North Carolina Community College System

FUNDING FORMULA STUDY:

◊ Enrollment Projections and Funding

◊ High-Cost Programs and Funding

Submitted to the NORTH CAROLINA GENERAL ASSEMBLY
(Joint Legislative Education Oversight Committee and
Chairs of Appropriations Committees of the Senate and House)

on behalf of the NORTH CAROLINA STATE BOARD OF COMMUNITY COLLEGES

By HOCKADAY-HUNTER & ASSOCIATES

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I. Overview and Purpose of the Study

In House Bill 1414, Section 8.13 *Study of the FTE Funding Formula*, the North Carolina General Assembly directed that

> the State Board of Community Colleges shall consider modifications to its funding formulas to ensure that colleges have sufficient funds to adequately serve students when enrollment increases. In the course of the study, the State Board shall consider methods of accurately projecting enrollment for the upcoming academic year and using projected enrollment in its funding formulas. The State Board shall also consider modifications to its funding formulas to ensure that adequate funding is provided for high-cost programs. The State Board shall report the results of its study to the Joint Legislative Education Oversight Committee and to the chairs of the appropriations committees of the House of Representatives and the Senate by January 15, 2005.

The *State of North Carolina Request for Proposal # 401211* directed that the offeror, in this case Hockaday-Hunter & Associates, study the existing formulas for the "Current Operating Budget" and make recommendations for changes in the formulas that would ensure that colleges have sufficient funds to adequately serve students when enrollment increases and to ensure adequate funding is provided for high-cost programs. The study should consider the following:

- ◊ Methods of accurately projecting enrollment for the upcoming academic year;
- ◊ Use of projected enrollment in funding formulas;
- ◊ Ways to ensure that adequate funding is provided for high-cost programs.

To accomplish the task identified in the Legislation and the Request for Proposals, Hockaday-Hunter & Associates developed the schedule of activities shown in Appendix A. Those activities became the guide for the study and the basis for this report. Several sources provided assistance during the course of the study including the Funding Formula Study Advisory Committee, the Education Commission of the States, nationally known and respected researchers, Community College Presidents and Staffs from North Carolinas and across the nation, all of whom are credited in the report.

II. Enrollment Projections and Funding

A. Executive Summary

The legislation directed that **"the State Board of Community Colleges shall consider modifications to its funding formulas to ensure that colleges have sufficient funds to adequately serve students when enrollment increases. In the course of the study, the State Board shall consider methods of accurately projecting enrollment for the upcoming academic year and using projected enrollment in its funding formulas."**

In conducting the study, Hockaday-Hunter & Associates determined that methods of projecting enrollment for the upcoming academic year do exist. Several models appear to be reasonably accurate with four states using enrollment projection models exclusively in determining funding. Analysis of those models and studies of additional models show that the models range from very simple to very complex. There is no demonstrated correlation between the complexity of the model and the accuracy of the projections. There was concern that more complex models could be misapplied or become an excessive burden on staff. Also, legislative leaders prefer projection methods that are transparent and easy to understand; therefore most funding bodies opt for a simpler approach. No method has proven to be more accurate than allowing each college to project its enrollment for the upcoming year and funding the system based on a compilation of those numbers. No model is in use that can predict enrollment spikes at individual colleges.

The North Carolina Community College funding formula model is not based on enrollment projections but is funded one year in arrears with funding based on the number of "Full Time Equivalent" (FTE) students served the previous year or the average number of students served in the previous three years, whichever number is higher. While this method does not address all funding issues that may occur, overall the model appears to have served the system well. There was concern voiced by state staff and local presidents that any modifications in the funding formula mechanics might create greater

problems than the changes solve. For example, modifications without an infusion of new money to eliminate or significantly close the gap between the number of students served and the funded FTE that has existed for several years will harm some colleges. (*Appendix B*)

Based on the survey completed by the community college presidents, the current funding formula can accommodate an FTE enrollment increase of 3.2% in an academic year. During the past ten years the average enrollment growth has been 4.9%. If the growth exceeds 3.2%, the presidents report they have serious to very serious problems, which include under serving students and, in some cases, denying services. The most common methods of addressing unfunded enrollment growth are to increase staff workloads and hire adjunct instructors. Therefore it would appear the issue of the gaps that exist when individual campuses experience enrollment spikes of more than 3.2% should be addressed. It is our opinion that efforts to address the problem should not include any changes in the current funding formula, for reasons previously stated. In our recommendations we will address accommodating enrollment spikes outside the current funding formula.

The General Assembly has great interest in ensuring that colleges have the funds needed to serve the students who arrive at their campuses as the language of the legislation ("to ensure that colleges have sufficient funds to adequately serve students when enrollment increases") makes clear. The problem of more students enrolling than a college has resources to serve is a serious problem but also an individual college problem. Without doubt, closing the overall funding gap that exists in the current formula would lessen the severity of the problem at individual colleges and for this reason and others that issue needs to be addressed.

To address the specific problem that led to Enrollment Projections and Funding being included in this study, it is our belief based on research and input from practitioners that the establishment of a reserve fund such as the Public School Reserve Fund is the most effective and reasonable way to address this problem.

II. Enrollment Projections and Funding

B. Background and Research Findings

To satisfy the intent of the General Assembly and the directives of the RFP regarding colleges having sufficient funds to adequately serve students when enrollment increases, six questions were addressed:

1) Can enrollment growth for the System or an enrollment spike for an individual college be accurately projected for the upcoming academic? If yes, what is the best method of making these projections?

North Carolina is not alone in its quest to improve the mechanisms by which community colleges receive state funds. In a survey conducted by the *Education Commission of the States*, community college representatives reported that the most serious issues they face are dealing with the dual challenges of increasing state and local financial support for community colleges and improving the methods by which colleges are funded. (Center for Community College Policy, Education Commission of the States, *State Funding for Community Colleges: A 50-State Survey*, Denver, CO: November 2000.)

