,600
Religion	4,100	1,500	5,600	18,000	23,600
Social Studies	2,200	2,000	4,200	41,200	45,400
Sociology	2,200	300	2,500	16,900	19,400
Total	$34,800	$72,700	$107,500	$276,300	$383,800

rate of 5%, assuming an average useful life of the equipment of twenty years as shown in TABLE 11.

It was felt that the costs of library equipment should be treated as a separate category of equipment because of the nature of the library equipment and the method of its allocation to instructional departments. Included in the capital costs of the library were the estimated replacement values of such items as microfilm viewers, projectors, copy machines, recording equipment, bookbinding equipment, book cases, and cabinets. The value of the library equipment of $118,000 was obtained from the insurance appraisal previously mentioned. The cost of books, periodicals, and microfilm were not included in the capital portion because these items are purchased on a regular annual basis and their values are included in the operating expenses of the library. Under the assumption that the library and its facilities are available proportionately to all students regardless of department, the equipment costs were allocated to instructional departments on the basis of student credit hours. The annual cost of the library equipment of $11,800 was calculated on an annual 10% depreciation rate as shown in TABLE 12.

The next step in the development of the model was to summarize the total annual costs of capital assets by department. The magnitude of the annual capital costs of $445,700, as shown in TABLE 13, supports the contention that the annual capital costs are major elements of the costs of higher education and should be included in the study.

TABLE 11
ALLOCATION OF MAJOR EQUIPMENT COSTS
TO INSTRUCTIONAL DEPARTMENTS

Instructional Department	Direct Equipment	Indirect Equipment	Total Costs	Annual Depreciation
Biology	$ 26,000	$ 48,000	$ 74,000	$ 3,700
Business		63,000	63,000	3,200
Education		45,000	45,000	2,200
English		66,000	66,000	3,300
Fine Arts	82,000	67,000	149,000	7,500
Foreign Languages		51,000	51,000	2,600
Human Relations		12,000	12,000	600
Mathematics		31,000	31,000	1,600
Physical Education	73,000	101,000	174,000	8,700
Physical Sciences	39,000	69,000	108,000	5,400
Psychology		47,000	47,000	2,300
Religion		47,000	47,000	2,300
Social Studies		95,000	95,000	4,700
Sociology		40,000	40,000	2,000
Total	$220,000	$782,000	$1,002,000	$50,100

TABLE 12
ALLOCATION OF LIBRARY EQUIPMENT COSTS
TO INSTRUCTIONAL DEPARTMENTS

Instructional Department	Library Equipment Costs	Annual Cost 10%
Biology	$ 7,300	$ 700
Business	11,700	1,200
Education	7,200	700
English	11,300	1,100
Fine Arts	9,400	1,000
Foreign Languages	9,000	900
Human Relations	1,800	200
Mathematics	5,400	500
Physical Education	9,000	900
Physical Sciences	5,400	500
Psychology	8,000	800
Religion	7,700	800
Social Studies	17,600	1,800
Sociology	7,200	700
Total	$118,000	$11,800

TABLE 13
SUMMARY OF ANNUAL CAPITAL COSTS
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Building Rental Costs	Major Equipment Depreciation	Library Costs	Total Capital Costs
Biology	$ 24,500	$ 3,700	$ 700	$ 28,900
Business	30,200	3,200	1,200	34,600
Education	22,900	2,200	700	25,800
English	31,600	3,300	1,100	36,000
Fine Arts	32,100	7,500	1,000	40,600
Foreign Languages	24,900	2,600	900	28,400
Human Relations	5,700	600	200	6,500
Mathematics	15,300	1,600	500	17,400
Physical Education	44,200	8,700	900	53,800
Physical Sciences	41,400	5,400	500	47,300
Psychology	22,600	2,300	800	25,700
Religion	23,600	2,300	800	26,700
Social Studies	45,400	4,700	1,800	51,900
Sociology	19,400	2,000	700	22,100
Total	$383,800	$50,100	$11,800	$445,700

Summary of the Costs

The foregoing computations of operating expenses and annual capital costs were then summarized by instructional departments as shown in TABLE 14. This summary, reflecting the total dollars of cost by departments, provides an informative presentation of the allocation of the total costs of $2,886,700 of the college being studied. In reviewing this summary, an administrator may note, for example, that the social studies department had incurred the highest costs of all the departments with $371,900. Whether this amount may seem excessive depends on the goals and policies of the college and whether social studies is an area of instruction in which this investment may be justified. On the other hand, the summary may indicate the desirability of increasing the program offerings in human relations as an increased attraction for future students. In this manner, the summary of departmental costs can be of value in making decisions in the planning of the curriculum.

Perhaps a more significant administrative tool would be the summary of the departmental costs per student credit hour as shown in TABLE 15. The costs per student credit hour for each element of the costs by department were computed by dividing the costs in TABLE 14 by the student credit hours shown in TABLE 4.

