DOCUMENT RESUME

ED 246 806 HE 017 554

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TITLE Formula Budgeting for Higher Education: State Practices in 1979-80. Working Paper Series.
INSTITUTION National Center for Higher Education Management Systems, Boulder, Colo.
SPONS AGENCY National Inst. of Education (ED), Washington, DC. Educational Policy and Organization Program.
PUB DATE 82
CONTRACT 400-80-0109.
NOTE 94p.; Tables have faint print.
AVAILABLE FROM National Center for Higher Education Management Systems, P.O. Drawer P, Boulder, CO 80302 ($5.00).
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Ancillary School Services; *Budgeting; College Administration; College Instruction; College Libraries; Community Colleges; Comparative Analysis; *Expenditures; Guidelines; Higher Education; Operating Expenses; Research; *Resource Allocation; School Maintenance; *State Colleges; *State Surveys; Technical Institutes
IDENTIFIERS *Formula Budgeting

ABSTRACT

Budget formulas used by states for state-supported colleges and universities are described, along with budgeting guidelines. A comparative analysis of the budget formulas in use in 1979-1980 reveals the similarities and differences in design among 19 states. Functional areas of expenditure used in the formula calculation are also compared for each state, including instruction and academic support, libraries, student services, institutional support, research and public service, and physical plant operation. For each state and functional area, information is also provided on formula methods for developing requests, including line items, base factors, formula factors, and the method of calculation. Descriptions of individual budget formulas for four-year institutions are provided for the following 19 states: Alabama, Arkansas, Colorado, Florida, Georgia, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Montana, New Jersey, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, and Washington. Separate formulas for community colleges and technical institutes reported by nine states are also described. State guidelines and other nonformula, budget development practices are also covered. (SW)

Formula Budgeting for Higher Education: State Practices in 1979-80

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National Center for Higher Education Management Systems

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Francis M. Gross

1982

National Center for Higher Education Management Systems
P.O. Drawer P Boulder, Colorado 80302
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The work upon which this publication is based was performed by NCHEMS pursuant to Contract No. 400-80-0109--Program on Educational Policy and Organization--with the National Institute of Education. It does not necessarily reflect, however, the views of that agency.

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Budget formulas are popular devices for states to allocate money to higher education. This study reinforces what previous surveys have shown: roughly half of the states use some form of a formula to determine at least part of their budgets for higher education. The total of states using budget formulas depends on who is doing the counting and why. In this study, Dr. Gross followed the usual criterium among scholars in the field: an explicit, mathematical linkage between pre-established formula factors and institutional base factors had to be used to arrive at the requested appropriation or funding level in order to claim that a formula was in use.

What this discussion points out is that there are a variety of types of formulas in use. By comparing the findings of this study to the findings in Dr. Gross' widely noted 1974 study, and both studies to other literature in the field, patterns in funding trends for higher education emerge.

Understanding that a variety of formulas are in use, and are, therefore, available for adaptation in other situations will be important in the future. The combined impact of unstable enrollment projections, uncertain state tax revenues for allocation, and unabated inflation will pressure all funding mechanisms used by the states for higher education. Formulas have always been a controversial device and will probably become more controversial in the next decade. Nevertheless, they do offer significant advantages and are probably here to stay. Formulas will change inevitably and studies like this one will be needed to provide information about the kinds of changes that are going on. For this reason, a major descriptive study on budget formulas should probably be made about every five years.

In 1978, the National Center for Higher Education Management Systems (NCHEMS) solicited the cooperation of six other postsecondary education organizations to investigate the current status of resource acquisition and allocation for state supported colleges and universities. A design group was formed representing the following organizations:

Association for Institutional Research (AIR)
Education Commission of the States (ECS)
National Association of College and University Business Officers (NACUBO)
National Association of State Budget Officers (NASBO)
National Center for Higher Education Management Systems (NCHEMS)
National Council of State Directors of Community and Junior Colleges (NCSDJC)
State Higher Education Executive Officers (SHEEO)

The design group agreed that a new study was needed. The last major, widely disseminated, comprehensive study of all state budget formulas was conducted in 1973 (Gross 1973). The group decided that the study should include descriptions of the resource acquisition and allocation process used by each state as well as descriptions of the budget formulas currently used in each state that did formula budgeting.

In 1979, the SHEEO officers in each state were asked to supply descriptions of the appropriation process and copies of all procedures for developing appropriation requests. The latter were to be sent directly to Francis M. Gross, Vice Chancellor for Business and Finance, at The University of Tennessee, Martin, Tennessee, who had volunteered to assist in the study by performing the analysis of the budget formulas currently in use.

This publication presents the descriptions of the budget formulas and guidelines obtained from states that participated in the study.

I.

Introduction

Background of Budget Formula Development and Utilization

Budget formulas are prescribed or set methods for applying predetermined average cost rates or staffing ratios to quantifiable program measures (such as enrollment or square feet of building space), in order to calculate the future dollar requirements of institutions (Gross 1979). In the context of financing higher education, budget formulas have been used by many states as a means for appropriating tax dollars to support public colleges and universities. The use of formulas to develop requests is termed formula budgeting. Appropriating funds based on formula-derived requests is termed formula funding. Formula budgeting by state colleges and universities may or may not result in formula funding by state legislatures.

Three developments have made the use of budget-formulas by states an attractive solution to an old problem. These developments are: (1) the movement to systemize, rationalize, and centralize state budgeting, (2) the development of cost analysis, and (3) the development of generally accepted classifications for financial accounting in colleges and universities (Miller 1964). The development of budget formulas has undoubtedly been influenced as well by (a) the phenomenal increase of college enrollments that began in the 1950's and peaked in the early 1970's (Gross 1973); (b) the development of statewide coordinating agencies with the responsibility for reviewing requests from and recommending state appropriations for state supported colleges and universities (Glenny 1959); and (c) the changing nature of state financial support ranging from the golden years of the 1950's to the retrenchment of the 1980's (Bowen 1980).

The first uses of budget formulas for developing and analyzing appropriation requests for colleges and universities occurred in 1951 in four states: California, Indiana, Oklahoma, and Texas (Miller 1964). Between 1951 and the early 1970s, the practice grew to include twenty-five states (Gross 1973). In this study 19 states reported the use of budget formulas. Table 1 presents budget-formula utilization by states during six of the past twenty-nine years.

TABLE 1

[illegible] FORMULA UTILIZATION BY STATE

State	1951[a]	1963[a]	1965[a]	1973[a]	1977[b]	1979
Alabama			X	X	X	X
Alaska					X	
Arkansas				X	X	X
California	X	X	X			
Colorado				X		X
Connecticut			X			
Florida		X	X	X	X	X
Georgia				X	X	X
Illinois			X			
Indiana	X		X			
Kansas						X
Kentucky		X	X			X
Louisiana			X	X	X	X
Maryland				X		
Minnesota			X	X		
Mississippi			X	X	X	X
Missouri				X	X	X
Montana						X
Nevada				X	X	
New Jersey				X	X	X
New Mexico			X		X	
New York				X	X	
North Dakota			X	X	X	
Ohio				X	X	X
Oklahoma	X	X	X	X		X
Oregon			X			
Pennsylvania				X		X
South Carolina				X	X	X
South Dakota				X	X	
Tennessee		X	X	X	X	X
Texas	X	X	X	X	X	X
Virginia				X	X	
Washington				X	X	X
West Virginia				X	X	
Wisconsin				X	X	
TOTALS	4	6	16	25	22	19

[a] Gross 1973

[b] Kentucky 1977

II.

Comparative Analysis of Budget Formulas Used for Statewide Application

A comparative analysis of the budget formulas in use reveals the similarities and differences in design among the 19 states. The appropriation requests are for state supported four-year colleges and universities and, in some cases, community colleges. The states reporting formulas for calculating the 1980-81 fiscal-year requests or the 1980-82 biennial requests used the approaches and methodology reported in prior formula studies. These states calculated separately the amounts requested for each functional area of expenditure in the educational and general budget before applying any revenue deduction to arrive at a net state appropriation request.

This analysis is made by comparing each formula's approach in calculating the request by functional area. Each functional area is defined below as it is used in this study.

Definitions of Functional Areas

Instruction and academic support. The functional area referred to as instruction and academic support encompasses those activities that assist the systematic imparting of knowledge, skills, and behaviors. In making a budget request, compensation for administration, faculty supporting staff, clerical employees, and the operating expenses associated with instruction and nonsponsored research are included. In addition, expenditures are included for all academic activities that directly support instruction. Some support activities are agricultural farms, demonstration schools, academic administration, and academic computer centers. Although libraries are normally considered part of academic support, they are discussed separately since many states have separate library formulas.

Libraries. The area referred to as libraries includes all activities that assist the collection, organization, and supervision of scholarly materials at the campus level, or at the departmental level. In making a budget request, it is necessary to include all expenditures for salaries, and the costs of acquiring and maintaining the collections.

Student services. The area called student services covers all activities that relate to the student outside of the classroom. Budget concerns here must insure funds for undergraduate and graduate admissions and records, guidance and counseling, student activities, student health services, and placement.

Institutional support. The area called institutional support must budget expenditures for the general executive and administrative offices that serve the institution as a whole. These expenditures finance the president's office, the business office, the personnel office, the development office, safety and security, and other offices unrelated to a specific area.

Research and public service. Although usually separate areas in the budget, the two areas of research and public service are combined for this analysis. A research budget comprises all expenditures for research projects that are budgeted separately from instructional departments. Budgets in this area usually embrace matching and institutional seed funds to acquire grants

and contracts for sponsored research. Public service covers all activities designated primarily to serve the general public. These services involve budgeting for conferences and institutes, adult study courses, public lectures, radio stations, museums, and other related activities.

Operation and Maintenance of Plant. The area of operation and maintenance of plant requires budgeting for expenditures in administration, maintenance, and custodial care of physical plant, grounds, utilities, and all other activities associated with the day-to-day operation of the physical plant and its maintenance. Capital outlay expenses are not included here.

Use of Formulas for Functional Areas by States

In nine states--Alabama, Georgia, Kansas, Kentucky, Mississippi, Oklahoma, South Carolina, Tennessee, and Texas--formulas were applied in calculating the resources needed in all six of the functional areas: Montana used a formula to develop the request for five functional areas; Arkansas, Missouri, Ohio, Pennsylvania, and Washington applied formulas to four areas; Colorado, Florida, and New Jersey used formulas in three areas; and Louisiana addressed only one area using a formula.

Six states--Arkansas, Louisiana, Montana, Ohio, Oklahoma, and Pennsylvania--used formulas to calculate the total budget in each of the functional areas while the other 13 states--Alabama, Colorado, Florida, Georgia, Kansas, Kentucky, Mississippi, Missouri, New Jersey, South Carolina, Tennessee, Texas, and Washington--calculated only a portion of one or more functional areas with formulas.

Several states addressed two or more functional budget areas in a single formula component, while Alabama, Georgia, Kentucky, and Texas included student services with the formula calculation of institutional support. Oklahoma included libraries, student services, institutional support, and physical plant operation and maintenance with instruction. Mississippi included libraries, student services, and physical plant operation and maintenance, while Montana included libraries, student services, and public service with institutional support. A summary of how states apply formulas to functional budget areas is found in table 2.

Formula Calculations by Functional Area

Each of the 19 formulas was compared on a component-by-component basis. Examining the formulas by functional area revealed which base factors (defined here as the measure of activity used for institutions) and which formula factors (defined here as the rate factors that are applied to the institutions' base factors) were used. The comparison also showed what methods of calculation (rates times base factors, position ratios with salary rates, or percentage of previous calculation) were employed. Further, the comparison revealed the extent of institutional differentiation (through the use of different rates, ratios, or percentages for separate academic areas, levels of instruction, types of institutions as well as individual institutions) that was found in each formula. This information is summarized in table 3.