As part of this study, Hockaday-Hunter & Associates asked the Education Commission of the States (ECS) to undertake research to provide a better understanding of how states distribute resources to their community colleges. This survey reviewed the funding systems of eleven states, chosen for their geographic diversity. The eleven states reviewed for this study were: Alabama, Arizona, Florida, Illinois, Kansas, Kentucky, Louisiana, Ohio, South Carolina, Virginia and Washington.

The survey was conducted by contacting individuals in each state who possess in-depth knowledge of their state's community college funding system. In most cases, these individuals were presidents of local community colleges; however, interviewees also included business officials and finance staff. ECS staff reviewed the information provided in the initial interviews and clarified specific technical points by contacting additional experts in the state or by reviewing relevant legislation and/or administrative

codes. The definition of what constitutes a "Community College" differs from state to state. For the purpose of this study, the term "Community College" refers to any two-year public post-secondary institution – including schools that are sometimes referred to as junior colleges or technical schools/colleges.

Representatives from each state involved in this survey were asked if their state used enrollment projections to fund their community colleges and if their formula contained a provision that takes into account large, single year spikes in student enrollment for either the system as a whole or for individual colleges. All eleven states reported that they did not use enrollment projections to determine funding and that they had no provision within their funding system for one-year upward spikes in student enrollment for the system or individual colleges. This does not mean enrollment is not a critical component of their community college funding formula. The enrollment component is used in other ways, such as in North Carolina, but not as the variable to determine total funding.

Six states reported that they have provisions that help to assure that colleges will not see a decrease in funding levels if they have a one-year downward spike in student enrollment. States reported having funding safeguards that included "hold-harmless" provisions (Arizona and Kansas) and "rolling student counts" (Florida, South Carolina and Virginia). In the case of community college funding programs, hold-harmless provisions guarantee that a college will receive at least the same amount of state funding from one year to the next even if student enrollment decreases. Rolling student counts allow for colleges to average out student enrollment numbers over a period of years – thus helping to counterbalance any single year when there might be a decrease in student enrollment.

The greatest similarity that the eleven states in this study share is that none of their funding systems has a mechanism for single year spikes in enrollment. To most of the interviewees in this study, the idea that the state may provide additional funding for single year spikes in enrollment through the funding system seemed foreign. No interviewee reported that a state policymaker had introduced legislation on this topic or that individuals from the community college community had even seriously discussed this idea. This should not be seen as an indication they did not feel enrollment spikes are

a problem at their individual colleges. It is more of a reflection of the variation in funding methods from state to state. It appears that most states examined by the ECS had some mechanism in place whereby monies are available to respond to enrollment spikes but they are not designated as such. For example, in many states tuition receipts remain at the college creating an immediate source of funds to provide for an unanticipated rise in enrollment.

Elizabeth Kolb Cunningham, formerly with the North Carolina Education Research Council, was commissioned to review community college funding nationally to determine the use of enrollment projections. It was determined that three primary elements tend to drive community college funding formulas in the United States: enrollment, space utilization, and comparison with peer institutions. Twenty states use enrollment as a key component of their community college funding formula. Four states (Montana, Nevada, Pennsylvania and South Carolina) use projected enrollment to allocate funds to their community colleges. Our focus became those four states.

Montana: Prior to 1996, state funds for Montana's institutions of higher education were allocated on the basis of a rolling 3-year enrollment average. In 1996, the Montana legislature amended its funding formula to allocate funds on the basis of projected enrollment. The legislature gave Montana's Office of the Commissioner of Higher Education the responsibility for formulating the enrollment projection model. Rod Sundsted, Associate Commissioner for Fiscal Affairs, was responsible for testing various enrollment projection models. Dr. Sundsted found that no statistical model produced more accurate projections than allowing each campus to submit its own projections calculated using the method of its choosing. Dr. Sundsted does verify that the projections submitted by each campus are relatively consistent with the results of a linear regression analysis based on enrollments from the prior four years. Using this methodology, the projections of the Office of the Commissioner of Higher Education have been within 150 to 200 FTEs of actual enrollment each year for the system.

Nevada: Sally Jackson, Research Assistant, University and Community College System of Nevada provided a description of the state's enrollment projection process. Every ten years, each institution of higher education is required to submit enrollment

projections for the next ten years. Institutions formulate their projections on the basis of the following information:

- ◊ Actual and projected rates of Nevada high school graduates,
- ◊ Population growth in local service areas,
- ◊ Historical and projected community college participation rates,
- ◊ In-migration of individuals who are between the ages of 25 – 39 years old, unmarried, and have earned a bachelor's degree, and
- ◊ Increase in minority, particularly Hispanic, population.

Projections for all institutions are combined and used to formulate a long-range enrollment plan for higher education in Nevada. The State has found the accuracy of this method acceptable.

Pennsylvania: In the fall of each year, the Pennsylvania Commission for Community Colleges asks each college to calculate its projected enrollment for the following academic year. Colleges generally base their estimates on current enrollment figures. The Pennsylvania legislature is currently considering several changes to the community college funding model. None of the changes recommended by the Pennsylvania Commission for Community Colleges would eliminate or alter the use of campus-based enrollment projections because the State has found the accuracy of this method acceptable.

South Carolina: The state uses a 10-step model to calculate funds needed annually by its institutions of higher education. A lump sum amount is allocated for all institutions. The South Carolina State Board for Technical and Comprehensive Education uses a rolling 3-year enrollment average to divide the lump sum allocation among each community college campus and has found the accuracy of this method acceptable.