The average total cost per student credit hour as shown in TABLE 15 was $91, ranging from $128 for physical sciences to $79 for social studies. In further reviewing the departmental costs per credit hour it was noted, for example, that in physical sciences $33 of the total $128 per credit hour can be attributed to the allocation of annual

TABLE 14
SUMMARY OF TOTAL COSTS BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 147,000	$ 28,900	$ 175,900
Business	231,000	34,600	265,600
Education	183,000	25,800	208,800
English	216,000	36,000	252,000
Fine Arts	221,000	40,600	261,600
Foreign Languages	175,000	28,400	203,400
Human Relations	44,000	6,500	50,500
Mathematics	114,000	17,400	131,400
Physical Education	194,000	53,800	247,800
Physical Sciences	138,000	47,300	185,300
Psychology	160,000	25,700	185,700
Religion	160,000	26,700	186,700
Social Studies	320,000	51,900	371,900
Sociology	138,000	22,100	160,100
Total	$2,441,000	$445,700	$2,886,700

TABLE 15
SUMMARY OF TOTAL COSTS PER STUDENT CREDIT HOUR
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Costs Per Student Credit Hour		
	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 75	$ 14	$ 89
Business	74	11	85
Education	95	13	108
English	71	12	83
Fine Arts	88	16	104
Foreign Languages	74	12	86
Human Relations	90	13	103
Mathematics	76	12	88
Physical Education	82	23	105
Physical Sciences	95	33	128
Psychology	75	12	87
Religion	78	13	91
Social Studies	68	11	79
Sociology	72	11	83
Average	$ 77	$ 14	$ 91

capital costs. Since the average capital cost per credit hour is $14, the physical sciences portion of $33 is significantly higher. It is understandable, however, that a department requiring substantial laboratory equipment and laboratory space would incur higher than average costs per student credit hour. The fact that the physical sciences department incurred the highest costs per student credit hour in the college is not necessarily indicative of any financial irresponsibility of the department. It may simply reflect that the physical sciences programs are more costly than others.

In reviewing the costs per student credit hour for social studies, on the other hand, it was noted that the capital costs of $11 and the operating expenses of $68 were both substantially below the average costs for these elements. The low costs in social studies can be attributed partially to the minimum requirements for specialized equipment and a minimum of space requirements for instruction.

The review of TABLE 15 further revealed that the education department had incurred a cost of $108 per student credit hour which was substantially above the college average. Since it is unlikely that the education department would require any large amount of specialized equipment or space, an analysis of these costs seemed appropriate. It was determined that most of the above-average costs per credit hour in the education department were in the operating expenses of $95 per credit hour. Referring back to TABLE 7 it was found that the education department had incurred $90,000 cost for direct operating expenses for faculty, staff, and supplies. A discussion of these costs with the vice president of finance of the college under study revealed

that the education department had maintained a student/faculty ratio of five fewer students per faculty than in the college as a whole. This reduced ratio resulted in an escalation of the cost in the education department of $19 per student credit hour. Thus, the total cost per student credit hour for the education department, assuming the average student/faculty ratio of the college, would have been $89 instead of $108. Such an analysis is significant and may indicate the need to review the policies and practices of the department.

In a manner similar to the foregoing analyses, the costs per student credit hour of each department may be evaluated in depth by cost element and compared with the average costs per unit of the college or with the costs per credit hour of the other departments. The cost accounting data shown in TABLE 15 and the previous tables may also serve to facilitate a year-to-year comparison of the costs in each department to determine and analyze any major annual deviations.

The costs per student credit hour by department obtained through the development of the cost accounting model were then compared with similar cost data in two other colleges of approximately the same size and complexity as described in the next chapter.

CHAPTER V

APPLICATION OF THE COST ACCOUNTING MODEL

The cost accounting model developed in the prior chapter was applied to two other colleges of comparable size and complexity. The selection of the colleges used for the application was based on the original response from colleges described in Chapter III. For the purpose of the remainder of this study, the college used as a basis for the development of the model will be referred to as "College A" and the colleges used for the application of the model as "College B" and "College C." A summary of some of the pertinent data regarding each college is shown below:

	College A	College B	College C
Full-Time Equivalent Students	1,100	1,400	2,000
Full-Time Equivalent Faculty	60	85	82
Annual Student Credit Hours	31,554	39,749	52,549
Student/Faculty Ratio	18.3/1	16.5/1	24.4/1
Usable Building Space (sq. ft.)	312,500	364,000	347,900

Colleges B and C, like College A, are independent four-year colleges located in the Piedmont area of North Carolina. The curriculum offerings at Colleges B and C correspond generally with the curriculum at College A. In order to facilitate the comparison of the colleges, the departmental organization at Colleges B and C were arranged in the same order as reflected for College A. One exception, however, is a special program offered at College B which has been shown in a separate category and is not described in this study in order to preserve the anonymity of the College.

