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ABSTRACT

An analysis of the procedures states have adopted to distribute federal funds for vocational education under the 1976 Amendments to the Vocational Education Act shows that there is widespread confusion and variation among the states. While the Act specifies that a formula must be used for distribution of funds, the exact criteria for determining the formula are not spelled out, and states, therefore, have established a variety of formulas, some of which are no more in tune with the Act's intent than a simple per-capita distribution would be. There are three basic steps in designing formulas for distributing funds: data selection, transformation of data into standardized scores, and transformation of standardized scores into dollar allocations or reimbursement rates. States employed a variety of approaches to data collection and to transforming raw data into standardized scores, although they used one of three general methods for transforming standardized scores into dollar allocations or rates of reimbursement: a tabular method, a reimbursement rate equation, or a weighted points method. No state was using a procedure free of technical difficulties, arbitrary judgments, unexplained calculations, questionable interpretations of federal law, or inaccurate and inappropriate questionable interpretations of federal law, or inaccurate and inappropriate data. An alternative formula was proposed. (The final section of this report provides detailed descriptions of the fund distribution practices in each state--see note.) (KC)

Analysis of Distribution Procedures Used by States to Distribute Federal Funds for Vocational Education

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University of California, Berkeley

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Robert Polster had primary responsibility for much of the research on which this report is based. In addition to elaborating in Section III the complex procedures used in each of the fifty states, he developed the specific details of the Suggested Formula in Section IV and contributed much to the analysis in Section II. Under the direction of Judith Balderston and Charlotte Alhadeff, Jerry Cayford and Neil Taxy provided additional assistance in understanding each state's procedures and organizing the results for presentation. David Stern helped to organize the analysis, oversaw much of the state-by-state research, and provided constructive comments on earlier drafts.

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EXECUTIVE SUMMARY

No other aspect of the 1976 Amendments to the Vocational Education Act has generated more controversy and confusion than the issue of how states are to distribute federal funds to eligible recipients. Almost four years after the passage of the 1976 Amendments, clear federal guidelines have not been established, and every state operates under great uncertainty as to whether it is complying with federal law. This report analyzes the procedures states have adopted to distribute federal funds for vocational education. It is organized in four sections. The first discusses contradictions and ambiguities in federal legislation and regulations affecting distribution of funds. The second develops a taxonomy of procedures adopted by the states and analyzes the strengths and weaknesses of various approaches. The third suggests a clearer and simpler approach to funds distribution. The fourth provides detailed descriptions of the practices in each state.

Federal Law and Regulations

A number of contradictions and ambiguities in federal vocational education legislation have hampered the development of clear and effective distribution procedures at the state level. The Congress clearly stated that it would not permit procedures that produced uniform per capita distribution of funds, but it did not specify what type of non-uniform distribution was to be achieved. Critera affecting the distribution of funds -- such as location in an economically depressed area, proposals for programs new to the area to meet new and emerging manpower needs, relative financial ability, and concentrations of low income families or individuals -- have been so vaguely defined that, in most states, all local education agencies (LEAs) receive some federal funds. Moreover, since neither the legislation nor the regulations specifies what weights are to be attached to these criteria, it is quite likely that in several states, the distribution of funds is not significantly different from that which would result from allocating funds on the basis of per capita enrollments or through matching funds on a uniform percentage basis.

The importance of clarifying these issues cannot be overemphasized. Despite the requirement that states distribute funds by formula, there is nothing inherently fair about a formula. By including and excluding different variables and by manipulating values assigned to different coefficients of the variables, it is possible to design a formula to produce any outcome desired, while still appearing to consider the criteria required in existing legislation. A formula per se is no assurance of fairer and more effective allocation, unless the criteria and weights they are to be assigned are specified explicitly.

State Distribution Formulas

There are three basic steps to designing formulas for distributing funds: 1) data selection, 2) transformation of data into standardized scores, and 3) transformation of standardized scores into dollar allocations or reimbursement rates. The first step involves identifying and defining variables that are used to measure the various criteria affecting the distribution of funds. States have enjoyed great latitude in the choice and employment of different variables, and dozens of different measures have been used. For formulas affecting funds distribution in FY 1979, all but four states employed one or more measures of relative financial ability, and only three did not use some measure of income. Twenty-nine states used a variety of measures of unemployment. Reflecting the difficulty of defining a sensible variable for measuring "new programs," only seven states included this criterion in their distribution procedures. Thirteen states incorporated some measure of relative costs, and only eight used a separate factor designating some eligible recipients as located in an economically depressed area.