Summary of State Enrollment Projection Model Information

Several state contacts mentioned that they had attempted to employ more complex enrollment projection models. Some legislative leaders were uncomfortable with the complexity of the models and felt that more transparent, readily grasped projection methods were more appropriate. In other instances, state contacts were concerned that more complex models could be misapplied or burdensome to campus staff responsible for submitting campus enrollment projections to the state office. A study of enrollment projection models in Community College Systems is reviewed below. None of the

models would be able to account for important events affecting enrollment at individual campuses (e.g., plant closings or openings). For this reason, several states allow campuses to adjust their enrollment numbers and receive additional funding as long as they can justify the change. None of the models incorporate economic indicators. None of the state contacts indicated that they had been able to accurately predict enrollment spikes that they have experienced in the last few years as a result of economic conditions.

Study of Enrollment Projection Models in Community College Systems

The most exhaustive research based study on enrollment projections appears to have been done by Shuqin Guo, in the Research and Planning Division of the Chancellor's Office of the California Community Colleges. In a paper presented at the 40th Research and Planning Conference in May of 2002, Guo reported on an examination of three projection methods using different variables at community colleges and compared the results of the forecasts. The three enrollment projection methods were applied to six community colleges of varying sizes. Eight years of college enrollment data and local population data were collected for each college. The three methods were applied with the following results:

Method 1: Auto-regression model:

Population, college budget, and student fees are factors that have an impact on enrollment. This model auto-regresses total enrollment on the population of individuals age 16 to 55, college budget, and student fees. The auto-regression model weights the data of more recent years more heavily than the previous years unlike regression, which gives the same weight to the data of each year. The auto-regression method produced the smallest errors of any model, ranging from 0.66% to 3.23%, an average error of 1.85% for the six colleges.

Method 2: Linear Regression Model:

In this model, total enrollment was linearly regressed on the population of individuals age 16 to 55, college budget, and tuition. This model produced the second best results, with mean absolute percent errors ranging from 0.7% to 4.45%, with an average of 2.27% for the six colleges.

Method 3: Three-Component Model:

This is a comparatively complex model. The enrollment was broken down into three component groups: One group included first-time credit students (including first-time transfers); another group was returned credit students; and the final group was non-credit students. Population is only used to forecast new students. Assuming different age groups of population to have different impact on the enrollment of new students, population was divided into four age groups: a) ages between 18 and 19; b) ages between 20 and 24; c) ages between 25 and 34; and d) ages between 35 and 55. The number of first-time students and non-credit students were functions of population size of each age group. Auto-regression was used respectively to forecast the number of first-time and non-credit students using the four population groups as independent variables. Rates were calculated using the moving average of three years. To estimate the number of returned students for the next year, the total enrollment of current year was multiplied by the moving average of the returning rates. The projected total enrollment number was the sum of the estimated number of returned students, the estimated number of first time students, and the estimated number of non-credit students. For the three-component model, the errors were from 3.13% to 7.77%, with an average of 5.61%.

Important Considerations Regarding Enrollment Projections Models

- *Time frame*: How long do you want to forecast? The more distant the projection period, the more difficult the forecast will be.
- *The cost of forecasting*: The cost of developing the model; the cost of collecting and storing data.
- *The availability of data:* Does the system have the data needed? How time consuming is it to extract the data needed?
- *The data pattern*: Is there any trend in the data distribution? What kind of trend?
- *The ease of operation and understanding*.

(Shuqin Guo, *Three Enrollment Forecasting Models: Issues in Enrollment Projection for Community Colleges,* Presented at the 40th RP Conference, Asilomar Conference Grounds, Pacific Grove, California: May 2002.)

Use of Enrollment Projections in North Carolina

There is a history of the use of enrollment projections to fund community colleges in North Carolina. In the early years of the system each college submitted its projections of enrollment for the upcoming academic year to the system office. Based on that data the system office submitted the projected enrollment numbers to the General Assembly, which then funded the system based on the submitted numbers. This practice was short-lived when serious discrepancies developed between the submitted projections and the actual number of students being served. That led to the development of the current funding model. The following variables and combinations of variables were examined to determine if they demonstrated any validity in consistently projecting enrollment growth in the North Carolina Community College System:

change in the unemployment rate;

change in overall population;

change in the number of high school graduates; and,

change in annual sales and use tax receipts.

No prediction validity was found.

2) What constitutes an enrollment increase that the current funding formula cannot accommodate?

To determine the extent of the problem of local colleges not having adequate funds to serve all students when an enrollment spike occurred at the college in a current academic year, the presidents of the 58 North Carolina Community Colleges were surveyed. They were asked to respond to the following three statements as they relate to their colleges. Sixty percent of the presidents responded and the distribution of respondents was equally spread across the colleges by size.

The Presidents responded as follows to the statement, "the funding formula cannot accommodate an enrollment spike in the current year of more than …"

	(Choices)	*(Percentage of responses)*
a.	1%	16%
b.	2%	19%
c.	3%	19%
d.	4%	22%
e.	5%	19%
f.	If greater than 5%, fill in the number	5% (for those responding greater than 5%, the average response was7.5%)

Average of Responses: 3.2%
Most Frequent Response 4.0%

It should be noted that the distribution of the response was very even from 1% - 5%. This can be attributed to several factors including the nature and variety of the colleges, the method of responding to enrollment spikes, and individual interpretation of the statement.

3) If the current funding formula fails to accommodate an enrollment increase, what is the severity of the problem for the local college?

The Presidents responded as follows to the statement, "when an enrollment spike occurs in a current year that the funding formula cannot accommodate, the effect on your ability to serve your students is …"

	(Choices)	*(Percentage of responses)*
a.	minimal	5%
b.	somewhat serious	15%
c.	serious	50%
d.	very serious	28%

78% of the Presidents responded that the problem was serious or very serious.

4) If the current funding formula fails to accommodate an enrollment increase, how do the colleges cope with the problem?