Accumulation of College B Costs

The operating expenses for College B of $3,815,000 were obtained from the College's financial statements for the academic year ended May 31, 1975. The operating expenses of College B were classified as direct instructional expenses and indirect expenses. The bases of the allocation of the operating expenses for College B were the same as for College A. The direct instructional expenses were allocated to the instructional departments on the basis of the departmental assignments of the faculty and staff personnel as revealed in the administrative records. The indirect operating expenses were allocated to instructional departments on the basis of the departmental student credit hours and on the basis of the floor space utilized by the departments. The plant operations and maintenance expenses were allocated on the basis of floor space and the remainder of the indirect expenses were allocated on the basis of student credit hours. The departmental break-down of student credit hours is shown in TABLE 16, and the break-down of usable building space by department is shown in TABLE 17. The operating expenses were thus categorized as follows: direct instructional expenses, $1,740,000; indirect expenses allocated on student credit hours, $1,820,000; and indirect expenses allocated on the basis of floor space, $255,000. The allocation of the operating expenses for College B to instructional departments is shown in TABLE 18.

The annual capital costs of College B were obtained in the same manner as the capital costs of College A. In determining the estimated annual building rental costs, it was first necessary to accumulate

TABLE 16
COLLEGE B
STUDENT CREDIT HOURS BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Student Credit Hours	Per Cent to Total
Biology	2,377	6.0%
Business	5,009	12.6
Education	1,127	2.8
English	3,828	9.6
Fine Arts	2,450	6.2
Foreign Languages	2,375	6.0
Human Relations	312	.8
Mathematics	1,686	4.2
Physical Education	1,127	2.8
Physical Sciences	1,934	4.9
Psychology	2,652	6.7
Religion	4,319	10.9
Social Studies	4,303	10.8
Sociology	2,994	7.5
Special Program	3,256	8.2
Total	39,749	100.0%

TABLE 17
COLLEGE B
BUILDING SPACE BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Building Space (Square Feet)	Per Cent to Total
Biology	24,500	6.7%
Business	37,200	10.2
Education	9,400	2.6
English	29,500	8.1
Fine Arts	34,400	9.5
Foreign Languages	22,900	6.3
Human Relations	2,500	.7
Mathematics	13,800	3.8
Physical Education	24,900	6.8
Physical Sciences	27,900	7.7
Psychology	23,100	6.3
Religion	32,600	9.0
Social Studies	32,900	9.0
Sociology	22,600	6.2
Special Program	25,800	7.1
Total	364,000	100.0%

the square footage of building space which was available on a facilities study made in 1975. This report set forth the space utilized for major purposes such as classrooms, gymnasiums, auditoriums, offices, storage, etc. From a related report it was possible to determine the direct instructional space of 74,800 square feet and to assign this space directly to the instructional departments. The non-instructional space of 289,200 square feet was allocated to departments based on departmental student credit hours. The results of the allocation of building space are shown in TABLE 17. The estimated annual rental costs for the building space were calculated through the use of the same rental costs per square foot as used for College A. The estimated building rental costs by department are included in TABLE 19 with the other capital costs.

The annual costs of major equipment and library equipment were based on the costs provided by the comptroller of College B. The estimated replacement cost for major equipment totalled $1,200,000 and library equipment was estimated to have a value of $150,000. The major direct equipment for laboratories, music, and art of $300,000 was assigned directly to instructional departments. The remaining $900,000 of major equipment was allocated to instructional departments on the basis of student credit hours. Library equipment costs of $150,000 were allocated to instructional departments based on student credit hours. In the same manner as used with College A, annual expiration costs of major equipment were computed at a 5% annual depreciation rate, and library equipment costs at a 10% annual depreciation rate. As shown in TABLE 19, the total annual capital costs including

TABLE 18

COLLEGE B

TOTAL OPERATING EXPENSES BY
INSTRUCTIONAL DEPARTMENT

Instructional Department	Direct Expenses	Indirect Expenses Based on Credit Hours	Indirect Expenses Based on Space	Total Operating Expenses
Biology	$ 105,000	$ 109,000	$ 17,000	$ 231,000
Business	160,000	230,000	26,000	416,000
Education	85,000	51,000	6,000	142,000
English	167,000	175,000	21,000	363,000
Fine Arts	115,000	113,000	24,000	252,000
Foreign Languages	133,000	109,000	16,000	258,000
Human Relations	31,000	15,000	2,000	48,000
Mathematics	89,000	73,000	10,000	172,000
Physical Education	82,000	51,000	17,000	150,000
Physical Sciences	122,000	89,000	20,000	231,000
Psychology	90,000	122,000	16,000	228,000
Religion	178,000	199,000	23,000	400,000
Social Studies	202,000	197,000	23,000	422,000
Sociology	106,000	137,000	16,000	259,000
Special Program	75,000	150,000	18,000	243,000
Total	$1,740,000	$1,820,000	$255,000	$3,815,000