Instruction and academic support (except libraries). Each of the 19 states treated the calculation of requests for instruction and academic support

TABLE 2

FORMULA CALCULATION OF FUNCTIONAL AREA BY STATES

State	Instruction and Academic Support	Libraries	Student Services	Institutional Support	Research and Public Service	Physical Plant Operation
Alabama	Total Budget	Total Budget	Total Budget	Total Budget	Total Budget	All except Utilities
Arkansas	Academic Salaries Other Salaries Operating Budget	Total Budget		Total Budget		Total Budget
Colorado	Academic Salaries	Salaries Collections				All except Utilities
Florida	Academic Salaries Advising Salaries Administration Salaries Supporting Salaries Operating Budget	Collections			Research Salaries Public Service Salaries	
Georgia	Academic Salaries Supporting Salaries Operating Budget	Total Budget			Public Service Budget Only	Total Budget
Kansas	Instructional Budget Academic Support Budget	Total Budget	Total Budget	Total Budget	Research Budget	Maintenance Security Administration
Kentucky	Academic Salaries Academic Support Budget	Total Budget	Total Budget	Total Budget	Research Budget	Maintenance and Custodial
Louisiana	Total Budget					
Mississippi	Total Budget	Total Budget	Total Budget	Total Budget	Research Budget	Total Budget

TABLE 2 (Continued)

State	Instruction and Academic Support	Libraries	Student Services	Institutional Support	Research and Public Service	Physical Plant Operation
Missouri	Total Budget	Total Budget		Total Budget		All except Utilities
Montana	Academic Salaries Operating Budget Equipment Academic Support	Total Budget	Total Budget	Total Budget	Public Service Budget	
New Jersey	Academic Salaries Academic Administration Operating Budget			Total Budget		Custodial Maintenance Grounds Administration Security
Ohio	Total Budget		Total Budget	Total Budget		Total Budget
Oklahoma	Total Budget	Total Budget	Total Budget	Total Budget	Research Budget Public Service Budget	Total Budget
Pennsylvania	Instructional Budget Academic Support Budget		Total Budget	Total Budget		Total Budget
South Carolina	Academic Salaries Operating Budget Academic Support Budget	Total Budget	Total Budget	Total Budget	Research Budget	Administration Maintenance Custodial Grounds
Tennessee	Instruction Budget Academic Support	Total Budget	Total Budget	Total Budget	Research Budget	All except Utilities

Table 2 (Continued)

State	Instruction and Academic Support	Libraries	Student Services	Institutional Support	Research and Public Service	Physical Plant Operation
Texas	Academic Salaries Academic Administration Operating Budget	Total Budget	Total Budget	Total Budget	Research Budget	Administration Maintenance Custodial Grounds
Washington	Academic Salaries Operating Budget	Salaries Operating Budget Collections	Total Budget			Maintenance Custodial Salaries Custodial Supplies Grounds

Table 3

Formula Methods for Developing Requests for Instruction and Academic Support

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Alabama	Instructional Budget	Projected Student Credit Hours	Credit Hour Complexity Indexes and Rates per Credit Hour	Total Weighted Student Credit Hours Times Given Rates	15	3	Separate Rates for Universities and Community Colleges
	Academic Support	Instructional Budget	Percentage	A Percentage of the Base Factor			
Arkansas	Faculty Salaries	Projected Student Credit Hours	Credit Hour-Faculty Ratios and Salary Rates	Faculty FTE Positions Times Given Salary Rates		6	
	Departmental Operating Budgets and Instructional Administration	Projected Student Credit Hours	Rates Per Credit Hour	Credit Hours Times Rates Per Credit Hour by Level of Instruction		5	
Colorado	Faculty Salaries	Projected FTE Students	Student-Faculty Ratios	Faculty FTE Positions Times Average Salary Rates Per Institution	39	4	Separate Salary Rates for each Institution
Florida	Teaching Salaries	Projected Student Credit Hours	Student-Faculty Ratios and Salary Rate	Teaching FTE Positions Times Statewide Average Salary Rate		4	
	Academic Advisor Salaries	Projected FTE Students	Student-Advisor Ratios and Salary Rate	Advisor FTE Positions Times Statewide Average Salary Rate			
	Academic Administration Salaries	Academic FTE Positions	Academic Administrative Ratio and Salary Rate	Administrative FTE Positions Times Statewide Average Salary Rate			
	Instructional Supporting Salaries	Academic FTE Positions	Academic-Clerical Ratio and Salary Rate	Clerical FTE Positions Times Statewide Average Average Salary Rate			
	Departmental Operating Budget	Academic FTE Positions	Rate Per FTE Position	Academic FTE Positions Times a Given Salary Rate			

Table 3 (Continued)

Formula Methods for Developing Requests for Instruction and Academic Support

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Georgia	Teaching Salaries	Projected Student Credit Hours	Credit Hour-Faculty Ratios and Salary Rates	Teaching FTE Positions Times a Given Salary Rate		3	
	Instructional Supporting Salaries	FTE Faculty Positions	Faculty-Clerical Ratio and Salary Rate	Supporting FTE Positions Times a Given Salary Rate			
	Departmental Operating Budget	FTE Faculty Positions	Rate per FTE Position	Faculty FTE Positions Times Given Rate			
Kansas	Instructional Budget	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Rates Given for Each Level in Each Academic Area	23	4	Separate Rate for Four Types of Institutions
	Academic Support	Instructional Budget	Percentage	A Percentage of the Base Factor			Separate Percentages for Each Institution
Kentucky	Faculty Salaries	Actual FTE Students	Student-Faculty Ratios and Salary Rates	Faculty FTE Positions Times Given Salary Rates	20	4	Separate Ratios for Community Colleges
	Academic Support Budget	Faculty Salaries	Percentage	A Percentage of the Base Factor			
Louisiana	Instruction and Academic Support	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Rates Given for Each Level by Cost Area	9	5	
Mississippi	Instructional Budget	Projected Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Rates Given for Each Level and Discipline	26	3	Separate Rates for three Types of Institutions
Missouri	Instructional Budget	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Rates Given for Each Level and Academic Area	5	2	Separate Allowance for Small Schools

Table 3 (Continued)

Formula Methods for Developing Requests for Instruction and Academic Support

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Montana	Faculty Salaries	Three Year FTE Student Average	Student-Faculty Ratios and Salary Rates	Faculty FTE Positions Times Given Salary Rates			Separate Ratios and Rates for Each Institution
	Departmental Operating Budgets	Base Year Budget and Three-Year FTE Enrollment Average	Percentage	Base Year Expenditure Plus Adjustment for Enrollment Change			
	Equipment	Three-Year FTE Student Average	Rate Per FTE Student	FTE Students Times Given Rate			Separate Rates for Each Institution
New Jersey	Instructional Salaries	Projected FTE Students	Student-Faculty Ratios and Salary Rates	Faculty FTE Positions Times Given Salary Rates	19	3	Separate Ratios and Rates for Rutgers
	Instructional Administration	Instructional Salaries	Percentage	A Percentage of Base Factor			Separate Percentage for Rutgers
	All Other Instructional Budgets	Instructional Salaries	Percentage	A Percentage of the Base Factor			Separate Percentage for Rutgers
Ohio	Instructional Budget	Projected FTE Students	Rates per FTE Student	FTE Students by Program Times Given Rates	6	3	
	Academic Support	Projected FTE Students	Rates Per FTE Student	FTE Students by Program Times Given Rates	6	3	
Oklahoma	Instructional Budget and Academic Support Library, Student Services, Institutional Support, Physical Plant Operation	Projected FTE Students	Rates Per FTE Student	FTE Students Times Rates Given for Each Level and Instructional Program		3	Separate Rates for Four Types of Institutions

Table 3 (Continued)

Formula Methods for Developing Requests for Instruction and Academic Support

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Pennsylvania	Instructional Budget	Projected Student Credit Hours	Credit Hour-Faculty Ratios and Rates per Position	Faculty FTE Positions Times Given Rates		Credit Hour-Faculty Ratios Determined by Regression Technique with Academic Area and Instructional Level Differentiation	
	Academic Support	Projected Student Credit Hours	Rates per Credit Credit Hour	Student Credit Hours Times Given Rates			
South Carolina	Instructional Salaries	Actual Fall Student Credit Hours	Credit Hour-Faculty Ratios and Salary Rates	Faculty FTE Positions by Discipline Times Given Rates	34	3	Separate Salary Rates by Type of Institution
	Other Instructional Costs	Instructional Salaries by Level and Academic Area	Percentage	Instructional Salaries by Level and Academic Area Times Given Percentages	34	3	Separate Percentages by Type of Institution
	Academic Support Budget	Instructional Budget	Percentage	A Percentage of the Base Factor			
Tennessee	Instructional Budget	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Rates Given for Each Level and Academic Area	28	4	
	Academic Support Budget	Instructional Budget	Percentage	A Percentage of the Base Factor			Separate Percentages by Type of Institution
Texas	Teaching Salaries	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours by Level of Instruction and Academic Area Times Given Rates	16	3	
	Departmental Operating Budgets	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours by Level of Instruction Times Given Rates		3	
	Academic Administration	Teaching Salaries	Percentage	A Percentage of the Base Base Factor			Percentage Varied by Institution Due to Complexity Factor Adjustment

Table 3 (Continued)

Formula Methods for Developing Requests for Instruction and Academic Support

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Washington	Faculty Salaries	Projected Student Credit Hours and Salary Rates	Credit Hour-Faculty Ratios and Percent of Formula	Faculty FTE Positions Times Percent of Formula Times Salary Rates	4	4	Separate Rates Per Institution
	Departmental Operating Budgets	Faculty FTE Positions	Rate Per FTE Position	Faculty FTE Positions Times Given Rate			

as a separate component of its formula. A comparison of these formula components by state is presented in table 3. Louisiana, Mississippi, Missouri, and Oklahoma, used a single calculation involving a single base factor that was either student credit hours or student FTE enrollment. The other 15 based requests on two or more separate calculations that used two or three methods of calculation. In most of these states, one or more of the separate calculations was linked to a previous formula determination (faculty FTE positions, instructional salaries, or total instructional budget). Every state utilized student enrollment (FTE or credit hours) as the primary or initial base factor. While 11 states projected credit hours or FTE enrollments (using base-year data adjusted for trends), eight states used either actual base-year totals or some form of base-year totals (for example, the average of several past years).

All 19 states provided for some forms of differentiation. Academic areas (14 states), levels of instruction (18 states), or particular institution (13 states) were differentiations that were commonly used.

Libraries. A comparison of the 14 states having a separate formula for libraries is presented in table 4. In nine states, the library budget request resulted from a single calculation. This calculation used either rates per credit hour (Alabama, Arkansas, Kentucky, Tennessee, and Texas), or rates per FTE student (Kansas and Missouri), or a percentage of the total instructional budget (Georgia and South Carolina). Three others--Colorado, Florida, and Washington--had separate calculations for library acquisitions expenditures, and Mississippi and Montana combined the request for libraries with the calculation for institutional support. In eight states, there was a provision for differentiation among institutions either through instructional levels (Alabama, Arkansas, Colorado, Kansas, Kentucky, Tennessee, and Texas) or by institution or type of institution (Alabama, Colorado, Kansas, Texas, and Washington).

Student services. Of the 12 states that applied formulas for the calculation of requests for student services, only Kansas, Ohio, Pennsylvania, South Carolina, Tennessee, and Washington utilized separate formula components. A comparison of these states is presented in table 5. The other six states--Alabama, Georgia, Kentucky, Mississippi, Montana, and Texas--combined student services with institutional support.

In each instance, the total student services budget request was a formula based on student-related base factors and given rates per base unit. Kansas and Tennessee relied solely on actual headcount enrollments; Ohio used projected FTE enrollment. Pennsylvania used projected credit hours. South Carolina used both headcount and credit hours, and Washington recognized student headcount, applications, active placement files, and dormitory residents.

Kansas and South Carolina differentiated between institutional type and size.

Institutional support. A comparison of the components of the formulas used by 14 states for calculating requests for institutional support is presented in table 6. Of the 14 states, 12 employed a single calculation in developing the total request. Montana calculated separately staff salaries (based on FTE enrollment times a given rate) and operating expenses (based on

Table 4

Formula Methods for Developing Requests for Libraries

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation: Instructional Levels	Differentiation: Institution
Alabama	Total Budget	Projected Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Given Rates for Each Level of Instruction	4	Separate Rates for Community Colleges
Arkansas	Total Budget	Project Student Credit Hours	Rates Per Credit Hour Plus Base Amount	Student Credit Hours Times Given Rates by Level of Instruction Plus Base Amount	4	
Colorado	Professional Salaries	Weighted Student and Faculty FTE Positions(Patrons)	Patrons-Position Ratios	Total Weighted Patrons Divided by 800	4	
		Branch Library Service Hours	Hours-Position Ratio	Total Hours Divided by .0012		
		Associate Degree and Certificate	Program-Position Ratio	Total Programs Divided by .0525		
		Total FTE Positions Justified	Salary Rate	Library FTE Positions Times Given Salary Rate		Separate Salary Rates for each Institution
	Collection	Volume Requirement Percentage	Total Volumes Published Annually	Total Volumes Published Times the Volume Requirement Percentage by Discipline Yields Total Acquisition Volumes. Acquisition Volumes Times Fixed Rate (Average Cost Per Volume)		Average Volume Cost Per Institution
Florida	Collection Budget	Graduate Programs Faculty FTE Positions and Student Enrollment	Percentage and Average Cost Per Volume	Total Required Holdings Calculated as a Function of the Base Factors Times a Percentage and Rates Per Volume		
Georgia	Total Budget	Instructional and Research Budget	Percentage	A Percentage of the Base Factor		
Kansas	Total Budget	Weighted Actual FTE Students	Rates Per FTE Student	Weighted FTE Students Times Given Rates by Level of Institution	4	Separate Rates by Type of Institution
Kentucky	Total Budget	Actual Student Credit-Hours	Rates Per Credit Hour	Student Credit Hours Times Given Rates by Level of Instruction	4	

Table 4 (Continued)

Formula Methods for Developing Requests for Libraries

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation: Instructional Levels	Differentiation: Institution
Missouri	Total Budget	Actual FTE Students	Rate Per FTE Students Plus Base Amount	A Fixed Base Amount Plus a Given Rate Per FTE Student Over 3,500		
South Carolina	Total Budget	Instructional Budget	Percentage	A Percentage of the Base Factor		
Tennessee	Total Budget	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours by Level of Instruction Times Given Rates	5	
Texas	Total Budget	Actual Student Credit Hours	Rates Per Credit Hour	Student Credit Hours by Level of Instruction Times Given Rates with Minimum Base Amount	4	
Washington	Professional and Supporting Salaries	Projected FTE Enrollment and Collection Size	Student-Staff Position Ratios, Collection-Staff Ratios and Salary Rate	Library FTE Positions Times Salary Rate	4	
	Operating Budget	Library FTE Positions	Rates per FTE Position	Library FTE Positions Times Times Given Rate		
	Collection Budget	Library Collection Size and Rates Per Volume	Percentage	Collection Acquisition Allowance (Collection Times Given Percentage) Times Institutional Rates Per Volume		Separate Rates per Institution

Table 5

Formula Methods for Developing Requests for Student Services

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation
Kansas	Total Budget	Actual Student Headcount	Rate Per Student	Actual Student Headcount Times Given Rates	Separate Rate for Types of Institutions
Ohio	Total Budget	Projected FTE Enrollment	Rate Per FTE Student	FTE Enrollment by Programs Times Given Rates	
Pennsylvania	Total Budget	Projected Student Credit Hours and	Rates Per Credit Hour	Student Credit Hours Times Given Rates	
South Carolina	Total Budget	Actual Student Credit Hours and Headcount	Rates Per Credit Hour and Headcount	Actual Credit Hours Times Given Rates Plus Headcount Times Given Rates	Headcount Rates Decline at Each 4,000 Enrollment Interval
Tennessee	Total Budget	Actual Student Headcount	Rate Per Student	Actual Student Headcount Times Given Rate	
Washington	Total	Student Applications, Headcount, Active Placement Files, and Dormitory Residents	Weighting Factors and Rate Per Unit	Weighted Units Times Given Rate	

Alabama, Georgia, Kentucky, Mississippi, Montana, and Texas combined student services with calculations for institutional support.