The Presidents responded as follows to the statement, "When an enrollment spike occurs that the funding formula cannot accommodate, it forces the college to … (check all that apply)"

	(Choices)	*(Percentage of responses)*
a.	cut programs	43%
b.	increase faculty loads	88%
c.	use alternative funding	63%
d.	reduce support staff	63%
e.	other (please list below)	43%

The most notable actions listed under "other" were canceling classes, capping enrollment, and adding adjunct instructors. The purpose of the action in (c) and (d) above was to acquire funds to hire adjunct professors.

In summarizing the results of the survey and the input from the Advisory Committee regarding the survey, it appears the current funding formula can accommodate an enrollment spike at a local college of around 3.2 percent. When the spike exceeds that number, the consequences are serious or very serious for the college affected.

The Presidents point out that they have only bad choices when faced with the problem of more students than funds to serve those students. Generally the colleges have to deal with the problem by some combination of the following actions: instructors are asked to teach more students affecting quality of instruction and morale; less qualified adjunct instructors are employed affecting the quality of instruction and creating associated problems; support staff is cut resulting in a reduction of needed services to students; courses are closed denying access to students; or program offerings are cut.

5) Can the current formula be changed to ensure that colleges have sufficient funds to adequately serve students when enrollment increases?

The answer to this question is "No." Changing the mechanics of the current formula would serve no useful purpose in addressing the problem. Should the General Assembly chose to close the gap between the current FTE funding and the actual number of students being served by increasing systemwide funding, the problem would be mediated, That action would increase the tolerance level for colleges to absorb a greater increase in enrollment before serious problems developed and would raise the threshold for an "enrollment spike." However, that action will not eliminate all situations where individual colleges face an enrollment growth that exceeds their ability to accommodate and therefore does not address the problem the General Assembly has identified.

II. Enrollment Projections and Funding

C. Considerations

- ◊ Systemwide projections of enrollment for an upcoming academic year can be made with a reasonable degree of accuracy.
- ◊ There is no demonstrated correlation between the complexity of the projection models and the accuracy of the projections.
- ◊ Funding bodies have opted for simple projection models due to the difficulty of understanding more complex models and the fear that such models may be manipulated.
- ◊ The simplest model is to allow each college to project its enrollment for the upcoming year and either allocate funds to each college based on those projections or use the sum of those projections to fund a formula.
- ◊ No efforts were found in other states to project enrollment spikes (significant increases in enrollment in an individual college) beyond allowing colleges to project their own enrollment. No model exists nor can one be developed for this purpose because the causes are often unforeseeable, i.e., plant closings, natural disasters, sudden changes in a local economy.
- ◊ Due to the inability to accurately project enrollment spikes at individual colleges, several states allow colleges to adjust their enrollment projections for the upcoming year if they can justify the change.
- ◊ Funds to accommodate enrollment spikes at a local college must be provided in a timely manner or the resources needed to prevent students from not being served or under served will not be able to be acquired in time to address the problem.

- ◊ The mechanics of the NCCCS funding formula have worked well and appear to distribute funds in a fair and equitable manner to the colleges even though colleges vary greatly in the number of students served and in the local factors which affect cost of operation and delivery of services.

- ◊ Based on the results of the survey of local presidents included as part of this study, the current formula (funded at the current level) can accommodate an enrollment increase of 3.2% at a local college in a given academic year before the college faces a serious to very serious problem in serving students. The presidents attribute their ability to absorb that growth to the flexibility allowed in the current funding formula and the willingness of their employees to assume heavier workloads.

- ◊ Based on the results of the survey of local presidents (included as part of this study), if the formula remains funded at the current level and if an increase of more than 3.2% occurs from one academic year to the next, the result is that some students are not served and other are underserved.

- ◊ From the 1995-96 through the 2003-04 academic year, the average gap between the funded FTE and actual number of students served was 7679, which at the current FTE funding rate is a funding deficit of $31,117,542 per year. (*Appendix B*)

- ◊ From the 1995-96 through the 2003-04 academic year, the average rate of growth per year was 4.89% or 1.66% per year beyond the maximum growth the presidents say the colleges can absorb without serious or very serious harm to students. (*Appendix B*)

- ◊ The 1.66% per year beyond the maximum growth the presidents say the college can absorb without serious or very serious harm to students is 35% of the 4.89% growth per year and is a funding deficit of $10,710,080. (*Appendix B*)

II. Enrollment Projections and Funding

D. Recommendations

With Legislative interest in ensuring that colleges have sufficient funds to adequately serve students when enrollment increases, we make the following Recommendations for Section II of the Study that deals with Enrollment Projections and Funding:

Recommendation 1

◊ That the General Assembly should address the gap between the funded FTE and actual number of students served in an academic year by establishing an $11,000,000 non-reverting reserve fund under the control of the State Board of Community Colleges. This fund would be used for enrollment growth at individual colleges in a current academic year that exceeds 3.2 % of the FTE from the previous year or their three-year rolling average FTE, whichever is used for the funding purposes that academic year.

Recommendation 2

◊ That the General Assembly should replenish the fund in each budget cycle to ensure that the gap between funded FTE and actual number of students served at any college does not exceed 3.2% in any academic year.

Recommendation 3

◊ That the State Board of Community Colleges should approve a distribution formula, developed by the NCCCS staff, to distribute the reserve funds in a manner that allows colleges to take quick action to prevent denying service or under serving students due to enrollment growth in the current academic year.

III. High-Cost Programs and Funding

A. Executive Summary

The legislation directed that **"the State Board of Community Colleges shall also consider modifications to its funding formulas to ensure that adequate funding is provided for high-cost programs."**

Can the current funding formula accommodate high-cost programs? The answer is clearly "yes." Research by the Education Commission of the States and by Brenda Albright, noted researcher on community college funding, as well as a review of work done in several states in dealing with funding for high-cost programs and conversations with leaders in community college finance at the state and local level reinforced the consensus that the current funding formula can accommodate high-cost programs.