TABLE 19

COLLEGE B

SUMMARY OF ANNUAL CAPITAL COSTS BY
INSTRUCTIONAL DEPARTMENT

Instructional Department	Building Rental Costs	Major Equipment Depreciation	Library Equipment Depreciation	Total Annual Capital Costs
Biology	$ 36,100	$ 4,000	$ 1,000	$ 41,100
Business	51,200	6,000	1,500	58,700
Education	13,300	1,000	500	14,800
English	41,000	4,000	1,500	46,500
Fine Arts	53,400	9,000	1,000	63,400
Foreign Languages	33,400	3,000	1,000	37,400
Human Relations	3,400	1,000	500	4,900
Mathematics	19,500	2,000	500	22,000
Physical Education	40,400	5,000	500	45,900
Physical Sciences	43,400	5,000	500	48,900
Psychology	33,000	3,000	1,000	37,000
Religion	44,900	5,000	1,500	51,400
Social Studies	45,600	5,000	1,500	52,100
Sociology	31,300	3,000	1,000	35,300
Special Program	36,100	4,000	1,500	41,600
Total	$526,000	$60,000	$15,000	$601,000

estimated annual building rental, the depreciation cost of major equipment, and the depreciation cost of library equipment was $601,000. As in College A, College B's annual capital costs constitute a significant portion of the total costs of a college, and their magnitude justifies their inclusion in the study.

Summary of College B Costs

By summarizing the operating expenses and the annual capital costs of College B from TABLES 17 and 19 the total annual costs are reflected at $4,416,000 in TABLE 20. Such a summary of total costs by department can be of value as a financial guide in planning. The summary of total costs reveals that considerable emphasis in College B, for example, is on business with a cost of $474,700 and on social studies with a cost of $474,100. Less emphasis has been placed on human relations with a cost of $52,900.

A more significant relationship of costs by department is shown in TABLE 21 in which the costs are presented as cost per student credit hour. This analysis puts the departments on a common basis and permits a more equitable comparison. TABLE 21 reflects that the average cost per student credit hour for College B is $111, with $93 for operating expenses and $18 for annual capital costs. A perfunctory review of the analysis reveals numerous differences in the departmental costs. The physical education department, for example, incurred the highest cost per student credit hour of $174 consisting of above-average operating expenses of $133 and above-average capital costs of $41. It is further noted that the physical education department consumed only 2.8%

TABLE 20

COLLEGE B

SUMMARY OF TOTAL COSTS BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 231,000	$ 41,100	$ 272,100
Business	416,000	58,700	474,700
Education	142,000	14,800	156,800
English	363,000	46,500	409,500
Fine Arts	252,000	63,400	315,400
Foreign Languages	258,000	37,400	295,400
Human Relations	48,000	4,900	52,900
Mathematics	172,000	22,000	194,000
Physical Education	150,000	45,900	195,000
Physical Sciences	231,000	48,900	279,900
Psychology	228,000	37,000	265,000
Religion	400,000	51,400	451,400
Social Studies	422,000	52,100	474,100
Sociology	259,000	35,300	294,300
Special Program	243,000	41,600	284,600
Total	$3,815,000	$601,000	$4,416,000

TABLE 21

COLLEGE B

SUMMARY OF COSTS PER STUDENT CREDIT HOUR
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Annual Costs per Student Credit Hour		
	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 97	$ 17	$ 114
Business	83	12	95
Education	126	13	139
English	95	12	107
Fine Arts	103	26	129
Foreign Languages	109	16	125
Human Relations	154	15	169
Mathematics	102	13	115
Physical Education	133	41	174
Physical Sciences	119	25	144
Psychology	86	14	100
Religion	93	12	105
Social Studies	98	12	110
Sociology	87	11	98
Special Program	75	12	87
Average	$ 93	$ 18	$ 111

of the student credit hours but utilized 6.8% of the total building space (TABLES 16 and 17). This disproportionate use of floor space resulted in a greater allocation of indirect operating expenses and capital costs than indicated by the student credit hours. It is therefore concluded that the physical education department incurred above-average costs per student credit hour as a result of the department's requirements for space.

In further reviewing the costs in TABLE 21 it is noted that the human relations department also incurred a cost per credit hour that was significantly higher than the College average. The capital costs of $15 were not excessive, but the operating expenses of the human relations department of $154 were well above-average for the College. Further analysis of TABLE 18 reveals that human relations incurred direct expenses of $31,000 representing 1.7% of the total direct expenses. Since the human relations department credit hours constitute only .8% of the total, it indicates that the faculty and staff costs exceed twice the average of the College as a whole.

An analysis of the education department reveals similar findings. The above-average costs in education can be traced to the direct instructional expenses reflecting the above-average costs for faculty and staff.

As reflected in TABLE 21, the cost per student credit hour of $144 for physical sciences is also considerably above the College average. The capital costs of $25 for physical sciences exceeds the average by $7. The operating expenses of $119 per credit hour exceed the average $27. Further analysis reveals that physical sciences utilized 8% of

the College space with less than 5% of the student credit hours. This resulted in the higher-than-average allocation of indirect expenses and estimated building rental costs. In addition, physical sciences incurred above-average annual costs for major equipment.

By analyzing the departmental costs per student credit hour it is possible to gain a better understanding of the total costs of the College. Such an understanding will provide an improved base for decision-making.