The states employed a variety of different approaches to transforming raw data into standardized scores that permit accurate comparisons among variables measured on different scales. Twenty-nine states used non-continuous methods that were judged to be inappropriate -- imprecise, arbitrary, and subject to manipulation. Twenty-one states used continuous methods that, while superior to non-continuous methods, were sometimes employed incorrectly.

For transforming standardized scores into dollar allocations or rates of reimbursement, states developed one of three general methods: 1) a tabular method, 2) a reimbursement rate equation, or 3) a weighted points method. Eleven states used the tabular method, considered the least appropriate of the three approaches. Typically, this approach was poorly explained, and provisions seemed arbitrary. Six states calculated a reimbursement rate that varied depending on an eligible recipient's scores on the various distribution criteria. However, the range of variation was usually too narrow to produce significant differences among recipients. Consequently, this approach tends to direct more funds per student to higher spending recipients, who often are also high wealth districts. In short, this approach may often contradict the stated purposes of the law and was considered inappropriate. Finally, twenty-seven states employed some variation of the weighted points method, allocating funds based on each recipient's total point score as a proportion of total points earned by all recipients in the state. While superior to the other two methods, this approach also suffers from defficiencies that were poorly handled by most states adopting this method. To summarize, no state was using a procedure free of technical difficulties, arbitrary judgments, unexplained calculations, questionable interpretations of federal law, or inaccurate and inappropriate data.

An Alternative Formula

For reasons developed in detail in Section II of the report, none of the three general methods proposed by the states in FY 1979 is capable of fairly incorporating all the criteria the Congress has specified to determine allocations of federal funds for vocational education. Consequently, Section III suggests an alternative approach. It proceeds in three steps. First, it calculates each eligible recipient's vocational education enrollment, weighted in terms of enrollment of target populations and students in high cost programs. Second, it calculates relative financial ability in terms of both property wealth and household income. Third, it allocates funds based on relative financial ability per unit of weighted vocational education enrollments by "levelling up," -- i.e., first bringing the neediest recipient up to the level of the second neediest, then those two together to the level of the third, and so forth until funds are exhausted. The suggested formula has the virtue of being easy to administer and monitor, while simultaneously addressing the major objectives of federal vocational education legislation.

I. GENERAL OVERVIEW

Among the most significant features of the 1976 Amendments to the Vocational Education Act were provisions modifying funding arrangements. Consolidating programs that previously had been separately funded, the Amendments created four general types of grants: 1) a "basic" grant that, in addition to regular vocational education programs, could be used for other purposes including work-study, cooperative vocational education, construction, and several other activities; 2) a grant for "program improvement and supportive services," including research, exemplary and innovative programs, curriculum development, guidance and counseling, teacher training, and grants to overcome sex bias; 3) a grant for "special programs for the disadvantaged;" and 4) a grant for consumer and homemaking education. The Amendments also created a number of national programs, including the establishment of the Vocational Education Data System (VEDS) and the National Occupational Information Coordinating Committee. Finally, it provided for state planning grants, bilingual training, special renovation and remodeling, and state and national advisory councils.

By consolidating programs, Congress pursued a "block grant" approach that simplified the basic structure of federal funding for vocational education, but at the same time, Congress considerably complicated the rules by which these grants were to be distributed by the states to eligible recipients. Maintaining the "setaside" provisions for handicapped, disadvantaged, and postsecondary and adult students -- as well as designating funds for the Bureau of Indian Affairs and for efforts to promote sex equity -- Congress further specified several new criteria that were to affect funds distribution. Henceforth, states would not be permitted to distribute funds uniformly to eligible recipients. Rather, they would have to consider such factors as relative financial ability, the relative number or concentration of low-income families or individuals, location in an economically depressed area or an area of high unemployment or high dropout rates, and proposals for new programs. Further, subsequent regulations interpreted the setaside provisions of the Amendments to apply only to the "excess costs" of providing programs for the handicapped and disadvantaged. To ensure that states met these requirements, the Bureau of Occupational and Adult Education (BOAE) of the Office of Education encouraged states to adopt funding "formulas" -- presumably representing objective, quantitative procedures for allocating funds. These formulas were to determine the distribution of federal funds under Sections 120, 134, 140 and 150 of the Vocational Education Act.