While the answer is clearly "yes, funding formulas can accommodate high-cost programs," the implications of the answer are not as simple. In order to accommodate differentiated funding, decisions must be made about which programs are high-cost, what funding weights would be given to programs that are determined to be high-cost, and how additional funding might be obtained to support the weighting of high-cost programs.

This report studies five states that have funding formulas that accommodate programs that are considered high-cost programs. The distribution of state or public funds to the Community Colleges in these states takes into account that some programs are more expensive than others.

In order to differentiate among programs in the distribution of funds, these states have completed a cost analysis of instructional and supplies costs of some or all of the programs in their community college systems.

Because of the need to adequately fund high-cost programs and because the Allied Health field is so important in today's economy, we recommend that the NCCCS Funding Formula be modified to provide higher allocations to Allied Health programs.

III. High-Cost Programs and Funding

B. Background and Research Findings

To satisfy the intent of the General Assembly and the directives of the RFP regarding colleges having adequate funding for high-cost programs, several questions must be addressed in preparation to answering the key question: Can North Carolina's current funding formula accommodate high-cost programs?

◊ **Can a formula be designed to take into account high-cost academic programs?**

Most states that use formulas have funding models are based on *expenditures* by function (Instruction, Public Service, Academic Support, Student Services, Institutional Support, Operation and Maintenance of Physical Plant, and Scholarships) and *revenues* by source (resident tuition, non-resident tuition, and other revenues).

Most of the formulas differentiate by academic area for the purposes of recognizing mission differences among the various colleges and recognizing that the costs of delivering various programs differ by academic discipline.

Instruction costs include part-time and full-time faculty, support staff, equipment, and supplies and other instructional expenditures of the colleges, schools, departments, and other instructional divisions of the institution and expenditures for departmental research and public service that are not separately budgeted. The instruction category includes general academic instruction, occupational and vocational instruction, special session instruction, community education, preparatory and adult basic education conducted by the teaching faculty for the institution's students. Academic administration where the primary function is administration (e.g., academic deans), are generally not included in instructional costs.

A number of states and institutions analyze instructional costs for the various academic disciplines. This information is used in developing formula approaches and for management purposes. The general philosophy is that formulas should recognize differences in costs among various academic programs.

There are substantial variations in costs for the various institutions by discipline. In general, the highest cost fields are health related professions, engineering/technical related (engineering, engineering related technologies, mechanics and repairs, precision production trades), visual and performing arts, and some science programs, e.g., life sciences. The lowest cost areas tend to be philosophy, English, foreign languages, liberal arts, and social sciences.

These cost differences among disciplines are attributable primarily to student/faculty ratios and class size (e.g., lab intensive courses which result in lower student/faculty ratios, particularly in nursing and other health related fields), faculty salary differences (e.g., business and engineering faculty salaries are higher than most other faculty), full-time and part-time faculty mix (e.g., institutions that are able to utilize a relatively high percentage of part-time faculty have lower costs as do 4-year institutions that use graduate assistants for teaching), and costs associated with equipment and supplies that are higher for certain engineering and scientific disciplines.

Most institutions tend to have high student/faculty ratios in general study fields such as liberal arts, philosophy, psychology, and social sciences and history and low ratios in the technical fields and lab-intensive programs such as health professions, mechanics and repairs, and engineering.

◊ What are examples of states that use formulas that take into account these differences?

For a number of years, many states have successfully used formulas that recognize cost differentials in various programs as shown in the examples of Florida, Illinois, Ohio, Tennessee, and Texas. These states have conducted cost studies for a number of years and use this information in the formulas to allocate resources to both 4- and 2-year colleges. (Nationally, the University of Delaware Cost Study is a voluntary effort that provides cost data by academic discipline.)

Florida: The state has conducted cost studies by discipline for a number of years. The highest cost disciplines from these cost studies are: Physical Sciences, Fine and Applied Arts, Computer and Information Sciences, all postsecondary vocational programs. Florida uses 45 separate academic discipline categories.

Florida has recently adopted a formula approach for funding its twenty-eight community colleges. The formula differentiates these costs through assigning different class sizes and faculty credit hour loads to the various disciplines. As examples, Business and Management is the "lowest cost" discipline, and the formula generates allocations based on a class size of 30 and faculty credit hour load of 40 while postsecondary Vocational Health is the "highest cost" discipline based on a class size of 16 and a faculty credit hour load of 30. In this example, vocational health is funded at a level more than twice as high as business and management.

Illinois: Since 1965, state funds have been allocated to Illinois community colleges using an operating grant (formula) approach plus additional funds targeted for specific purposes, e.g., workforce training.

Most funds (61%) are allocated by the base-operating grant. Each district receives a funding allocation for enrollments (student credit hours) in the areas of baccalaureate courses, business courses, technical courses, health courses, remedial courses, and Adult Basic Education courses. The allocation is based on calculations of per unit (student credit hour) average costs (for all districts) in each of these areas. Costs are highest in the health areas, as an example for a recent year, the actual costs were $286 per, or about 40% more expensive than a credit hour in business. A small portion of the base operating grant (about 1 percent) is allocated based on gross square footage.

The philosophies that underpin the Illinois community colleges' base operating grants are:

a) Funding should be, in large part, a function of credit hour production;

b) Funding levels should be based, in large part, on an existing statewide average unit cost for instruction; and

c) Course costs differ and should be funded differentially, with higher cost courses being funded at higher rates.

The base operating grant focuses on equity, productivity, and mission. By providing the same allocation for the same programs to each district, the formula provides for an equitable distribution of funds. Because enrollment growth and decline affect the allocation of funds, productivity is addressed. Because the funding strategy recognizes

differences in programming, (e.g., some districts have a greater concentration of technical programs than others), mission differences are recognized in the funding strategy.