Accumulation of College C Costs

The operating expenses of College C of $3,301,000 for the year ended May 31, 1975 were obtained from the financial statements and were classified as direct instructional expenses and indirect operating expenses. The allocation of the operating expenses was accomplished by the assignment of the direct expenses and the allocation of the indirect expenses on the basis of credit hours or on floor space utilized, depending on the nature of the expenses. The departmental break-down of the student credit hours and building space is shown in TABLE 22. The total operating expenses of College C consisted of $1,172,000 of direct expenses, $1,840,000 indirect expenses related to student credit hours, and $289,000 indirect expenses related to building space, as shown in TABLE 23. The direct instructional expenses were applied to the instructional departments in the ratio of the assignment of the faculty members provided by the business manager of the College.

College C, like Colleges A and B, had available a facilities study reflecting the usable floor space at the College by major categories of

TABLE 22

COLLEGE C

STUDENT CREDIT HOURS AND BUILDING SPACE
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Student Credit Hours		Building Space	
	Hours	Per Cent	Square Feet	Per Cent
Biology	3,107	6.0%	22,100	6.4%
Business	8,608	16.3	53,800	15.5
Education	2,736	5.2	15,500	4.4
English	6,316	12.0	35,700	10.3
Fine Arts	3,078	5.8	25,600	7.3
Foreign Languages	2,070	3.9	14,400	4.1
Human Relations	-----	---	------	---
Mathematics	3,498	6.6	21,200	6.1
Physical Education	4,135	7.9	40,800	11.8
Physical Sciences	2,357	4.5	19,500	5.6
Psychology	1,585	3.0	9,200	2.6
Religion	4,182	8.0	25,200	7.2
Social Studies	8,700	16.6	52,900	15.2
Sociology	2,177	4.2	12,000	3.5
Total	52,549	100.0%	347,900	100.0%

TABLE 23

COLLEGE C

TOTAL OPERATING EXPENSES BY
INSTRUCTIONAL DEPARTMENT

Instructional Department	Direct Expenses	Indirect Expenses		Total Operating Expenses
		Credit Hours	Space	
Biology	$ 85,800	$ 110,400	$ 18,500	$ 214,700
Business	164,400	299,900	44,800	509,100
Education	57,200	95,700	12,700	165,600
English	150,100	220,800	29,800	400,700
Fine Arts	135,800	106,700	21,100	263,600
Foreign Languages	42,800	71,800	11,800	126,400
Human Relations	-------	------	------	-------
Mathematics	64,300	121,400	17,600	203,300
Physical Education	128,600	145,400	34,100	308,100
Physical Sciences	50,000	82,800	16,200	149,000
Psychology	28,500	55,200	7,500	91,200
Religion	85,800	147,200	20,800	253,800
Social Studies	143,000	305,400	44,000	492,400
Sociology	35,700	77,300	10,100	123,100
Total	$1,172,000	$1,840,000	$289,000	$3,301,000

offices, classrooms, laboratories, etc. The report showed 347,900 square feet of total usable floor space of which approximately 60,000 square feet were for classrooms and laboratories. The direct departmental space for classrooms, laboratories, auditoriums, offices, etc. was identified and assigned directly to the departments. The remainder of the space was allocated to departments on the basis of student credit hours. Applying the same rental schedule used for Colleges A and B, the total annual building rent estimated for College C was $452,000, or approximately $1.30 per square foot per year. The square footage costs were then applied to the departmental space with the results shown in TABLE 24.

The major equipment costs were obtained from an insurance appraisal report of 1975 which reflected the replacement cost of the major equipment at $1,406,000. The annual expiration cost of the major equipment was calculated at $70,000 based on a depreciation rate of 5% as shown in TABLE 24. The cost of the library equipment was not readily available at the College, and an estimate of $150,000 was used and depreciated at a 10% depreciation rate per year.

Summary of College C Costs

A summary of College C annual operating expenses and capital costs appears in TABLE 25. As stated previously, a summary of total costs by department can be of value as a guide for budgeting and planning. More significant, however, are the costs per student credit hours by department as shown in TABLE 26. This analysis allows a comparison of the departments without regard to the size of the departments.

TABLE 24

COLLEGE C

ANNUAL CAPITAL COSTS BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Estimated Building Rent	Major Equipment(1)	Library Equipment(2)	Total Annual Capital Costs
Biology	$ 28,700	$ 4,200	$ 900	$ 33,800
Business	69,900	11,400	2,400	83,700
Education	20,100	3,700	800	24,600
English	46,400	8,400	1,800	56,600
Fine Arts	33,300	4,100	900	38,300
Foreign Languages	18,700	2,700	600	22,000
Human Relations	------	-----	---	------
Mathematics	27,500	4,600	1,000	33,100
Physical Education	53,000	5,500	1,200	59,700
Physical Sciences	25,300	3,200	700	29,200
Psychology	12,000	2,100	400	14,500
Religion	32,700	5,600	1,200	39,500
Social Studies	68,800	11,600	2,500	82,900
Sociology	15,600	2,900	600	19,100
Total	$452,000	$70,000	$15,000	$537,000

(1) Major Equipment reflects a 5% depreciation rate
(2) Library Equipment reflects a 10% depreciation rate