Formula Methods for Developing Requests for Institutional Support and Other Expenses

State	Function	Base Factors	Formula Factors	Method Of Calculation	Differentiation
Alabama	Institutional Support and	Actual Student Headcount	Rates Per Student	Student Headcount Times Given Rates	Separate Rate for Large and Small Institutions
Arkansas	Institutional Support	Projected Student Credit Hours	Base Amount and Rates Per Credit Hour	Base Amount Plus Student Credit Hours Times Given Rates	Separate Rates by Credit Hour Range
Georgia	Institutional Support and Student Services	Instructional, Research, and Public Service Budgets	Percentage	A Percentage of the Total Base Factors	
Kansas	Institutional Support	Total Educational and General Budget	Percentage	A Percentage of the Base Factor	Separate Percentage for Types of Institutions
Kentucky	Institutional Support and Student Services	Actual Student Headcount	Rates Per Student	Actual Student Headcount Times Given Rate	
Mississippi	Institutional Support, Student Services, Libraries Public Service, and Physical Plant Operation	Instructional Budget	Percentage	A Percentage of the Base Factor	Separate Percentage for Types of Institutions
Missouri	Institutional Support	Actual Student FTE Enrollment	Rates Per FTE Student	Actual FTE Students Times Given Rates	Separate Rates for Types of Institutions
Montana	Academic Support, Student Services, Libraries, Public Service, and Institutional Support	Average FTE Enrollment	Rates Per FTE Student	Average FTE Students Times Given Rates Yielded Staff Salaries	Separate Rates for Types of Institutions
		Base Year Budget and Average FTE Enrollment	Percentage	Base Year Budget Plus Percentage Adjustment for Change in Enrollment Yielded Operating Budgets	

Table 6 (Continued)

Formula Methods for Developing Requests for Institutional Support and Other Expenses

State	Function	Base Factors	Formula Factors	Method of Calculation	Differentiation
New Jersey	Institutional Support	Projected FTE Enrollment	Rates Per Student	Projected FTE Students Times Given Rates	Separate Rates for Types of Institutions
Ohio	Institutional Support	Projected FTE Enrollment	Rates Per Student	FTE Enrollment by Program Times Given Rates	Separate Rates for Six Programs
Pennsylvania	Institutional Support	Projected Student Credit Hours	Rates Per Credit Hour	Student Credit Hours Times Given Rates	
South Carolina	Institutional Support	Total Educational and General Budget	Percentage	A Percentage of the Base Factor or a Fixed Minimum	
Tennessee	Institutional Support	Actual FTE Enrollment	Rates Per Student and Base Minimum	Actual FTE Students Times Given Rates	Separate Rates for Community Colleges
Texas	General Administration and Student Services	Actual Student Headcount, Base Year Expenditures for Sponsored Research, and Total E&G Budget	Rates Per Students and Percentages	Fall Student Enrollment Times Given Rates Plus a Percentage of the Base Year Expenditures for Sponsored Research Plus a Percentage of the Total E&G Budget	Declining Rates by Enrollment Ranges for Large and Small Institutions
	General Expense	Actual Student Credit Hours	Rates Per Credit Hour	Actual Student Credit Hours Times Given Rates	Increasing Rates Per 200,000 Credit Hour Interval Up to 600,000 Credit Hours

the previous year's budget adjusted by a percentage to reflect enrollment changes). Texas combined student services and general administration in a single calculation (based on headcount, base-year sponsored research, and total request for Education and General (E&G) budget. It determined general administration in another calculation (based on credit hours times rates per hour. Eight states calculated total institutional support based directly on student enrollment. Only Alabama and Kentucky used headcount and rates per student, and Missouri, New Jersey, Ohio, and Tennessee relied solely upon FTE enrollment times given rates per student. Arkansas and Pennsylvania based their calculation on credit hours times given rates. The remaining four states used a percentage of base approach in which the base factors consisted of the total E&G budget (Kansas and South Carolina), the total instructional budget (Mississippi), or the total instruction, research, and public service budgets combined (Georgia).

Ten states provided for differentiation among schools: separate rates per institution (Montana), separate rates or percentages for types of institutions (Alabama, Kansas, Mississippi, Missouri, New Jersey, and Tennessee), separate rates by institutional size (Arkansas and Texas), or separate rates by type of academic programs (Ohio).

Research and public service. Ten of the 19 states using formulas include the calculation of expenditures for research and public service as a separate formula component. Table 7 presents a comparison of the methodology used by these states.

In four of these states, calculations were directly related to instruction by being based upon a percentage of the total instructional budget (Alabama, Mississippi, and Oklahoma) or by being based on faculty salaries (Florida). Kansas used FTE's (weighted by program) times given rates; Georgia multiplied only the Continuing Education Unit's times given rates. Two states used prior year sponsored research expenditures as a base to which a percentage (South Carolina) was applied or from which a proportional share of a fixed pool (Tennessee) was calculated. Kentucky and Texas applied a percentage to both prior year expenditures of sponsored research and faculty salaries to calculate the request for departmental research. Mississippi and Montana included the calculation for public service with the institutional support formula component.

Seven states provided for differentiation among schools. Five states used separate rates or percentages by type of institution: Alabama, Kansas, Mississippi, Oklahoma, and Tennessee. Separate ratios for instructional levels were used by Florida, weighted credit hours by program were used by Kansas, and institutional complexity was the factor for Texas in determining the differentiation.

Operation and maintenance of plant. Of the formula states, 15 treated the calculation of physical plant operation and maintenance as a formula item and 14 used separate formula components. A comparison of these formulas is presented in table 8. In eight states, there was a determination of the total physical plant budget (except utilities) through one formula calculation. Six states relied upon gross square feet of building space (Alabama, Colorado, Georgia, and Missouri) or gross square feet adjusted for intensity of usage (Arkansas) or ages of buildings (Tennessee) times given rates as the sole

Table 7

Formula Methods for Developing Requests for Research and Public Service

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
Alabama	Research and Public Service Budget	Instructional and Academic Support Budget	Percentage	A percentage of the Base Factor			Separate Rate for Universities and Community Colleges
Florida	Research Faculty Salaries	FTE Teaching Positions	Teaching-Research Faculty Ratio and Salary Rate	Research FTE Positions Times Statewide Salary Rate		2	
	Public Service Salaries	FTE Teaching Positions	Teaching-Public Service Ratio and Salary Rate	Public Service FTE Positions Times Statewide Average Salary Rate			
Georgia	Extension and Public Service Budget	Projected CEU Production	Rates Per CEU	Projected CEUs Times Given Rates			
Kansas	Research Budget	Research Units (Based on Enrollment Weighted by Program)	Rates Per Research Unit	Research Units by Type Times Given Rates		3	Separate Rate for Type of Institution
Kentucky	Departmental Research Budget	Faculty Salaries and Budgeted Sponsored Research	Percentage	A Percentage of Total Faculty Salaries Plus a Percentage of Total Budgeted Research			
Mississippi	Research	Instructional Budget	Percentage	A Percentage of the Base Factor			Separate Percentage Rates for Two Types of Institutions
Oklahoma	Organized Research	Instructional Budget	Percentage	A Percentage of the The Base Factor			Separate Percentage Rates for Three Types of Institutions
	Extension and Public Service Budget	Instructional Budget	Percentage	A Percentage of the Base Factor			Separate Rates for for Three Types of Institutions

Table 7 (Continued)

Formula Methods for Developing Requests for Research and Public Service

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation		
					Academic Areas	Instructional Levels	Institution
South Carolina	Research Budget	Prior Year Sponsored Research	Percentage	A Percentage of the Base Factor			
Tennessee	Research Budget	Prior Year Research Expenditures and Research Awards	Fixed Award Pool	A proportional share of the Fixed Award Pool Based on Each Institution's Proportional Share of Actual Unrestricted Expenditures for Research and Actual Sponsored Research Awards			Universities Only
Texas	Research	Instructional Salaries and Base Year Sponsored Research	Percentages and Complexity Formula	A Percentage of Total Instructional Salaries Plus a Percentage of Total Sponsored Research Expenditures (Adjusted for Institutional Complexity)			Institutional Complexity Adjustment

Table 8

Formula Methods for Developing Requests for Operation and Maintenance of Plant

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation
Alabama	Total Budget (Except Utilities)	Gross Square Feet of E&G Building Space	Rate Per Square Foot	Total Square Feet Times Given Rate	
Arkansas	Total Budget	Gross Square Feet of E&G Building Space and Student FTE Enrollment	Rate Per Square Foot	Total Square Feet Times Times Student Intensity Factor Times a Given Rate	
Colorado	Total Budget (Except Utilities)	Gross Square Feet of E&G Building Space	Square Feet - Physical Plant FTE Unit Ratios and Rates Per Physical Plant Unit	FTE Physical Plant Units Times Given Rates	
Georgia	Total Budget	Gross Square Feet of E&G Building Space	Rate Per Square Foot	Total Square Feet Times a Given Rate	
Kansas	Maintenance	Gross Square Feet of E&G Building Space	Rate Per Square Foot	Total Square Feet Times a Given Rate	Separate Rates for Institutions
	Security	On-Campus Headcount Enrollment	Rate Per Student	Student On-Campus Headcount Times Given Rate	Separate Rates for Type of Institution
	Administration	Maintenance and Security Budget	Percentage	A Percentage of the Base Factors	Separate Percentages for Types of Institutions
	Logistical	Total E&G Budget	Percentage	A Percentage of the Base Factor	Separate Percentages for Types of Institutions
Kentucky	Maintenance and and Custodial	Assignable Square Feet of E&G Building Space	Rates Per Square Foot	Assignable Square Feet by Category Times Given Rates	
	Grounds	Acres	Rate Per Acre	Total Acres Times Given Rate	
Missouri	Total Budget (Except Utilities)	Gross Square Feet of E&G Building Space	Rate Per Square Foot	Total Square Feet Times Given Rate	

Table 8 (Continued)

Formula Methods for Developing Requests for Operation and Maintenance of Plant

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation
New Jersey	Custodial Salaries	Gross Square Feet of E&G Building Space	Square Feet-Position Ratio and Salary Rates	FTE Positions Times Given Salary Rates	Separate Salary Rates for Types of Institutions
	Maintenance	Gross Square Feet of E&G Building Space	Rates Per Square Foot	Total Square Feet Times Given Rates	Separate Rates for Types of Institutions
	Grounds Salaries	Acres of Land	Acre-Position Ratio and Salary Rates	FTE Positions Times Given Rates	Separate Salary Rates for Types of Institutions
	Administration	Custodial, Maintenance and Grounds Budget	Percentage	A Percentage of the Base Factors	Separate Percentages for Types of Institutions
	Security	Gross Square Feet and Student FTE Enrollment	Rates Per Square Foot and Per Student	Total Square Feet and FTE Students Times Given Rates	Separate Rates for Types of Institutions
Ohio	Total Budget	Projected FTE Enrollment	Rates Per Student	FTE Enrollment by Program by Given Rates	
Pennsylvania	Total Budget	Gross Square Feet of E&G Building Space and Student Credit Hours	Rate Per Square Foot and Student Credit Hour	Total Square Feet and Student Credit Hours Times Given Rates	
South Carolina	Administration and Service	FTE Employees, FTE Students, and Building Replacement Costs	Rates	Weighted FTE Enrollment Plus FTE Employees Times a Percentage of Building Replacement	
	Maintenance	Building Replacement Costs	Percentage	A Percentage of Building Replacement Cost by Type of Building	
	Custodial Services	Gross Square Feet of E&G Building Space	Hourly Wage Rate	Gross Square Feet of Building Space Adjusted for Average Clock Hours Times Given Rate	
	Grounds Maintenance	Building Perimeters, Student Headcount, and Acres of Ground	Hourly Wage Rate and Percentage	A Percentage of Total Buildings Perimeter Plus Weighted Acreage Plus a Percentage of Headcount Students Times Given Rate	