Ohio: the State Share of Instruction (SSI) has been used in Ohio since the mid-1960s. Most of the state resources (about $1.5 billion) that are provided to Ohio's public colleges and universities are provided through the SSI formula. The formula is used for 38 state-supported colleges and universities, both 4- and 2-year institutions. Ohio conducts costs studies and the SSI formula is based on actual average costs that are determined by a "cost study." Ohio's formula classifies courses into 15 different categories that differentiate between the costs to educate students. Ohio includes all instructional costs plus support costs including libraries and technology in its formula factors.

Tennessee: For more than 30 years, Tennessee has utilized a formula as its funding mechanism for higher education for both 2- and 4-year institutions. Tennessee has also completed instructional cost studies since the late 1960s. The Tennessee Higher Education Commission has a statutory charge to develop a "fair and equitable distribution and use of public funds" that recognizes "institutional differences as well as similarities in function, services, academic programs and levels of instruction."

Approximately half of the resources are allocated to the instructional area. The Tennessee funding formula is enrollment and mission-driven. The formula analyzes all student credit hours (SCH) in a matrix consisting of course level (i.e. freshman/ sophomore, junior/senior, master's, professional, and doctoral) and subject taxonomy (31 areas are used - History, Psychology, etc.). The matrix is then converted to full time equivalent students (FTE), defined as 15 undergraduate SCH and 12 graduate SCH. The FTE student matrix is then evaluated against a same-sized matrix of predetermined student-faculty ratios. Each cell of FTE is divided by the corresponding student-faculty ratio to determine an appropriate number of faculty for a particular academic area given the number of FTE students. Finally, all the required numbers of faculty are summed and the result is multiplied by a peer average salary. The table below illustrates the various student faculty ratios that are used in Tennessee's formula approach.

Tennessee Student Faculty Ratios

	Fresh./ Soph.	Junior/ Senior
Visual Arts	19	14
English	21	16
Engineering	19	14
Math	23	16
Business	23	16
Health Prof. Clinical	10	10

Texas: One of the first states to use funding formulas to allocate state appropriations among institutions of higher education, Texas has a separate formula that is used for community and technical colleges. The formula allocates approximately 99 percent of total state appropriations to community and technical colleges.

The community and technical college funding formula supports specific expenditure categories defined by the National Association of College and University Business Officers (NACUBO). The formula rates include the direct cost of faculty salaries and departmental operating expense for each instructional program and an allocation of indirect administrative costs. Administrative costs include academic support, student services, institutional support, and staff benefits (except for group insurance premiums and retirement contributions provided by the state).

Texas offers twenty-nine disciplines with the highest cost areas being Career Pilot and Health Occupations (including Dental Hygiene, Nursing, and Respiratory Therapy).

◊ Can North Carolina's current funding formula accommodate high-cost programs?

While the answer is clearly "yes, funding formulas can accommodate high-cost programs," the implications of the answer are not as simple. In order to accommodate differentiated funding, decisions must be made about which programs are high-cost, what funding weights would be given to programs that are determined to be high-cost, and how additional funding might be obtained to support the weighting of high-cost programs.

Currently the North Carolina Community College System designates four programs (2 Truck Driving Programs; 1 Marine Science Program; and 1 Heavy Equipment Program) as high-cost programs which are funded apart from the funding formula. It appears that programs with larger numbers of hours already get weighted funding. However, weighted funding for this study means that the FTE from some programs should be funded at a higher level than FTEs from some other programs.

Generally Presidents in the North Carolina Community College System see high-cost programs as a serious matter in providing services to students. Yet they fear special funding for high-cost programs, without additional funds, will seriously affect the fairness of the current funding formula by simply redistributing the current resources of the system without improving the overall wealth. Therefore, some presidents believe efforts toward any change should be directed towards improving the overall funding of the System which would eliminate the problem of high-cost programs.

States that use a weighting system for high-cost programs developed the weighting system based on a cost analysis of various programs. Some programs that are high-cost programs in some colleges may not be high-cost programs in other colleges. Allied Health Programs were the most expensive programs as a group in those states. Allied Health Programs generally carried a weight of 1.5 to 1.6 when all other programs were weighted at 1.0. Technical Programs, as a group, were the second most expensive programs.

Many states have successfully used formulas that recognize cost differentials in various programs for a number of years. Each state's approach is different because mission, program offerings, and budgeting practices differ. A common approach for each state has been to conduct a cost study and collect comparable information on costs by programmatic area to assure that all colleges are treated fairly.

III. High-Cost Programs and Funding

C. Considerations

◊ Information obtained from five states studied verifies that these states have Funding Formulas that accommodate programs that are considered High-Cost Programs. The distribution of funding to the Community Colleges in these states takes into account that some programs are more expensive than others.

◊ In order to differentiate among programs in the distribution of funds, these states have completed a cost analysis of some or all of the programs in their community college systems. A cost analysis generally includes only instructional and supplies costs. The North Carolina Community College System Funding Formula does not differentiate among programs in the distribution of funds to the community colleges.

◊ The four programs in the North Carolina Community College System that receive special funding do not receive the funds through the Funding Formula. NCCCS Presidents see high-cost programs as a serious matter in providing services to students. They fear special funding for high-cost programs, without additional funds, will seriously affect the fairness of the current funding formula. The current NCCCS Funding Formula is generally seen as fair and equitable.

◊ As a result of cost analysis, a weighting system has been devised for High-Cost Programs in the states studied. Allied Health Programs are the most expensive programs as a group. Technical Programs, as a group, are the second most expensive programs.

◊ Some programs that are high cost in some colleges may not be high cost in other colleges. All community colleges appear to have Allied Health Programs. Allied Health Programs in the states researched generally carried a weight of 1.5 to 1.6 when all other programs were weighted at 1.0.