TABLE 25

COLLEGE C

SUMMARY OF TOTAL COSTS BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 214,700	$ 33,800	$ 248,500
Business	509,100	83,700	592,800
Education	165,600	24,600	190,200
English	400,700	56,600	457,300
Fine Arts	263,600	38,300	301,900
Foreign Languages	126,400	22,000	148,400
Human Relations	-------	------	-------
Mathematics	203,300	33,100	236,400
Physical Education	308,100	59,700	367,800
Physical Sciences	149,000	29,200	178,200
Psychology	91,200	14,500	105,700
Religion	253,800	39,500	293,300
Social Studies	492,400	82,900	575,300
Sociology	123,100	19,100	142,200
Total	$3,301,000	$537,000	$3,838,000

TABLE 26

COLLEGE C

SUMMARY OF COSTS PER STUDENT CREDIT HOUR
BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Annual Costs per Student Credit Hour		
	Operating Expenses	Annual Capital Costs	Total Costs
Biology	$ 69	$ 11	$ 80
Business	60	10	70
Education	61	9	70
English	63	9	72
Fine Arts	86	12	98
Foreign Languages	60	11	71
Human Relations	--	--	--
Mathematics	58	9	67
Physical Education	75	14	89
Physical Sciences	64	12	76
Psychology	57	9	66
Religion	61	9	70
Social Studies	56	10	66
Sociology	56	9	65
Average	$ 63	$ 10	$ 73

In College C the average annual cost per student credit hour was calculated to be $73. Using the College average as a base, two departments stand out with cost per credit hour greatly exceeding the average. The fine arts department incurred costs of $98 per credit hour with most of the excess in operating expenses of $86. The above-average costs can be traced to the indirect operating expenses which were allocated on the basis of floor space. The fine arts department utilized considerable space for auditoriums and practice rooms.

As in Colleges A and B, College C experienced above-average costs in both physical education and in physical sciences with $89 and $76, respectively. The high costs in these departments can be attributed to the need for above-average space and instructional equipment.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Cost Accounting Data

Having computed the total costs and the costs per student credit hour by department for Colleges A, B, and C, it was felt that a comparison of these costs could serve to show the practical utility of the model. TABLE 27 was prepared to facilitate the comparison by reflecting the costs per student credit hour by department for each college in the study. In this comparison the "special program" of College B was eliminated, and the average cost per credit hour of College B was revised to provide a more equitable comparison.

In reviewing the comparative data in TABLE 27 the most obvious difference is the overall average cost per student credit hour of each college. College A had an average cost per credit hour of $91, compared to $113 for College B, and $73 for College C. It was further noted that the major portion of the differences in costs was in the operating expenses for each college and more specifically in the direct instructional expenses. Assuming that the two major factors that contribute to the level of the direct expenses are the student/faculty ratio and the expenses per faculty member, it was decided to determine the effect of these factors.

As shown in TABLE 28, the College A student/faculty ratio was 18.3/1, with 60 faculty members at an annual cost of $14,900 per faculty

TABLE 27

COMPARATIVE COSTS PER STUDENT CREDIT HOUR OF COLLEGES A, B, AND C BY INSTRUCTIONAL DEPARTMENT

Instructional Department	Operating Expenses			Annual Capital Costs			Total Costs		
	A	B	C	A	B	C	A	B	C
Biology	$ 75	$ 97	$ 69	$ 14	$ 17	$ 11	$ 89	$114	$ 80
Business	74	83	60	11	12	10	85	95	70
Education	95	126	61	13	13	9	108	139	70
English	71	95	63	12	12	9	83	107	72
Fine Arts	88	103	86	16	26	12	104	129	98
Foreign Languages	74	109	60	12	16	11	86	125	71
Human Relations	90	154	--	13	15	--	103	69	--
Mathematics	76	102	58	12	13	9	88	115	67
Physical Education	82	133	75	23	41	14	105	174	89
Physical Sciences	95	119	64	33	25	12	128	144	76
Psychology	75	86	57	12	14	9	87	100	66
Religion	78	93	61	13	12	9	91	105	70
Social Studies	68	98	56	11	12	10	79	110	66
Sociology	72	87	56	11	11	9	83	98	65
Average	$ 77	$ 95	$ 63	$ 14	$ 18	$ 10	$ 91	$113	$ 73

TABLE 28

REVISION OF DIRECT INSTRUCTIONAL
EXPENSES OF COLLEGES B AND C

	Student/ Faculty Ratio	Faculty Members	Faculty Expenses	Total Direct Expenses	Addition (Reduction)
College A	18.3/1	60	$14,900	$ 894,000	
College B	16.5/1	85	20,500	1,740,000	
Revisions:					
College A Ratio	18.3/1	76	20,500	1,558,000	$(182,000)
College A Faculty Expenses	18.3/1	76	14,900	1,132,000	(426,000)
					$(608,000)
College C	24.4/1	82	14,300	$1,172,000	
Revisions:					
College A Ratio	18.3/1	110	14,300	1,573,000	$ 401,000
College A Faculty Expenses	18.3/1	110	14,900	1,639,000	66,000
					$ 467,000

member. By revising the College B and C costs to conform with the student/faculty ratio and the faculty expenses of College A it is possible to see the effects of these factors on the average costs per credit hour.