Table 8 (Continued)

Formula Methods for Developing Requests for Operation and Maintenance of Plant

State	Line Item	Base Factors	Formula Factors	Method of Calculation	Differentiation
Tennessee	Total Budget	Gross Square Feet of E&G Building Space, Building Ages, and Usage Intensity	Rate Per Square Foot	Total Gross Square Feet Adjusted for Intensity of Usage and Age of Buildings Times Given Rate	
Texas	Administration and General	FTE Student Enrollment FTE Employees, and Building Replacement Costs	Hourly Wage Rate	FTE Students, FTE Employees, and Building Replacement Costs Times Given Relationships and Wage Rate	
	Maintenance	Building Replacement Costs	Percentages	A Percentage of Building Replacement Cost (Applied on a Building-by-Building Basis)	
	Custodial Services	Gross Square Feet of E&G Building Space	Rate Per Square Foot	Total Square Feet Times Given Rate	
	Grounds Maintenance	Linear Feet of E&G Buildings, Acres of Grounds, and Student Headcount	Wage Rate	Total Linear Feet of Building, Acres of Ground, and Student Headcount Weighted and Multiplied by Given Wage Rate	
Washington	Building Maintenance	Building Replacement Costs	Percentages	A Percentage of Building Replacement Costs (Applied on a Building-by-Building Basis)	
	Custodial Salaries and Equipment	Square Feet of E&G Building Space Serviced	Square Feet-Position Ratios and Rate Per Square Foot	Custodial FTE Positions Times Institutional Salary Rates Plus Square Feet Times Given Rate	Separate Salary Rates Per Insti-Institution
	Custodial Supplies	Custodial FTE Positions	Rate Per FTE Position	Custodial FTE Positions Times Times Given Rate	
	Grounds Maintenance	Acres of Land	Acre-Position Ratios and Rates Per Acre	Grounds FTE Positions Times Institutional Salary Rates Plus Acres Times Given Rate	Separate Salary Rates Per Institutinon

Mississippi included physical plant with the calculation for institutional support

predictor of physical plant expenditures. Pennsylvania multiplied both building square feet and student credit hours by given rates while Ohio used FTE enrollment times given rates.

In six states, a multiformula approach was used by determining separately the requests for the maintenance, custodial services, administration, and grounds care components of the physical plant. All six used gross square feet of building space in determining custodial care (Kansas, Kentucky, New Jersey, South Carolina, Texas and Washington), and Kansas, Kentucky, and New Jersey also used building square feet for determining the requests for maintenance. South Carolina, Texas, and Washington applied a percentage of building replacement costs to calculate maintenance. Requests for funds for grounds care were based on acreage by Kentucky, New Jersey, and Washington, and by a combination of building perimeters, student headcount, and acreage by South Carolina and Texas. Kansas used a percentage of the total E&G budget. Physical Plant administration was calculated separately by four states based on maintenance and security budgets (Kansas), on maintenance, custodial, and grounds budgets (New Jersey), or on FTE students, FTE employees, and building replacement costs (South Carolina and Texas).

Two states calculated security requests based on student headcount (Kansas) and FTE enrollment plus building square feet (New Jersey).

Only Kansas, New Jersey, and Washington provided for institutional differentiation through either separate rates or percentages per institution or types of institutions.

III.

Descriptions of State Budget Formulas and Other Practices

Of the 44 states that responded to the NCHEMS request for practices used to develop appropriation requests, 24 supplied descriptive information that could be used to distinguish between formula budgeting and other practices. Of these 24, only 19 states were found to be using budget formulas. The other 20 states responded that budget formulas were not in use. These 20 states did not supply the procedures that they do use for the development of requests for their postsecondary institutions.

This section describes the individual formulas on which the comparative analysis in the last section is based. It also describes separate formulas reported for community college use. Descriptions of state guidelines and other nonformula, budget development practices are included.

Information about each state budget formula ranged from concise narrative summaries to multivolume documents. The descriptions presented here, describe the methodology for developing the appropriation request for each functional level. Each formula description also includes, if it was supplied, any policy pertaining to nonstate revenue in the development of the net appropriation request. Unless it is otherwise noted, these formulas were used statewide and pertained to all state-supported institutions of higher education. It should also be understood that funds are not necessarily actually appropriated on the basis of each formula-produced request; governors and state legislatures, in many cases, modify the requests and fund only percentages of the formula-derived amounts.

State Budget Formulas for Four-Year Colleges and Universities

Alabama

The Alabama Commission on Higher Education (ACHE) is the state-level agency that coordinates both program offerings and, since 1975, the annual state appropriation requests for all state postsecondary institutions. The ACHE utilized the following formula in developing the annual operating budget requests for the 1978-79 fiscal year for universities and regional colleges:

1. Instruction

   The formula for instruction was based on projected student credit hours categorized by level of instruction: undergraduate I, and graduate II; and by discipline: 15 academic subdivisions. These subcategories were multiplied by weighting factors to obtain total weighted credit hours for each institution. The hours were then multiplied by fixed rates ($37.02 for universities and $26.39 for junior colleges) to determine a total budget request for instruction.

2. Academic Support

   A fixed percentage (5.0) of the total amount calculated for instruction was budgeted.

. Research and Public Service

A fixed percentage (4.0) for universities and for junior colleges of the total amount calculated for instruction and academic support (components one and two) was budgeted.

. Library

Projected credit hours were multiplied by five fixed rates--one for junior colleges ($2.39) and four for universities (ranging from $3.28 for undergraduate to $28.21 for graduate II).

. Student Services and General Administration

Actual fall (1977) headcount was multiplied by given rates per student for six levels of enrollment:

a. Institutions with headcount under 4,000

First 1.000	$300,000.00 base
Next 1.500	150.96 per student
Next 1.499	103.98 per student

b. Institutions with headcount 4,000 and over

First 4,000	$170.60 per student
Next 4,000	127.26 per student
Over 8,000	114.66 per student

6. Physical Plant Operation and Maintenance

Recommended funding was based on gross square feet of educational and general (E&G) building space times a given rate ($1.69). Utilities were calculated separately by multiplying E&G gross square feet by rates for each institution (based on 1976-77 actual cost-per-square-foot plus increases of 25 percent and 20 percent for 1977-78 and 1978-79 inflation).

7. General Institutional Expense

This term was designed as a general category into which various activities such as campus security. alumni affairs. and administrative computing could be grouped conveniently. The funding request for this component was derived by multiplying the total amount for all other components (1 through 6) by a given percentage (2.0).

8. Revenue Deduction

A percentage (90.0) of the average tuition and fees per on-campus credit hour of instruction charged by each institution for fall 1977 was multiplied by the total unweighted projected student credit hours to determine the total revenue deduction for universities.

Arkansas

Formula budgeting has been used in Arkansas since 1970. It is coordinated by the Department of Higher Education. The biennial operating requests of the senior colleges and universities and community colleges must be submitted through the Department of Higher Education. The formula used in developing the 1980-82 biennium request is described below for six functional areas.

1. Teaching Salaries

Semester credit hours were projected for six levels of instruction: lower division--nonoccupational. lower division--occupational. upper division. master's, specialist, and doctoral. These projections were used with credit hour and faculty ratios (ranging from 707:1 for lower division--nonoccupational--to 147:1 for doctoral) to determine FTE faculty positions by level of instruction. Total calculated FTE faculty positions by level were multiplied by nine-month salary rates for each fiscal year to yield the total instructional-salary request.

2. Departmental Operations and Instructional Administration

Total student semester hours by level of instruction (lower division--nonoccupational, lower division--occupational. upper division, master's, specialist and doctoral) were multiplied by given rates per level for each fiscal year (ranging from $8.39 for lower division--nonoccupational--to $52.23 for specialist and doctoral in 1979-80).

3. Staff Benefits

Staff benefits were calculated as a percentage of the total unrestricted educational and general salary base (19.9 percent for FY 1979-80 and 20.5 percent for FY 1980-81).

4. Physical Plant Operation and Maintenance

Gross square feet of E&G building space multiplied by a student-intensity factor (gross square feet divided by FTE enrollment, divided by given rates for senior and two-year institutions), times a given rate per square foot ($2.07 for FY 1979-80 and $2.28 for FY 1980-81) yielded the total budget request.

5. Scholarships and Student Aid

Total projected student credit hours times given rates for senior ($0.96) and community colleges ($0.66) were used to develop the total request for student aid.

6. Library

Projected student credit hours at four levels of instruction (lower division, upper division, master's. specialist and doctoral) multiplied by given rates per level for each year ($3.34 to $22.46 for FY 1979-80, and $3.84 to $25.83 for FY 1980-81), plus a base of $75,000 yielded the library

general-operating budget requests. (Separate requests for library-collection additions were included in capital-outlay requests.)

7. Institutional Support

Projected student credit hours (SCH) were multiplied by rates given for aggregate levels as follows:

	1979-80	1980-81
Initial base amount	$290,125.00	$311,844.00
First 25,000 SCH	14.00	15.91
Next 75,000 SCH	10.55	11.34
Next 100,000 SCH	9.87	10.61
All over 200,000 SCH	4.29	4.61

The total amount calculated above was reduced by an allowance for service credits to auxiliary enterprises. It was computed as a percentage of total auxiliary income:

1.50 percent of first $1,000,000
0.75 percent of next $1,000,000
0.50 percent of next $1,000,000
0.25 percent of all over $3,000,000

8. Revenue Deductions

Total unrestricted income was considered in arriving at the amount to be deducted from the formula request to derive the net appropriation request. The student-fee portion of the formula was derived by multiplying projected FTE in-state and out-of-state enrollments by a given rate per FTE.

Colorado

The Colorado Commission on Higher Education (CCHE) used formulas for developing the 1980-81 annual budget requests for the following budget areas:

1. Instruction (Faculty Only)

Full-time-equivalent student enrollment was divided by student-faculty ratios for four levels of instruction (lower division, upper division, graduate I and graduate II) within 33 academic areas to determine the total number of FTE faculty positions. Salaries for instructional personnel were derived by multiplying formula FTE positions by the average faculty salary at each institution. (The CCHE took the position that faculty salary variations at institutions reflect the different markets in which those institutions compete.)

2. Library

Library-employee FTE positions were determined by formula and were based on four separate calculations:

a. Patron use. This was determined by dividing the sum of weighted faculty and students by 300; the weighted factors were used to differentiate among staffing loads imposed at each level of instruction and were as follows:

	Students	Faculty
Lower Division	1.0*	1.5
Upper Division	1.8	2.0
Graduate I	4.0	4.0
Graduate II	6.0	8.0

* 1.25 for community colleges

b. Branch-library services. This was determined by dividing the actual number of service hours by a fixed average and multiplying the result by 5.5 as follows:

$$\frac{\text{(Number of service hours)}}{4450} \times 5.5 = \text{FTE positions}$$

c. Media services. This was determined by multiplying the sum of the associate-degree program and half the value of certificate programs by .0525.

d. Sponsored research and contracts. This was the actual number of FTE positions that were available through indirect-cost recovery.

Total library-employee FTE positions were the sum of the patron, branch, media-services, and sponsored-research calculations.

The library-acquisitions budget request was developed by multiplying a volume-equivalent number that was indicative of each institution's role and mission by the institution's average cost per volume in the previous year. Volume-equivalent numbers were determined by multiplying the total number of volumes published annually by discipline by the percentage that each institution would normally be expected to purchase.

3. Physical Plant Operation and Maintenance

Gross square feet of building space was used in determining physical-plant FTE positions using the following formula:

$$\text{Physical-Plant Employee FTE} = \frac{\text{Gross Square Feet}}{8.500 + 0.001\ (\text{gross sq. ft.})}$$

Total FTE positions were then multiplied by a unit cost (statewide average cost per FTE of total physical-plant budgets) to obtain the total budget request.

In addition to these three areas, Colorado was also developing formulas for use in determining budget requests for: instruction (supporting staff, current expense, and travel), institutional support, student services, and capital outlay.

Florida

The state of Florida uses a formula to develop and analyze the appropriation requests of the nine senior institutions that make up the State University System. With the 1979 budget period, the state began making biennial appropriations. The formula used in developing the 1980-82 request for senior institutions was as follows:

1. Academic Salaries

Estimated total student credit hours by level of instruction (based on an annual average) were divided by faculty credit-hour ratios (41.3 lower division, 302.0 upper division, 232.2 graduate, and 67.0 thesis or dissertation) to determine total FTE teaching positions.