III. High-Cost Programs and Funding

D. Recommendations

With Legislative interest in providing funds to support High-Cost Programs, we make the Recommendations under Section III of the Study that deals with High-Cost Programs and Funding:

Recommendation 1

◊ That the North Carolina Board of Community Colleges determine which programs in the System fall into the general area of Allied Health.

Recommendation 2

◊ That the North Carolina Board of Community College determine a weighting of costs of Allied Health Programs (as a group) against all other programs (as a group) and that the weighting be evaluated every three years to respond to market forces.

Recommendation 3

◊ That efforts be undertaken to secure additional funding to support Allied Health Programs.

Recommendation 4

◊ That, if funds can be secured to support the additional weights for the Allied Health Programs, the current Funding Formula should be modified to allow for the differentiation in funding between the Allied Health Programs and all other programs.

IV. Study Contributors

STUDY CONSULTANTS

Jeff Hockaday & Donny Hunter, Project Co-Directors
Hockaday-Hunter & Associates

Dr. Hockaday's career includes service as a teacher, principal, superintendent and community college president. His leadership positions in the community college system include serving as President of Central Carolina Community College and as Chancellor of the Virginia Community College System, where he was also a Visiting Professor at George Mason University. He has also served as Chancellor of the Pima Community College District in Arizona and as Interim President of Hillsborough Community College in Tampa, Florida. In addition, he served as Interim President during the organizing year of the Kentucky Community and Technical College System.

Dr. Hockaday has served on many professional Boards and Committees, including two terms on the Board of Directors of the American Association of Community Colleges (AACC) and as an advisor to the National Association of Community College Trustees (ACCT) Board. He is also past Chair of the Meredith College Board of Directors. Dr. Hockaday has received numerous awards and recognitions, including being named CEO of the Year in ACCT's Southern and Pacific Regions and ACCT's National CEO of the Year in 1995. In 1992 he received the Mexican Government's Colanep Leadership Award. In 2002 the AACC presented Dr. Hockaday with its prestigious National Leadership Award. Dr. Hockaday is an undergraduate of Barton College and received a master's degree from East Carolina University in Education and his doctorate in Education Administration from Duke University.

Dr. Hunter's career includes service as a teacher, principal, assistant superintendent, superintendent, consultant with the NC Public Schools, Assistant to the NC Community College System President, and Executive Director of the NC State Board of Community Colleges. Dr. Hunter currently serves as Executive Director of the *Future Presidents Institute* held at the University of North Carolina, adjunct instructor in Campbell University's educational leadership program, and chief consultant to the NC Association of Community College Trustees for presidential searches and board training. Dr. Hunter has completed research studies for public schools systems in North Carolina and for the Kentucky Community and Technical College System. He serves on many professional boards and committees and has received numerous awards and recognitions. These include being named Regional Superintendent of the Year and NC Superintendent of the Year. In October 2002, Dr. Hunter received the highest civilian award given for service to the State of North Carolina when the Governor inducted him into the *Order of the Long Leaf Pine*, citing his contributions to North Carolina's public schools, community colleges and universities. Dr. Hunter holds a bachelor's degree from Campbell College, a master's degree and educational specialist degree from East Carolina University, is a

graduate of the University of North Carolina's Executive Training program, and holds a PhD in Educational Research and Policy Analysis from North Carolina State University.

Brenda Norman Albright, Consultant
Dr. Albright has consulted in more than fifteen states and with several national organizations. Her work includes facilitating the work of the Ohio Board of Regents Higher Education Funding Commission in developing new funding strategies for two and four-year institutions, analyzing funding adequacy, conducting a cost analysis, and developed a funding allocation methodology for the Trustees of the State Colleges in Colorado, facilitating the work of the Florida Community Colleges' Funding Task Force including design of a new budget development and formula process, and facilitating the work of the Illinois Community Colleges' Funding Task Force in designing new budget priorities and changes to the funding formula.

Elizabeth Kolb Cunningham, Consultant
After earning a law degree, Elizabeth Kolb Cunningham enrolled in the doctoral program in Educational Leadership at UNC-Chapel Hill to pursue her primary interest in education policy. She helped establish the North Carolina Education Research Council and developed many of its studies. As an independent consultant, she continues to work for the NC Education Research Council, the Hunt Institute for Educational Leadership and Policy, and other organizations with a focus on education.

Michael Griffith, Policy Analyst
Education Commission of the States
Dr. Griffith is a policy analyst with the school finance project. He has provided technical assistance to policymakers in 14 states on several key finance issues, including: adequacy, financing at-risk student populations, equity, special education financing, state budget/tax issues and pay-for-performance. Additionally, Griffith has been quoted on over 200 occasions in several media outlets, including *The Boston Globe*, *CNN*, *Education Week*, *The Los Angeles Times*, *NBC Nightly News*, *The New York Times*, *USA Today* and *National Public Radio*. Before joining ECS in 2000, he worked for the consulting firm of Augenblick & Myers on school finance projects in several states and for the Michigan State Senate, where he was responsible for taxation and school finance issues.

Lydia O. Tolar, Consultant
Specializing in developing proposals and proposal submissions, Lydia Tolar has developed "Requests for Proposals" for block grants, such as North Carolina's 2002-03 *No Child Left Behind* higher education appropriation. She identified and helped forge effort- and cost-sharing partnerships within and across departments, colleges, universities, and institutions. She has prepared proposals for such funding sources as National Science Foundation, US Department of Commerce, US Department of Education, US Department of Agriculture, Hewlett Foundation, and Howard Hughes Medical Institute. From February 2001-Sept. 2002 she served as the *Director of Research Development,* NC State University College of Education, Raleigh, NC.