When the College B student/faculty ratio is revised from the actual of 16.5/1 to College A's ratio of 18.3/1, the faculty at College B is reduced from 85 to 76, and the costs are reduced by $182,000. When the College B faculty expenses are reduced from $20,500 to $14,900, the overall costs of College B are reduced by an additional $426,000. Thus the costs of College B were reduced a total of $608,000 when the student/faculty ratio and the faculty expenses were transformed to conform to the costs of College A. The $608,000 reduction represents a reduction of $15 per student credit hour.

A similar revision to the College C student/faculty ratio and faculty expense resulted in an increase in costs of $467,000, or $8 more per student credit hour.

Based on the foregoing revisions, the average operating expenses per student credit hour for each college are as follows: College A, $77; College B, $80; and College C, $71. It is therefore apparent that the major overall differences in the average costs per student credit hour may be attributable to the student/faculty ratios and to the faculty expenses of each college.

Other less significant differences are reflected in the average annual capital costs per student credit hour of College A $14, College B $18, and College C $10. These costs tend to emphasize the differences in building space and the major equipment used at each of the colleges in relation to their respective student credit hours.

In spite of the differences found in the overall college average costs per student credit hour, there are some striking similarities in the departmental costs per credit hour in each college. For example, the physical education and physical sciences departments incurred substantial above-average costs per credit hour in Colleges A and B, and slightly above-average costs in College C. A similar situation is found in the fine arts department where each college sustained above-average costs per credit hour. As cited earlier, the physical education, physical sciences, and the fine arts departments all require a relatively high amount of space and equipment in each of the three colleges included in this study. The education department in Colleges A and B incurred above-average costs as a result of the reduced student/faculty ratios in each college. In College C the student/faculty ratio in the education department was approximately the same as the College average.

In summary, the comparison of the costs per student credit hour of Colleges A, B, and C reveals that each of the colleges provides similar emphasis by departments. The average cost per student credit hour differentials between colleges can be substantially explained by the differences in the student/faculty ratios and the individual faculty expenses.

Conclusions and Recommendations

The development of the cost accounting model at one college and its application to two other colleges, as presented in this study, have hopefully served to demonstrate the facility with which such an endeavor may be accomplished. In view of its relative simplicity, a similar model could conceivably be developed in any college or

university without disrupting the existing system. Much of the cost accounting data for this study was acquired outside the regular accounting records from other administrative documents and from discussions with administrators. It is felt that the cost accounting data accumulated in this study would normally be available at most institutions of higher education. The preparation of a cost accounting model could be further simplified if the college or university administrator would maintain the necessary data up-to-date on a monthly basis. For example, faculty and staff salaries could be noted by department on a monthly basis. Changes in departmental space requirements could be revised as the changes occur. Any additions or disposals of major equipment could be revised at the time of the transaction. By maintaining monthly records of the data an administrator could accelerate the accumulation of the data at year end.

The cost accounting data accumulated and presented by instructional department and by student credit hours in the manner described in this study may be of value to an administrator of a college in the planning of future operations. Schools considering the addition of departments of instruction could note the experiences of the schools included in the study. Institutions faced with the necessity of reducing costs through the curtailment of curricula should be in a better position to make the critical decisions demanded. The increased awareness of the departmental costs should contribute to a more precise and meaningful budget. Having acquired the knowledge of the costs by department, the department heads could take a more active role in the control of their own departmental costs and thus provide a better over-all control of the college operations.

A knowledge of the departmental costs per student credit hour could serve to expose areas of possible cost reduction. For example, one department may have incurred higher than normal costs in direct instructional expenses as cited in the study. If it is found that the high costs are attributable to an abnormally low student/faculty ratio, it may be possible to consider measures to effect improvement without jeopardizing the quality of education. As an example, departments of instruction sharing a low student/faculty ratio may be related in the area of subject matter. The possibility of combining departments for administrative purposes could be considered. As a matter of fact, one of the institutions studied terminated a drama major and transferred a number of the drama courses to the English department. In another situation it may be found through the analysis of the cost accounting data that a department is utilizing more building space than should be required. As a result it may be decided that the excess space could be better used for other purposes.

The inclusion of annual capital costs in the computation of the total costs per student credit hour of a college was deemed essential to the preparation of any cost study. The capital cost data may also prove beneficial in itself. In the study space utilization was identified by instructional department, and each department was charged the estimated annual rental costs for the space used. In the three colleges included in this study it was noted that the available instructional space was utilized somewhat less than 100% of the normal instructional hours. Faced with high rental costs for unused space, department heads may be encouraged to seek more efficient space

utilization through additional enrollments. In this manner the capital costs and the total costs per student credit hour may be significantly reduced. Also, schedules may be changed to spread classes from early morning until late afternoon, thus enabling more instructional hours within the confines of existing space. Cost studies of space utilization may make significant contributions in the planning of additional space needs as well as in answering the question as to whether new space is needed at all. A similar approach to the efficient utilization of the major instructional equipment may result in a similar beneficial reaction.