Research FTE positions were based on FTE teaching positions according to given ratios by level of instruction: 1:12 for lower and upper division and 1:3.4 for graduate and thesis or dissertation.

Academic-advisement positions were generated on one FTE position for each 244 FTE students.

Public-service FTE positions were generated on one FTE position for each 48 FTE teaching positions.

Academic-administration positions were generated on one FTE position for each 13 instructional, research, academic-advisement, and public-service positions calculated.

Total academic FTE positions generated were multiplied by a given average salary figure for the State University System to calculate the total salary base.

2. Non-Academic Salaries

Non-faculty, support positions were determined by allowing one FTE position per 2.85 academic FTE positions generated. Total FTE support positions times actual salary scales yielded the amount requested for the salary base.

3. Other Instructional Non-Salary Operating Expenses

Funds for costs of operating-budget support were based on a fixed amount per FTE academic position.

4. Library

Book budgets attempt to close the gap between existing holdings and standards set by the number of graduate programs, doctoral degrees awarded, faculty positions, and students enrolled. A ratio of annual purchases to the total standard holdings (1.85 percent) was used in connection with an average cost per volume to calculate the total book-acquisition funds requested.

5. All Other

The amounts for library operation, operation and maintenance of physical plant, student services, and institutional support were determined on an incremental nonformula basis.

6. Revenue Deductions

Total funds estimated from student fees, indirect cost recoveries, and other sources were deducted to arrive at the net appropriation request.

Georgia

The state of Georgia has used formulas for developing annual appropriation requests since 1963, when the regents of the University System of Georgia first introduced them. A major formula overhaul was undertaken in 1973, when a formula revision study was conducted by individuals from various institutions in the University System of Georgia. The revised formula of 1973 was still in use in 1979 and consisted of the following components:

1. Instruction and Research

Faculty FTE positions were based on ratios of student credit hours to faculty at three levels of instruction (lower division 1.500:1, upper division 1.080:1, and graduate and professional 550:1).

Research personnel FTE positions were based on a ratio of one FTE position for each graduate- and professional-faculty FTE position.

Academic-administration FTE positions were determined on a faculty-administrator ratio of 15 to 1.

Nonacademic FTE positions were based on a ratio of 1 to 3 with academic FTE positions.

Academic and nonacademic salaries were budgeted at given rates per type of FTE position. Operating expenses were budgeted at given rates per FTE academic position.

2. Extension and Public Service

Funds were requested on the basis of projected Continuing Education Unit (CEU) production at given rates per CEU.

3. General Administration, Institutional Support, and Student Services

Funds were budgeted at a percentage (19.6) of the total amount requested for instruction and research, and extension and public service (elements 1 and 2).

4. Physical Plant Operation and Maintenance

The amount requested was based on rates per square foot of E&G building space. Separate nonformula amounts for major repairs and replacements were requested.

5. Libraries

Funds requested were based on a percentage (9.0) of instruction and research plus extension and public service.

The total amount calculated by the formula plus nonformula additions became the total education and general annual operating budget request.

Kansas

The Kansas Board of Regents has the responsibility for coordinating and approving the annual appropriation requests of six state universities and one technical institute. The formula used for developing the request for FY 1980-81 consisted of the following components:

1. Instruction

Actual student credit hours generated during the preceding year, by academic discipline and by level of instruction (lower division, upper division, graduate I, and graduate II), were multiplied by given rates per credit hour for each discipline and level of instruction to determine the total amount for instruction. Separate rates based on averages of benchmark institutions were specified for four types of institutions.

2. Organized Research

Units of research (based on enrollment weighted for undergraduate programs, types of master's programs, and types of doctoral programs) times rates for each type of institution yielded the total request for research.

3. Library

FTE students weighted for level of instruction were multiplied by rates for each type of institution to calculate the amount requested.

4. Academic Administration and Support

The total academic-support request was based on a percentage that ranged from 8.93 for Kansas State to 6.91 for the three regional universities.

5. Student Services

The amount for student service was calculated by multiplying given rates ($190.86 for University of Kansas, $133.92 for Kansas State University, $156.12 for Wichita State University, and $170.50 for the three regional universities) times headcounts of students enrolled in the previous year.

6. Institutional Support

The total amount requested for instruction, research. academic support, student services, and physical plant was multiplied by percentage factors (separate factors for each type of institution) to yield the total request.

7. Physical Plant Maintenance and Operation

a. Maintenance budgets were based on total E&G gross square feet of building space times given rates (by type of institution).

b. Security costs were based on total on-campus enrollment times given rates (by type of institution)

c. Grounds expenditures were based on existing budget

d. Physical plant administration was calculated as a percentage (by type of institution) of the total amount calculated for maintenance. security, grounds, and logistical services.

e. Logistical Services was based on a percentage (by type of institution) of the total amount for instruction, research. academic support. and student services.

Since the formula-derived amount was based on enrollment data two years prior to the funding period in consideration. adjustments from the base to the current year were made. The adjusted total. less any budget overhead recoveries, became the formula appropriation request. For comparison purposes, appropriation requests based on continuation of programs at the base year (plus inflation) level are shown in the appropriation request.

Kentucky

The Kentucky Council on Higher Education published formula guidelines for use by all state colleges and universities in developing appropriation requests for the 1980-81 fiscal year. Each request represents a combination of program funding and formula-generated figures. The formula components for 1980-81 were as follows:

1. Instruction and Academic Support

Total instructional requests were calculated by multiplying FTE faculty positions by given salary rates. FTE faculty positions were a function of FTE students divided by student-faculty ratios for each type of institution (community colleges and universities), level of instruction (lower division. upper division. master's, professional. and doctoral), and twenty academic areas. Academic support was calculated as a percentage (20.0) of the total instruction request. An additional allowance of $85 per freshman or sophomore with an ACT score less than 12 was added for preparatory instruction.

2. Departmental Research

An allowance for individual and project research (other than medical or dental) was calculated as a percentage (10.0) of total faculty compensation plus a percentage (5.0) of the total budgeted sponsored research times a given institutional-complexity factor.

3. Libraries

Total base-year student credit hours by level of instruction (undergraduate, masters, law, and doctoral) times given rates yielded the recommended amount for libraries.

4. Student Services and Institutional Support

The amount requested was based on headcount enrollment times given rates as follows:

a. Institutions with Student Headcount 4,000 and Under

First 1.000	$831,390.00 (base)
Next 1.500	411.44 per student
Next 1.500	306.91 per student

Plus 7% of State Support of Primary Programs (Instruction and Research)

b. Institutions with Student Headcount Over 4,000

First 4,000	$440.24 per student
Next 4,000	328.39 per student
Over 8,000	295.88 per student

Plus 7% of State Support for Primary Programs (Instruction and Research)

5. Physical Plant Operation and Maintenance

This budget was calculated in three categories:

a. Custodial and General Maintenance. Total assignable square feet of building space by category (general, support, or medical) times given rates per square foot ($2.18, $1.82, and $2.92) yielded the request for custodial and general maintenance.

b. Utilities. Actual base year budget plus a percentage increase (20.0) was used to develop total utility requests.

c. Landscaping and Grounds. Total number of acres times a given rate ($1.239) per acre yielded the requested amount.

6. Scholarships and Fellowships

An allowance of $40 per FTE student enrollment was used to calculate the total amount requested for student aid.

7. Revenue Deductions

Total tuition and fee revenues anticipated were deducted from the total formula and nonformula (program-funded) request to arrive at the net appropriation request.

Louisiana

The Board of Regents has used formulas since 1971 in developing the state-appropriation requests of the state colleges and universities in Louisiana. The formula used for FY 1980-81 consisted of the following components:

1. Instruction, Departmental Research, and Academic Support

Total student credit hours (current year) were aggregated by level (lower division, upper division, lower nursing, upper nursing, master's, master's nursing, specialist-professional, and doctoral) and by lower or higher cost areas, and multiplied by given rates per level and cost area. (The rates reflected average Southern Regional Educational Board expenditures by function.) The result was 100 percent of the total student credit hour funding. In addition, all institutions received a flat sum of $1,084,482 for fixed administrative and support costs.

2. All Other Functional Areas

The amount budgeted for the current year was multiplied by a percentage (7.5 plus a 10 percent inflation factor) to arrive at the total request for all other areas.

Mississippi

The Board of Trustees of State Institutions of Higher Learning uses a formula for developing annual appropriation requests for the eight senior universities in that state. The formula used for developing the FY 1980-81 requests consisted of four components:

1. Instruction

Total student credit hours by level (lower division, upper division, and graduate) and by discipline (twenty-six areas) were multiplied by given rates per student credit hour for three types of institutions (comprehensive, urban, and regional without doctoral program). These calculated amounts represented the total instructional budget.

2. General Administration, Library, Student Services, and Physical Plant Operation and Maintenance

A percentage--47.0 percent for urban and comprehensive institutions and 50.0 percent for regional universities--of the total amount calculated for instruction was used to determine the budget.

3. Research

A percentage--6.0 percent for comprehensive and urban institutions and 2.0 percent for regional universities--of total instructional costs was used to calculate the research budget. The totals of the three components plus an inflationary allowance (9.5 percent) represented the total E&G budget for each institution.

4. Income Deduction

A percentage--32.0 percent for comprehensive, 30.0 percent for urban, and 26.0 percent for regional universities--of the total E&G budget was deducted to arrive at the net appropriation request.

Missouri

The Missouri Department for Higher Education uses formula funding in developing the annual appropriation request for the eight regional universities and colleges (University of Missouri excluded) in that state. The formula used for FY 1979-80 consisted of the following components:

1. Instruction

Using average costs per student credit hour within five broad academic categories (agriculture, biological and physical sciences, general, education and health, and fine arts), total instructional requests were developed by multiplying actual credit-hour production (weighted by level) times the applicable rates. (An economy-of-scale adjustment was made for three smaller institutions.) After adding a percentage for inflation and a percentage (plus or minus) for two-year enrollment changes, the result represented the total request for instruction.

2. Library

Beginning with a fixed base of $500,000, each institution received an additional sum ($81.00 for FY 1979-80) per FTE student over 3,500. The total amount was increased for inflation (25 percent for FY 1979-80).

3. General Support (Academic and Institutional)

FTE enrollment for the previous year times given rates per FTE (separate rates for four types of institutions) and adjustments for inflation yielded the total amount requested for academic and institutional support.

4. Physical-Plant Operation and Maintenance

Total gross square feet of E&G building space was multiplied by a given rate ($1.32) per square foot.

5. Other amounts for student aid, utilities, public service, and research were based on actual expenditures adjusted for inflation.

6. Revenue Deduction

Estimated student and other nonrestricted revenue was deducted to arrive at the net appropriation request.

Montana

The Board of Regents uses a formula in developing the annual appropriation requests for Montana's four-year colleges and universities. The formula used for 1979-80 consisted of the following components:

1. Faculty Salaries

FTE faculty positions were based on a three-year moving average of enrollment using a separate student-faculty ratio for each institution. Total FTE faculty positions times given salary rates (separate rates for different types of institutions) yielded the funding requested for faculty salaries.

2. All Other Personnel Salaries

The actual average cost per student (by institution) for the previous year was multiplied by the three-year moving average of enrollment to determine a base amount to which salary increases and special adjustments were added.

3. Operating Expenses

The previous year's budget base was adjusted for enrollment changes (using a three-year moving average) at a percentage margin (25.0 in FY 1979-80); that is, if enrollment increased or decreased by 12 percent, operating budgets were increased or decreased by 3 percent. In addition, increases for utilities, inflation, and special adjustments were added to arrive at the appropriation request for nonpersonal operating expenses.

4. Equipment

Average expenditures per FTE for equipment (by institution) over the past four years were multiplied by a three-year moving average of enrollment and increased for inflation to obtain the amount requested for equipment.

5. Student Aid

The average expenditure per FTE (by institution) for the previous year was multiplied by the three-year moving enrollment averages to obtain the student-aid request.

The sum of the personnel-salary components, operating expenses, equipment, and student aid represented the appropriation request.

New Jersey

The New Jersey Department of Higher Education used formulas in developing the appropriation requests for that state's public colleges and universities as follows:

1. Instruction

Total FTE faculty positions were determined using student-faculty ratios by level (lower division, upper division, and graduate) and by certain disciplines. Total FTE faculty positions times given salary rates yielded the total request for instructional salaries. All other instructional costs were determined as a percentage of total instructional salaries as follows:

	Rutgers	State Colleges
Departmental Research	7.5%	—
Academic Administration	6.0%	7%
Educational Development	2.04%	—
Instructional Support	21.0%	26%

2. Library, General Administration, Student Services, Student Aid, and Institutional Support

Total FTE students were multiplied by given rates ($1,137 for Rutgers, $830 for two colleges, and $780 for all others) to compute the request for General Support.