STUDY CONTRIBUTORS

Kennon Briggs, NCCCS Vice President
State Board of Community College's Funding Formula Study Director

Shirley Iorio, Legislative Research
Education Oversight Committee Staff

H. Martin Lancaster, President
North Carolina Community College System

Kristine Leggett, Fiscal Research
N.C. General Assembly

John Malia, Systems Accountant
North Carolina Community College System

Funding Formula Study Advisory Committee of the State Board of Community Colleges

North Carolina Association of Community College Presidents

North Carolina Association of Community College Faculty

North Carolina Community College Trustees Association

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Mr. Kennon Briggs was willing to share his expertise regarding the funding mechanics of the North Carolina Community College System. His overall knowledge of the system's programs was a major contribution to the study. In addition, his generous contribution of the NCCCS Financial Staff's time to answer questions and provide information was of great assistance to the consultants.

NCCCS Finance Staff provided a quick response to data needs and questions which were critical to the success of the Study.

The **Education Commission of the State** shared its expertise in gathering national data and provided that data in a timely manner which was instrumental in bringing a national perspective to the Study.

The **Community College Presidents** across North Carolina responded quickly and completely to surveys that were a foundation of the Study.

Appendix A

Schedule of Activities Required to Conduct Funding Formula Study

	Task	Rationale	Personnel	Deadline
1.	Finalize project initiation and meet State Board Study Director.	To confirm schedule of deliverables and study methodology	Project Co-Directors (PDs); State Board (SB) Study Director	9/1/04
2.	Define terms integral to further data collection and analysis: 1) enrollment projection; 2) enrollment increases; 3) high cost programs; 4) funding formula	To clarify terms, particularly what is considered a normal vs. unusual enrollment increase, to form the most accurate questions driving the study	PDs; SB Study Director; NCCCS administrative staff	9/3/04
3.	Meet with the Funding Formula Study Advisory Committee (SAC)	To solicit input into survey development	PDs; SB Study Director; SAC members	9/8/04
4.	Develop, conduct, and analyze results of survey to NC's 58 community college administrators regarding implications of current funding formula	To determine the extent of the problem of addressing enrollment growth and high-cost programs in the current funding formula	PDs; p/t statistical analyst	9/15/04
5.	Gather, analyze and summarize historical NCCCS data related to attempts to project enrollment and modify the funding formula to accommodate enrollment growth and high cost programs	To determine and analyze the success or lack of success of any past efforts by the NCCCS to address the problem	PDs; p/t statistical analyst	9/22/04
6.	Gather, analyze and summarize national data from selected CC systems on enrollment projections efforts and methods of dealing with enrollment increases and high cost programs with current funding formula in use	To determine the success or lack of success of efforts across the nation to address the problem and analyze applicability of possibilities to the NCCCS	PDs; p/t statistical analyst	9/22/04
7.	Meet with the Funding Formula Study Advisory Committee (SAC)	To give a study status report and solicit input regarding findings to date	PDs; SB Study Director; SAC members	9/22/04
8.	Construct and apply enrollment projections models	To determine if models can be constructed to accurately project enrollment growth for the upcoming year based on historical data	PDs; p/t statistical analyst	10/7/04
9.	Construct and apply high cost program funding models	To determine if the current funding formula or modifications thereof can provide adequate funding for high-cost programs	PDs; p/t statistical analyst; p/t graphic designer	10/7/04
10.	Meet with NCCCS President Martin Lancaster	To provide status report on study	PDs; SB Study Director	10/8/04
11.	Finalize draft report, to include conclusions, significant findings, implications and recommendations	RFP requires rough draft to be delivered to Study Director by 10/15/04	PDs; p/t technical writer and p/t graphic designer	10/15/04
12.	Revise draft as necessary in consultation with Study Director	Report must be finalized for presentations to State Board and NC Legislature	PDs; SB Study Director; p/t technical writer	11/1/04
13.	Provide further assistance as necessary to Study Director in preparation for his presentations of Study findings to the State Board and NC Legislature	Additional background or data may be required by Study Director, particularly after State Board presentations	PDs; SB Study Director	11/18/04; 11/19/04; 1/15/05

Appendix B

Funding Gap Table

I	II	III	IV	V	VI	VII
YEAR	Total FTE	Total FTE Change	Funded FTE	Gap Between Actual & Funded FTE	Gap in Dollars	35% of Gap between actual & funded
2003-04	187,848	4.09%	180,172	7676	$31,392,460	$10,987,361
2002-03	180,172	5.90%	169,537	10,635	$43,493,853	$15,222,849
2001-02	169,537	10.02%	152,545	16,992	$69,492,012	$24,322,204
2000-01	152,545	2.16%	149,246	3,299	$13,491,887	$ 4,722,160
1999-00	149,246	2.97%	144,810	4,436	$18,141,865	$ 6,349,653
1998-99	144,810	7.13%	134,487	10,323	$42,217,870	$14,776,255
1997-98	134,487	11.35%	119,219	15,268	$62,441,387	$21,854,485
1996-97	119,219	0.90%	118,756	463	$ 1,893,526	$ 662,734
1995-96	118,143	-0.52%	118,756	(613)	($ 2,506,980)	($ 2,506,980)
Yearly Average	150,667	4.89%	143,059	7679	$31,117,542	$10,710,080

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Business and Finance, NCCCS

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Lenoir Community College
NCACCP Finance Committee Chair

Mr. Bryan Conrad
Budget Analyst, OSBM

Dr. Gary Green, President
Forsyth Technical Community College

Dr. Shirley Iorio
Research Division/Fiscal Research Division
North Carolina General Assembly

Dr. Kathy Johnson, President
Nash Community College
NCACCP President

Dr. Mary Kirk, President
Montgomery Community College

Ms. Kristine Leggett
Fiscal Analyst, Fiscal Research Division
North Carolina General Assembly

Mr. John Malia
System Accountant, NCCCS

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