The determination of departmental costs could result in a possible innovation in tuition rates. The college could institute a system of "differentiated tuition" whereby supplemental tuition charges would be required for courses in those departments with above-average costs per student credit hour. This differentiated tuition would be similar to but more extensive than the current practice of charging laboratory fees for certain science courses. It is recognized, on the other hand, that differentiated tuition could tend to discourage the enrollment of certain talented and deserving students for whom the added cost might be prohibitive.

The cost accounting model developed and applied in this study can be an additional management tool for college and university administrators to be used in conjunction with all other available considerations. With this analytical tool an administrator may become more aware of college's costs and where they are incurred, and thus be better prepared to render judicious decisions.

One cannot conclude a study of this type, however, without calling attention to certain limitations and modifications that may warrant consideration in preparing cost analyses for individual institutions. The colleges used in this study are relatively small undergraduate institutions free of many of the complexities frequently associated with larger colleges and universities. Intentionally, the cost accounting model developed in this study is basic and uncomplicated in methodology in the hope that college administrators will be encouraged to use it as a guide in developing their own cost accounting programs. It is expected that the model presented will be adapted to correspond to the structure and the mission of each institution.

There are several variables that may be unique to each individual institution and should be taken into account in the development of a comprehensive cost accounting program. In the college used as a basis for the model, there was a negligible amount of faculty time devoted to research, public service, and institutional administration. This may not be the case in many institutions where the major emphasis is placed on these activities and the faculty costs are accordingly increased. Departmental costs may also be significantly affected by the length of service and tenure status of the faculty members. It may likewise be appropriate to consider the level of the courses offered in each department since some departments may offer a disproportionate share of upper level courses with a low student/faculty ratio with correspondingly higher costs. Departmental costs could be further influenced by the nature of the curriculum inasmuch as some types of courses are more effectively presented in small classes, thus resulting in higher costs.

In outlining the procedure for identifying the departmental costs per student credit hour, no attempt was made to evaluate the quality of the instruction provided. It is obvious that everything else being equal, a high student/faculty ratio may reduce the quality of education. No way has been devised of standardizing the educational output and assessing its quality as in the case of a product produced in a factory. Thus it is not the intent of this study to conclude that "cheapest is best." It is hoped, however, that the study would provide insight into the analysis of problems encountered by educational administrators in effective allocation of resources to provide quality education.

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APPENDIX A

LETTER TO COLLEGE PRESIDENTS

Mr. Edward E. Oliver is a doctoral candidate in our School of Education and is interested in conducting a study on the subject of cost accounting in higher education. More specifically, he would like to conduct the study in an independent four-year college in this area. As a basis for his cost accounting model which he plans to develop, it will be necessary for him to obtain certain accounting and administrative data from the records of the college.

I would greatly appreciate it if you would consider allowing Mr. Oliver to have access to some of your data for this purpose. I can assure you that any information you provide will be kept in strict confidence. Mr. Oliver has had considerable experience in industry as an accountant and controller and is sufficiently mature and trustworthy to accept this responsibility.

In my judgment, the cost accounting model to be developed by Mr. Oliver will be of great value to you in making sound decisions for your institution.

If you will favorably consider allowing Mr. Oliver to work with some of your administrative personnel in this endeavor, please let me know. He would be glad to have a conference with you to answer any questions that you may have.

Sincerely yours,

C. L. Sharma
Professor of Education

APPENDIX B
COLLEGE A ANNUAL BUILDING COST
BASED ON DEPRECIATION CHARGES

Building Use	Square Feet	Year Built	Original Cost (000)	Replacement Cost (000)	Annual * Depreciation
Maintenance	300	1924	$ 3	$ 10	$ 250
Cafeteria	6,600	1941	106	280	7,000
Gymnasium	11,100	1933	206	359	8,975
Libraries (2)	12,100	1937	201	440	11,000
Fieldhouse	3,800	1947	32	113	2,825
Classrooms	17,500	1924	485	1,083	27,075
Dormitories (5)	61,500	--	1,329	2,981	74,525
Heating Plant	1,500	1924	89	174	4,350
Auditorium	21,000	1954	317	1,003	25,075
Classrooms	5,900	1954	190	386	8,550
Gymnasium	21,300	1957	321	894	22,350
Community Rel.	1,500	1945	40	62	1,550
Dormitory	15,800	1963	324	708	17,700
Warehouse	2,800	1965	11	47	1,175
Classrooms	26,500	1967	1,043	1,523	38,075
Residences (6)	20,700	--	99	571	14,275
Dormitory	24,000	1968	655	954	23,850
Infirmary	4,400	1969	89	163	4,075
Residence	4,800	1958	125	244	6,100
Shelter	800	1970	4	8	200
Student Center	33,600	1972	1,300	1,477	36,925
Chapel	7,500	1972	315	358	8,950
Residences (4)	7,500	--	70	155	3,875
	312,500		$ 7,354	$ 13,993	$ 348,725

*Depreciation of 2.5% per year based on an estimated useful life of 40 years.