3. Physical-Plant Operation and Maintenance

a. Custodial. Total gross square feet of E&G building space was divided by ratios of square feet to FTE positions (12,000 and 150,000 per position) to arrive at FTE positions allowed. (An allowance for annual leave and sick leave plus supervision was also included.) Total FTE positions (both supervisory and nonsupervisory) were multiplied by average salary rates to determine total custodial salaries. Custodial supplies were calculated by increasing the current budget by 1.0 percent.

b. Building Maintenance. Total gross square feet by type of building was multiplied by given rates per square foot to calculate the maintenance request.

c. Grounds. One FTE position was budgeted for each 4, 8, 16, and 32 acres of class I, II, III, and IV grounds. One of each five positions (or five percent) was considered supervisory. Total FTE positions times average salary rates (separate for supervisor and employees) yielded the total salary request. The current year's supply budget plus an inflation factor (seven percent) yielded the supply request.

d. Administration. Total amount calculated for a, b, and c above, times an administrative allowance (percentage) yielded the total administrative request.

e. Security. Total gross square feet times a given dollar allowance ($.18 and $.36), plus on-campus FTE times a dollar allowance ($26), yielded the total request for security.

f. Other. The total budget request for utilities, garbage collection, vehicle repair, and insurance. was calculated using the current budget times an inflation allowance.

4. Income Deduction

Total expected student-fee revenue was deducted from the total E&G formula-generated request to arrive at the net appropriation request.

Ohio

The Ohio Board of Regents uses program-expenditure models based on particular programs of instruction for developing the biennial appropriation requests for the forty state-assisted colleges and universities under its jurisdiction. For the 1979-81 biennium, sixteen program-expenditure models--not unlike formulas--were used. Each model was applied to calculate an expenditure per FTE student for each year. Total projected FTE enrollment for each institution by program area was then multiplied by the expenditure per student derived by each model. Each model consisted of the following components:

1. Instruction and Departmental Research

Using given student-faculty ratios and average faculty salaries for that given program area, a per FTE student-faculty cost was calculated. Allowances per student for operating budgets, administrative and support salaries, and equipment were also calculated.

2. Academic Support

Average costs per student by program area were calculated and included.

3. Student Services

Allowances per FTE student based on historical expenditures by program were given.

4. Institutional Support

Allowances per FTE student based on historical expenditures by program were given.

5. Physical Plant

Allowances per FTE student based on historical expenditures by program were given.

6. Revenue Deduction

All income from external sources (other than state subsidies and student fees) was deducted from institutional expenses in calculating the per student support of each program-expenditure model. Each model included inflation allowances for salaries and operating budgets.

Oklahoma

The Oklahoma State Regents for Higher Education have the responsibility for recommending annually to the governor and the legislature an allocation of state funds for each of the twenty-seven colleges and universities and the eight constituent agencies included in the Oklahoma State System of Higher Education.

Starting in FY 1973-74, Oklahoma began to phase out the "base formula with percentage distribution" approach and had, by FY 1975-76, adopted a formula based on educational-program costs for twenty-five institutions. The same method was used for developing the FY 1979-80 request. The educational programs used in the Oklahoma formula were:

1. Instructional Program (includes resident instruction, instructional support, library, institutional support, student service, and physical-plant operation and maintenance)

   Average costs per FTE student, at three levels for each instructional program (major), were used with projected FTE enrollments to calculate the total instructional-program budget. Separate average-cost rates have been developed for comprehensive research universities, regional universities, specialized colleges, and community colleges.

2. Organized Research

   Funds were budgeted at a percentage (12.0 percent for research universities, 1.22 percent for regional universities and specialized colleges, and 0.55 percent for community colleges) of the total instructional-program budget.

3. Extension and Public Service

   Funds were budgeted at a percentage (8.0 for research universities, 1.39 for regional universities and specialized colleges, and 0.45 for community colleges) of the total instructional-program budget.

The sum of these three components represents the total E&G budget. From this was deducted total estimated revenue (student fees plus sale of educational services) to arrive at the net state-appropriation request for each institution.

Pennsylvania

The Pennsylvania Department of Education coordinates the budget requests for the forty-four higher education institutions, including state-owned colleges and universities (14), state-related universities (4), state-aided private colleges and universities (13), and community colleges (14). A single line-item appropriation is enacted annually by the Pennsylvania General

Assembly for the fourteen state colleges and universities; the amount allocated to each institution is determined through a formula by the Department of Education. The formula used for determining each institution's share of the FY 1980-81 appropriation is described below.

Individual institution-base budgets are calculated using a regression technique that relates costs to instruction-credit or weighted credit-hour production and physical size. The concept developed from research involving multiple-linear-regression techniques that found:

1. Among a sizable number of variables, credit hours were the best indicator of FTE faculty requirements.

2. Similarly, FTE faculty was the best predictor of direct cost.

Standard student-faculty ratios have been developed by fitting regression lines through scatter points representing, for each institution, student faculty ratios plotted against credit-hour production by discipline and at each level of instruction. (The regression line represented the collective staffing pattern of the fourteen colleges and universities.) Empirically established relationships between FTE faculty and direct costs have also been developed from historical cost data.

1. Instruction

Credit-hour production was divided by the student-faculty ratios given by the regression techniques described above. for each discipline and level of instruction. to obtain FTE faculty. A regression is performed of FTE-faculty positions against actual direct institutional cost to obtain predicted instructional costs.

2. Academic Support

Base-budget costs are determined by performing a regression of total actual academic-support costs for all institutions against the weighted credit-hour production.

3. Student Services

A regression was performed of total student-service costs of all institutions by weighted credit-hour production.

4. Institutional Support

A regression is performed of total institutional-support costs of all institutions against credit-hour production.

5. Physical-Plant Operation and Maintenance

A regression is performed of total physical-plant costs of all institutions by credit-hour production and gross square feet of building space.

6. Revenue Deductions

Total anticipated student fees are subtracted from the total formula-generated expenses to obtain the base budget.

Each institution's percentage share of the total base budget determines its proportionate share of the state appropriation.

South Carolina

The South Carolina Commission on Higher Education has the responsibility for coordinating, reviewing, and making recommendations concerning the annual state appropriation for all senior public colleges and universities and, since 1978, the appropriations applicable to the associate-degree programs of the 16 two-year community colleges and technical schools. The formulas and guidelines used for developing the FY 1980-81 appropriation requests were as follows:

1. Instruction

Actual fall student-credit hours were used to determine FTE faculty positions, using student-faculty ratios specified for three levels of instruction (undergraduate, graduate 1. and graduate 2) with thirty-four academic disciplines. Faculty salaries were determined by multiplying FTE teaching positions per academic discipline by salary rates specified for each discipline by type of institution (doctoral. master's. baccalaureate, and two-year branches of four-year institutions).

Other instructional expenses were calculated as percentages of total faculty salaries by level. discipline, and type of institution. After the total instructional-support expenses were determined, an adjustment was made for graduate teaching assistants (GTAs): the difference between average faculty salaries (by discipline) and average GTA salaries from the previous year was multiplied by the number of GTAs at each institution, and this was deducted from the amount for total salaries.

2. Academic Support

The amount requested was calculated as a percentage (12.0) of total instructional expenses.

3. Libraries

The amount requested for libraries was calculated as a percentage (10.0) of total instructional expenses.

4. Student Services

Total fall headcount and student-credit hours for the current year were multiplied by given rates applied as follows:

First 4,000 headcount $150 per student
Second 4,000 headcount $125 per student
Next 4,000 headcount $100 per student

All over 12,000 headcount $75 per student
Plus total credit hours $4 per credit hour

5. Research

Research requests were calculated as a percentage (25.0) of total prior-year, sponsored-research and restricted-research expenditures at each institution.

6. Public Service

Total public-service requests were limited to a percentage (25.0) of prior-year sponsored expenditures and nongeneral-fund expenditures for public service at each institution.

7. Physical-Plant Operation and Maintenance

Separate formulas were applied in calculating general physical-plant services, building maintenance, custodial services, and grounds maintenance.

a. General Physical-Plant Services. Total current FTE employees (FTEE), total current FTE students (FTES), total replacement cost of E&G buildings (RCB), and the average hourly rates for services (SW) were the factors used in the following equation for the request amount:

General Physical-Plant Services =
(SW[FTES + (2 X FTEE)] X 3.90) + (RCB X .0028)

RCB was determined by applying the cost-index factors from Marshall's Handy Appraisal Chart to the original construction cost of each education and general building; SW was obtained from the Survey of Current Business for January 1979.

b. Building Maintenance. Total replacement cost of E&G buildings times maintenance cost factors for different types of building construction for buildings with and without air-conditioning yields the total request. Cost factors were:

	Building Construction		
	Wood-Frame	Masonry-Wood	Masonry-Concrete
With Air-Conditioning	1.90	1.45	1.25
Without Air-Conditioning	1.75	1.30	1.10

c. Custodial-Services. Total E&G gross square feet of building space (GSF) and average hourly wages (SW) for services (taken from the Survey of Current Business) were factors in the following equation for amount requested:

$$\text{Custodial Services} = \frac{\text{GSF}}{\text{x}} \times 1.064 \times 22.400 \times 2080 \times 1.2$$

d. Grounds Maintenance. Total linear feet of the perimeter of all E&G buildings (P), the student headcount from the previous fall semester (HC), total acres of regularly maintained lawns and grounds (L), and the average hourly wages (SW) for services (taken from the Survey of Current Business) were combined in the following formula to calculate the amount requested:

$$\text{Grounds Maintenance} = SW(0.70\ P + 4122\ L + 0.50\ HC)$$

e. Utilities. Actual prior-year expenditures plus a percentage per year (15.0 for natural gas, 10.0 for other utilities) was used to calculate the amount requested.

8. Institutional Support

The total amount calculated for the areas above times a percentage (15.0) or $100,000 (whichever was larger) yields the amount requested for institutional support.

9. Revenue Deductions

Student-fee income calculated at $300 per FTE for universities ($200 for colleges and two-year branches) and doubled for out-of-state students, plus income from sales and service and any federal support for E&G operation was subtracted to arrive at the net appropriation request.

Tennessee

The Tennessee Higher Education Commission is charged with the development and maintenance of a means for equitable distribution of state funds to nine state universities, ten community colleges, and four state technical institutes. For FY 1980-81, the formula consists of the following components applicable to all three major types of institutions:

1. Instruction

Actual student-credit hours from the prior year (FY 1978-79) by discipline (28 academic areas) and level of instruction (lower division, upper division, master's, professional, and doctoral) were multiplied by given rates and by level within each discipline to arrive at the request amount. The rates were based on an overall average per FTE of the original base. Adjustments for enrollment changes in the current year were made only if an institution had incurred increases or decreases that exceeded a fixed range (plus or minus two percent); only the enrollment changes in excess of the range limits were entered into the calculation.

2. Academic Support (Except Library)

The amount recommended was a percentage (3.0 for research universities, 1.7 for regional universities, and 0.8 for community colleges and technical institutions) of the total amount calculated for instruction.

3. Library

Total student credit hours by instructional level (weighted by 1.2 for science areas) were multiplied by given rates for each level of instruction (lower, upper, master's, professional, and doctoral).

4. Student Services

A fixed rate ($142) per headcount student was used to calculate the request amount for student services. In addition, a fixed allowance ($40,000 for community colleges and $300,000 for regional universities) for intercollegiate athletics was included.

5. Public Service

A fixed allowance per institution was permitted according to the following schedule:

a. Community colleges/technical institutes:

$50,000 for FTE enrollments up to 2,500
$75,000 for FTE enrollments over 2,500

b. Universities:

$100,000 or 0.5 percent of total E&G budget request

6. Research (Universities Only)

A total of $2,600,000 was recommended and allocated as follows:

a. Fifty percent was distributed in proportion to the amount budgeted by each institution for research the prior year

b. Fifty percent was distributed on the basis of sponsored-research awards to each institution

7. Developmental Studies

Community colleges and technical institutes receive an allowance of one percent of total E&G expenditures. One regional university (Tennessee State University) receives an allowance of 0.5 percent of total E&G expenditures.

8. Institutional Support

Allowances are based on FTE students as follows:

a. Community colleges and technical institutes:
$100,000 plus $190 per FTE student

b. Universities:
$230 per FTE

9. Physical-Plant Operation and Maintenance

Total square feet of E&G building space was multiplied by a given rate ($1.20) per square foot and adjusted for intensity of usage (0.9 to 110.0 percent) and for age of buildings (for space constructed prior to 1960) to yield the request for buildings and grounds.

10. Nonformula Components

Funds for staff benefits, student aid, and utilities were based on current expenditures plus an inflation adjustment.

11. Revenue Deductions

Deductions include standardized student fees per FTE ($570 for research universities, $480 for regional universities, and $355 for community colleges and technical institutions), actual out-of-state tuition collections, and an allowance for interest income (1.5 percent of total E&G expenditures).

12. Instructional-Evaluation Allowance

Institutions were allowed to add to the next E&G expenditure request an amount up to two percent of their total E&G expenditures, based on numerical ratings of five instructional variables. (For example. 80 out of 100 maximum points would result in 80 percent of the 2 percent allowance.) The five instruction-evaluation variables were:

a. Proportion of eligible academic programs accredited (up to 20 points)

b. Performance of graduates on a measure of general educational outcomes (up to 20 points)

c. Performance of graduates on a measure of specialized or major-field outcomes (up to 20 points)

d. Evaluation of instructional programs and services by enrolled students, recent alumni. and community and employers (up to 20 points)

e. Peer evaluation of academic programs (up to 20 points)

Texas

Texas has utilized formula funding for state-supported colleges and universities since 1965. The Texas College and University System Coordinating Board is responsible for maintaining the formula used in developing the biennial appropriation requests. The formula used for the 1978-79 biennium consists of eleven components as follows:

1. Teaching Salaries

The amount budgeted for each fiscal year was calculated by multiplying student semester credit hours during the base year at three levels of instruction (undergraduate, master's. and doctoral) within nineteen

academic areas by rates specified per credit hour for each discipline at each level of instruction.

2. Departmental Operating Expenses

Student-semester hours in each academic area at each level of instruction were multiplied by given rates per credit hour to determine total departmental operating expenses.

3. General Administration and Student Services

The amount requested was based on headcount and sponsored research as follows:

a. Institutions with headcount 4,000 and under

First 1.000	$300,000.00 (base)
Next 1.500	116.21 per student
Next 1.500	80.03 per student

b. Institutions with headcount over 4,000

First 4,000	$118.59 per student
Next 4,000	110.85 per student
Over 8,000	99.87 per student

In addition to the amount based on headcount, a percentage (7.5) of the base year's expenditures for sponsored research and one percent of the total appropriation (less amount for general administration and student services) was added.

4. General Expense

The amount for general expense was calculated by multiplying base-year semester credit hours by given rates as follows:

First 200,000	$0.97 per credit hour
Next 200,000	1.09 per credit hour
Next 200,000	1.20 per credit hour
All over 600,000	1.32 per credit hour

5. Instructional Administration

A percentage of total calculated faculty salaries was requested for instructional administration. The percentage varies by institution and was calculated by the application of an algebraic formula through which a fixed percentage (5.4) was adjusted (according to the credit hours produced during the base period and the organizational complexity of each institution) to reflect economies of scale.

6. Libraries

Base-period semester credit hours by level of instruction were multiplied by given rates specified for each level:

Undergraduate	$ 2.88 per credit hour
Masters and Professional	5.80 per credit hour
Law	15.31 per credit hour
Doctoral	24.80 per credit hour

The minimum base was $225,000 plus $9.00 per credit hour for schools with a total credit hour production of 50.000 or less, and $450,000 for all other schools.

7. Organizational Research

The amount recommended was a fixed percentage (70.0) of the result of multiplying an institutional complexity factor times the sum of faculty salaries (for each year of the biennium) plus five percent of the total expenditures for sponsored research during the base year. The institutional complexity factor was calculated by dividing total weighted FTE students (during the base year) by total FTE students, where total enrollments for three levels of instruction (undergraduate, master's, and doctoral) and three graduate academic groupings (science and engineering, teacher education, and all other) were weighted to reflect instructional-program complexity.

8. Physical-Plant General Services

The amount requested for each year of the biennium was calculated as a function of (1) average hourly earnings for services (SW), (2) full-time student enrollment (FTSE), (3) full-time-equivalent employees (FTEE), and (4) building-replacement costs (RCB) in the following relationship:

$$\text{Request} = SW([FTSE + (2 \times FTEE)] \times 3.90) + (RCB \times .0028)$$

9. Building Maintenance

The amount requested for building maintenance was calculated by multiplying building-replacement costs by cost-factor percentages (for maintenance of buildings with and without air-conditioning, of wood, masonry, and concrete construction). Building-replacement costs were determined by applying cost-index factors (from Markel's Handy Appraisal Chart) to the actual book value of every E&G building.

10. Custodial Services

Total square feet of E&G building space times a given rate ($0.5358) was used in calculating the total request for custodial services.

11. Grounds Maintenance

Factors used in determining the request for grounds maintenance include (1) average hourly earnings for services (SW), (2) total linear feet of all E&G building perimeters (P), (3) total acres of lawns and regularly maintained areas (L), and (4) total fall-semester headcount (E) in the following formula relationship:

$$\text{Request} = SW(.70P + 122L + .50E)$$

The sum of components 1 through 11 (above) plus funds for nonformula areas less estimated revenue become the total appropriation request.

Washington

Formula budgeting in some form has been used in the state of Washington since 1955. The Council for Postsecondary Education coordinates the appropriation-request process and has just completed a major revision of the Washington formula. The revised formula for use by all state-supported four-year institutions for FY 1981-82 consists of four components.

1. Instruction and Academic Support

Projected student credit hours by level of instruction (lower division, upper division, masters. and doctors) and by discipline (regular or high-cost areas--high-cost areas include engineering at two doctoral institutions and architecture, fisheries. and forestry at the University of Washington) divided by given credit hour-faculty ratios. yield total FTE faculty positions. Total FTE faculty multiplied by the budgeted percentage of formula. ylelds budgeted FTE faculty. Budgeted percentage of formula was the percentage of formula FTE staffing that the institution actually has. This percentage. therefore, varies by institution. Total budgeted FTE faculty plus nonformula FTE faculty equals total budgeted FTE faculty. This number times average faculty salaries (by institution) yields total requested faculty salaries.

Department operating budgets were determined by multiplying total budgeted FTE faculty times a calculated rate per FTE. Staff benefits were calculated based on a given rate per FTE faculty position.

2. Student Services

The base factor consists of (1) number of student applications; (2) full-time headcount by level (lower division, upper division, and graduate); (3) part-time headcount by level (undergraduate and graduate); (4) number of active placement files; and (5) number of dormitory residents. State-wide average rates per unit for each base factor were used to arrive at the total request for student services.

3. Library

The library formula component consists of two parts: operations and resource-unit acquisitions.

a. Operations. Staff FTE positions include: (1) user-related staff based on weighted FTE students by level (lower division, upper division, master's, and doctors) plus each institution's existing base staff positions, divided by 300; (2) technical staff based on two ratios of collection size to positions (one for existing collections and one for new acquisitions); and (3) a base staff allowance (three FTE positions for a four-year institution plus two FTEs per branch library and two FTEs for a community college). Total FTE staff positions times the institutional budgeted percent of formula times the average salary (per institution) yields total staff salaries. The institutional budgeted

percent of formula represents the relationship between each institution's actual resource entitlement and the total formula-calculated entitlement. Staff benefits were calculated as a percentage of salaries.

Total budgeted FTE positions times a given rate yields the total supplies and operating budget exclusive of book purchases. An allowance for binding costs was calculated based on the weighted number of subscriptions plus the number of volumes to be rebound times the institutional-formula percentage times a given rate per volume.

b. Resource Units. The budget for collection-acquisition allowance was calculated by multiplying a resource-unit entitlement by the average cost per unit (by institution). Resource-unit entitlements were derived by multiplying the resource-unit entitlement base (total collection size plus the previous year's deletions) by a unit-addition percentage and by the institutional budgeted percent of formula.

4. Physical-Plant Operation and Maintenance

The physical-plant formula component consists of three sections as follows:

a. Building Maintenance. Total building-maintenance budgets were calculated by multiplying building-replacement costs by maintenance-cost percentages (for air conditioned and not air conditioned buildings of wood, masonry, and concrete construction). Building-replacement costs were determined by applying cost-index factors (from Marshel's Handy Appraisal Chart) to the actual book value of each E&G building. An allowance for utilities maintenance was calculated based on ten percent of the building-maintenance costs.

b. Custodial Services. Total gross square feet of space subject to custodial care divided by a ratio for janitors (200,000 to 1) and for window washers (350,000 to 1) yields the total number of FTE positions. These totals were increased by a percentage (1.1375) to allow for sick and annual leave, and the total FTE positions needed were multiplied by an average salary (per institution) to arrive at the budgeted amount for salaries. Total FTE positions times a given rate yields the total operations allowance. Equipment-replacement allowance was calculated as a rate per square foot of serviced building space. Total staff salaries plus operating and equipment-replacement allowances equal the total custodial budget.

c. Grounds Maintenance. One FTE position was allowed for every 4, 8, 16 and 32 acres of class I, II, III, and IV grounds plus one additional position per thirteen for sick and annual leave. Total FTE positions times an average annual salary (per institution) yields total staff salaries. Operational costs were based on acres (weighted by class) times a given rate.

Amounts for administration, safety and security, lease or rental property, power-plant operation, and refuse disposal were nonformula items. Utilities were determined using current rates per square foot (for each

Institution) adjusted for degree-days, increased (or decreased) usage and expected fuel-cost increases.

Specialized Community-College Formulas

Nine states reported the use of separate formulas for exclusive application to community colleges and technical institutes. Summary descriptions of these formulas are as follows:

Alabama

1. Instructional Salaries and Program Support

Using a student-faculty ratio of 15 to 1, the total of justified FTE positions times an average salary ($15,594 for FY 1977-78) were used to determine the total cost per student-contact hour per FTE instructor. This rate was increased by 50.5 percent to allow for all other costs. The result was added to an adjustment for mandated salary increases to yield a total-program cost per student-contact hour that, when multiplied by total projected student-contact hours, resulted in the total budget request before revenue deductions.

2. Revenue Deduction

A revenue deduction was calculated by multiplying total production of contact hours by the average tuition per contact hour. This figure was subtracted from the total formula request to arrive at the recommended appropriation before utility adjustment.

3. Utility Adjustment

A utility adjustment was calculated by multiplying total E&G gross square feet by a given rate (actual utility cost per square foot in FY 1976-77 adjusted upward for FY 1977-78) and then subtracting 6.4 percent of the total recommended net appropriation base before pay raises and utilities.

Arizona

State-operated community colleges were funded according to a formula specified by state statute as follows:

Total Operating Budget

An allocation per FTE student was given in accordance with the following schedule:

a. All Students--	$680 per FTE for first 1.000 $480 per FTE for all over 1.000
b. Additional for Vocational-Technical Students--	$272 per FTE for first 1.000 $176 per FTE for all over 1.000

Florida

The funding formula for community colleges uses student FTE enrollment by discipline (advanced and professional, occupational, developmental, and community instruction) weighted by cost-level indexes and multiplied by a given support level per FTE student. (Separate levels of support were given for large and small colleges based on actual costs per FTE student.) These calculations result in the total request for each college. Estimated revenues from student fees, federal funds, and other income were deducted in arriving at the state support requested.

Kansas

Community colleges were funded at fixed amounts per student-credit hour in accordance with the following schedule:

a. Residents from within Community-College Districts

First 64 student hours of academic courses	$21.00 per hour
All academic student hours above 64	$11.00 per hour
First 64 student hours of vocational courses	$31.50 per hour
All vocational student hours above 64	$11.00 per hour

b. Residents from outside Community College Districts

First 64 student hours of either academic or vocational courses	$21.00 per hour

Missouri

Community colleges receive state support equal to 50 percent of the total cost for general academic-credit instruction and 70 percent of the total cost of vocational-technical instruction.

Oregon

The state appropriates approximately 46 percent of the total operating budgets for community colleges based on the following formula:

First 1,100 FTE students	$1,245.00 per FTE
All FTE students in excess of 1,100	$ 945.00 per FTE

Pennsylvania

A single amount is appropriated by the legislature for all community colleges and then allocated to each institution on the basis of an equal amount per FTE student enrolled.

Washington

The formula used to develop the operating budget requests for community colleges was similar to that used for four-year institutions in two of its four components:

1. Instruction

Total student-FTE enrollment divided by given student-faculty ratios by discipline cluster (fourteen) yields total FTE academic positions, to which an allowance (5 percent) for supervisory faculty was added. Calculated FTE positions times budget percent of formula determines total budgeted FTE positions. Total budgeted positions (aggregated by full- and part-time positions) times statewide average salary rates (for full- and part-time faculty) yielded total budgeted instructional salaries. Departmental operating costs were based on a given rate per FTE student. Staff benefits were calculated as a percentage of salaries.

2. Student Services

Total projected enrollment by headcount (weighted for on- and off-campus) times a given rate per headcount times the budgeted percent of formula yields the total budgeted amount.

3. Library

Same as four-year institutions.

4. Physical Plant

Same as four-year institutions.

Other Funding Approaches by States

In addition to the formulas described, the approaches used by five other states for determining appropriation requests for colleges and universities are presented for information purposes. These approaches, while not considered formulas by the state coordinating agencies, share many important characteristics with formula budgets.

Illinois

The Illinois Board of Higher Education coordinates the development of appropriation requests for funding of all public postsecondary education in that state.

Each year the governing boards of the four state university systems submit five-year plans that detail the goals and objectives of each institution to the Illinois Board of Higher Education. The first year of each plan includes the funding-requirement requests for the upcoming fiscal year. The IBHE reviews each request and prepares budget recommendations for both the Governor and General Assembly. Guidelines developed by IBHE are contained in the Resource Allocation Management Program (RAMP), which serves as a framework for planning and budgeting. Although not a formula, the guidelines represent an objective approach toward the development of resource-requirement prediction.

Beginning with the base budget (current-year projected expenditure) of each institution, adjustments were made for (1) enrollment changes (tuition loss or gain only) and (2) excess program costs, determined by comparing institutional unit costs by discipline and level of instruction with statewide

average costs (excluding the University of Illinois, Urbana campus). Both types of adjustments reflect a marginal cost approach. In that program-support reductions due to enrollment declines were limited to the loss of fee revenue. and reductions for excessive program costs (over statewide average costs) were limited to 20 percent or, in some cases, 5 percent of the actual amount. To the adjusted base budgets were added increases for salaries, operating budgets. utilities, library material costs, new-building maintenance costs, and program support costs. The program support investment provides for (a) shifts in student curricular demands, [illegible]creased student social and economic needs, (c) improvement of instructi[illegible]ality, (d) faculty development, and (e) new-program costs or the rec[illegible]tion of existing programs. This amount represents the total expenditure appropriation for the institution.

Instead of a revenue deduction, Illinois maintains University Income Fund accounts into which all tuition charges, sales and service fees, student fees, and interest income are deposited. The total expected income in these accounts plus the state appropriation from the general fund are combined to the appropriation for higher education.

A funding formula was in use in FY 1979-80 for developing the Illinois Board of Higher Education recommended appropriation for public community colleges. Using program costs obtained annually by the Illinois Community College Board, an average cost per student credit hour in each of five programs (baccalaureate, business occupational. technical occupational. health, and general studies) was used to develop a base rate to which adjustments for salary, utilities, library materials, and general-operation increases of cost were added. Adjustments were also made (marginally) for enrollment changes. The result was a new rate per student-credit hour. This rate times projected student credit hours for FY 1979-80 yields the total resource requirements for community colleges. From this total. local tax revenues, student fees, and other nonstate funds were deducted to arrive at the total state credit-hour grant support. (This amount was expressed in rates per student credit hour by discipline for each institution.)

In addition to the formula credit-hour grants, the state appropriation requests also include funds for district-equalization funding. These amounts were distributed to districts whose local property evaluation per FTE student was below the state average.

Indiana

The Indiana Commission for Higher Education reviews the biennial appropriation requests of all state postsecondary institutions and recommends the level of funding for each institution. A nonformula approach was in use in developing budget requests for the 1979-81 biennium. Each institution followed a uniform format prescribed by the ICHE in which changes were made to the current-year, base budget to recognize the following accountability factors:

1. Enrollment increases or declines
2. Cost increases (salaries, utilities, and so forth)
3. New programs or changes in existing programs
4. Special needs for quality improvement
5. Increases in tuition and fees

A marginal-cost approach was incorporated into the adjustment format for enrollment changes. Having performed an instructional-cost study in 1976-77. the ICHE developed marginal-cost percentages that represent the ratio of variable-to-incremental direct costs of instruction. These percentages were calculated for 17 enrollment-change ranges (from 1.0 to 25.0 percent) for which variable-cost factors ranged from 37.7 to 86.6 percent. These marginal percentages were then used as adjustment factors applied to each institution's incremental direct instructional cost in preparing the budget request for FY 1979-80. (The scale was revised downward 6.05 percent for FY 1980-81 as the basis for application changed from direct costs to full, instructional costs.)

To arrive at the net appropriation request, Indiana deducted only (1) student tuition and fees (not including fees for student activities or debt service), and (2) federal unrestricted income (capitation grants and so forth). Income from sale of educational services. indirect-cost recoveries. and interest was not deducted.

Oregon

The Oregon Educational Coordinating Commission reported that a formula approach was used for determining the state appropriation for colleges and universities in that state. The method used for the 1979-81 biennium combined an incremental and formula system in which a base budget (established by a cost-per-student and expenditure-level approach for the last fiscal year) was adjusted for enrollment changes and inflation. To calculate the adjustment for enrollment change. instructional costs were determined for the previous year by level of instruction (lower division, upper division, and graduate) for variable-cost areas (instruction, research. academic support. and student services) and fixed-cost areas (administration and physical plant) per FTE student (using assumed weightings of 1.0. 1.25, and 2.0 respectively for each level). The result was a variable cost per student by level that was multiplied by enrollment changes in FTE students to obtain the net adjustment amount. However, enrollment-adjustment changes were limited to one percent of the previous year's budget or one-third of the enrollment-change adjustment--whichever was greater.

Virginia

The State Council of Higher Education in Virginia publishes guidelines that all state supported colleges and universities must follow in preparing the biennial appropriation requests. The guidelines in use for the 1980-82 biennium pertained primarily to staffing requirements and were applicable to the following functional areas:

1. Instruction (Positions Only)

Teaching and Research -	Projected FTE students by level (four) and discipline (eight) divided by student-faculty ratios
Administrative -	1 per 20 teaching and research positions for doctoral institutions

	1 per 35 teaching and research positions for regional colleges
	1 per 25 teaching positions for community colleges
Support Staff - (classified)	1 per 4 teaching and research positions for doctoral institutions
	1 per 8 teaching and research positions for regional and community colleges

2. Library (Positions and Collection Budget)

Administrative. Teaching, and Support Positions -	9 plus 1 per 400 FTE undergraduate and 1 per 100 FTE graduate students plus 1 per 35 FTE faculty for doctoral institutions
	9 plus 1 per 400 FTE students plus 1 per 40 FTE faculty for comprehensive colleges
	3 plus 1 per 500 FTE students plus 1 per 50 FTE faculty for community colleges
Collections -	Volume-deficiency (using Voigt formula times a standard cost per volume)

3. Institutional Support (Positions Only)

Support Staff -	4 plus 22.5 per 100 FTE faculty for all four-year institutions
	4 plus 10.5 per 1,000 FTE students for community colleges
Administrative Staff -	3 plus 2.75 per 1,000 FTE students for doctoral institutions
	3 plus 3 per 1,000 FTE students for comprehensive colleges
	3 plus 4 per 1,000 FTE students for community colleges

Wisconsin

Plagued with several years of budget and policy fluctuations, the University of Wisconsin System developed the 1977-79 biennial appropriation request using a statutorily-prescribed four-year planning cycle. This

procedure replaced the suspended enrollment-driven formula. Starting with a fixed-base appropriation for FY 1976-77, the University of Wisconsin System developed a single, system-wide appropriation request using incremental funding increases directed toward the fulfillment of specified goals.

Of particular interest was the method used to provide funding increments for enrollment increases. The suspended formula had assumed that the total funding needs of instruction, academic support, and student services varied directly and in a linear fashion with student enrollment changes. the new approach used a variable- and fixed-cost differentiation for these three areas. Specifically, 7 percent of instruction, 32 percent of academic support, and 35 percent of student-service costs were found to be fixed and, therefore, not subject to adjustment due to enrollment fluctuations.

Revenue Deductions

Most states considered the unrestricted revenues in the education and general portion of the budget to arrive at the net appropriation for colleges and universities. In formula states, the method followed was to deduct all or some portion (student fees, income from sale of educational services, etc.) of the unrestricted revenue from the calculated resource requirements determined through the formula process. The net result became the total amount requested from state funds. The practice followed by 12 of the formula states is presented in table 9. Information on the treatment of revenue was not included in the formula materials received from the states of Colorado. Georgia, Kansas. Louisiana. Montana, and Washington. In states using separate formulas for community colleges, the formulas calculated only a fixed percentage of the total resource requirements. Student fees, other revenue. and, in some cases, local governmental appropriations supplied the balance.

IV. Summary

The analysis of the information received from the states using budget formulas is summarized below.

1. In this study, 21 states reported using budget formulas to develop the annual or biennial appropriation requests for state-supported colleges, universities, and community colleges. Of those. 11 states (Alabama, Colorado. Florida. Georgia, Kansas. Mississippi. Missouri, Montana, Ohio. Pennsylvania. and Washington) used separate formulas for four-year institutions. Eight states (Arkansas. Kentucky, Louisiana, New Jersey. Oklahoma, South Carolina, Tennessee, and Texas) utilized the same formulas for all state institutions (community colleges, colleges, and universities); eight states (Alabama, Arizona, Florida. Kansas. Mississippi. Oregon. Pennsylvania, and Washington) used separate community college formulas. A geographical distribution of the formula states is presented in table 10.

2. Four states (Illinois. Indiana, Oregon, and Wisconsin) indicated the use of marginal costs to develop budgets on an incremental basis. One state (Virginia) continues to use guidelines that primarily relate to the justification of FTE positions in the appropriations request.

TABLE 9

REVENUE DEDUCT PRACTICES BY FORMULA STATES

State	Revenue Deduct Practice
Alabama	Ninety (90) percent of on-campus fees.
Florida	All student fees and indirect cost income.
Kentucky	All student fees.
Mississippi	A percentage (32 percent for comprehensive universities, 30 percent for urban universities, and 26 percent for colleges) of the total E&G budget request.
Missouri	All student fees and other nonrestricted income.
New Jersey	All student fees
Ohio	All unrestricted revenue.
Oklahoma	All student fees and income from educational services.
Pennsylvania	All student fees.
South Carolina	A flat fee per FTE student ($300 for universities, $200 for colleges and community colleges), income from educational services, and federal support.
Tennessee	A flat fee per FTE student ($570 for research universities, $480 for regional universities, and $355 for community colleges), and technical institution actual out-of-state tuition, income from services, and interest income (1.5 percent of total E&G budget).
Texas	All unrestricted revenue.

TABLE 10

GEOGRAPHICAL DISTRIBUTION OF STATES

USING FORMULAS

Geographic Region	Formula States	
	Universities	Community Colleges
Southeast	10	8
Midwest	4	2
Northeast	3	2
Far West	1	2
Southwest	1	2
TOTAL	19	16

3. The formulas in use by 19 states that apply to four-year institutions (and to community colleges in eight of those states) were complex and calculated separately the amounts for (a) instruction and academic support, (b) libraries, (c) student services, (d) institutional support, (e) research and public service, and (f) physical plant operation. In addition, the calculations in each area followed one of two approaches: the all inclusive method or the itemized method. The all inclusive method (total amount for one or more functional areas is determined through one calculation) was used in 73 percent of the calculations while the itemized method (amount for one or more functional areas is the sum of several separate calculations for different object categories such as academic salaries, clerical salaries, and operating budgets, and so forth) was used in only 27 percent of the calculations. Table 2 presents the areas each state determined by formula as well as the approach in each area.

4. Budget formulas continue to use one or more of three computational methods. A study conducted by the author in 1973 identified three basic computational methods in the 25 formulas in use at that time. An analysis of the formulas used by the 19 states in this study indicated no substantive deviation from those methods which are:

   a) Rate per base factor unit (RBFU) - in which given rates (formula factors) are multiplied by institutional descriptions (base factors) to calculate the resource requirements.

   b) Base factor position ratio with salary rates (BFPR/SR) - in which given position ratios (faculty/student, faculty/supporting staff, etc.) are used to determine FTE positions which are multiplied by given average salary rates to calculate total salary requirements.

   c) Percentage of base factor (PBF) - which represents the most simple formula application in that the resource requirement for a given functional area is expressed as a percentage of the total amount calculated for another functional area.

   A summary of the formula-calculation methods in use by the 19 states is presented in table 11.

5. Among the seven base factors generally found to be in use by states, enrollment (credit hours, FTE students, and student headcount) remained the most used predictor for estimating the resource requirements for instruction and academic support, libraries, student services, and institutional support. The total budget (or some portion such as sponsored research) was the most commonly used base factor in determining research and public service resource requirements. Square feet of building space continued to be the most favored base factor for physical plant funding predictions. A tally of the institutional base factors used per functional area by numbers of states is presented in table 12.

6. Of the 19 states that use formulas for colleges and universities, 12 reported the deduction of certain unrestricted educational and general revenues in arriving at the net state appropriation request. In eight

TABLE 11

FORMULA-CALCULATION METHODS

USED BY STATES

Functional Areas	Formula Calculation Methods		
	Rate Per Base Factor	Base-Factor Position Ratio w/Salary Rates	Percentage of Base Factor
Instruction and Academic Support	17	10	9
Libraries	10	4	3
Student Services	6		
Institutional Support	11		6
Research and Public Service	2	2	8
Physical Plant Operation	14	3	6

TABLE 12

FORMULA-BASE FACTORS USED BY STATES IN DETERMINING RESOURCE REQUIREMENTS BY FUNCTIONAL AREAS

Functional Areas	Formula Base Factors					
	Head Count	FTE Students	Credit Hours	Faculty Positions	E&G Budget	Square Feet/Acres
Instruction and Academic Support		6	13	6	.6	
Libraries		5	5	3	2	
Student Services	4	1	2			
Institutional Support	3	5	3		6	
Research and Public Service		1	1	4	8	
Physical Plant Operation	2	4	1	3	2	13/5

states (Florida. Kentucky, Missouri, New Jersey. Ohio. Oklahoma, Pennsylvania, and Texas), there was a deduction of all actual or estimated student fees. Alabama deducted 90 percent of student fees, while South Carolina and Tennessee deducted a flat fee per FTE student by type (for example. comprehensive university. regional college or university. and community college). In seven states (Florida. Missouri, Ohio. Oklahoma, South Carolina, Tennessee, and Texas), there was also a deduction of other revenue ranging from income from sale of educational services to interest income. One state, Mississippi. calculated the deduction as a straight percentage (by type of institution) of the total formula request.

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