Probably no other aspect of the 1976 Amendments has generated more controversy, confusion, and frustration than the general issue of how states are to distribute funds to eligible recipients. Almost four years after passage of the 1976 Amendments, clear federal guidelines have not yet been established, and every state operates under great uncertainty as to whether

it is complying with federal law. Regulations and guidelines issued to date have been ambiguous, confused, and contradictory. Procedures approved one year have been disapproved the next only to be approved again.

This report reviews the procedures states have adoped to distribute federal funds for vocational education. In this first section, we offer a general overview, concentrating on the specific provisions affecting the distribution of funds and identifying the issues that have impeded the development of workable procedures. These issues include 1) the meaning of "non-uniform" distribution among applicants, 2) the definition of distributional criteria, 3) the determination of distribution mechanisms, 4) the interpretation of the setaside provisions, 5) the treatment of Subpart 4 funds for the disadvantaged, and 6) the availability of data that are sufficiently current and disaggregated.

Section II analyzes the types of procedures that states have adopted and develops a taxonomy of data transformation and funds distribution procedures. Section III develops a "Suggested Formula" that, in our judgment, meets the requirements of the 1976 Amendments and could be used as a model for state systems. Finally, Section IV provides detailed descriptions of procedures used by the states in FY 1979 for distributing federal funds.

By far, the bulk of our report concentrates on individual state systems and the strengths and weaknesses of various approaches that states have adopted for distributing federal funds. We are very critical. We have found no state that has designed procedures free of mathematical errors, arbitrary judgments, questionable interpretations of federal law and regulations, and inaccurate or inappropriate data. Nevertheless, we find it difficult to fault individual states. As will become apparent in the sections that follow, federal leadership has been woefully inadequate. The Bureau of Occupational and Adult Education (BOAE) has been unable to define unambiguous criteria and to design clear procedures for distributing federal funds. A partial explanation for this failure is apparently inadequate expertise for analyzing and designing school finance systems. However, greater technical proficiency at BOAE cannot remove much of the ambiguity. Clearer directions are needed from Congress. Present legislation is irresolvably vague on several important issues. Moreover, the legislation pursues too many objectives with too few instruments and too little attention to which objectives have priority. Until such problems are resolved at the federal level, state responses are likely to continue to reflect a chaotic state of disarray.

A. Achieving "Non-Uniform" Distributions

A major change of the 1976 Amendments was the provision of more explicit requirements for distributing funds. The 1968 Amendments had instructed states to give due consideration to the results of periodic evaluations, to the relative need for vocational education among different population sub-groups, to the relative ability of school districts to provide resources, and to the excess costs of vocational programs. Yet, such provisions had proven inadequate. For example, the House Committee on Education and Labor reported:

> From our oversight of the [vocational education] Program during the last two years, we have found that these requirements are too general in nature to carry out the intention of Congress which was to provide additional resources to those school districts and agencies most in need of those resources to provide programs (House of Representatives, Report, No. 94-1085, May 4, 1976, p. 33).

Similarly, the Senate Committee on Labor and Public welfare noted:

> Existing law prohibits the allocation of funds among eligible applicants in a manner which fails to take into account the statutory criteria for allocation, such as the matching of local expenditures at a uniform percentage ratio. The purpose of such a provision was to require State boards to take into account the relative needs of applicants for Federal funds, and their relative ability to match such funds, in relation to other applicants within the State. Despite this provision, a number of states allocate funds among school districts on the basis of a flat formula, without taking relative need or ability to pay into account (Senate, Report, No. 94-882, May 14, 1976, p. 71).

In the 1976 Amendments, the Congress clearly states that henceforth uniform distribution of federal funds to eligible recipients is unacceptable:

> . . . the State will not allocate such funds among eligible recipients within the State on the basis of per capita enrollment or through matching of local expenditures on a uniform percentage basis (P.L. 94-482, Sec. 106(a)(5)(B)(ii)).

Instead, state administrations are to direct federal funds to local agencies most in need of additional resources. "Need," in this instance, takes several forms. Thus, the Congress directs

> that the State shall, in considering the approval of such applications [for funds], give priority to those applicants which --
> (i) are located in economically depressed areas and areas with high rates of unemployment, and are unable to provide the resources necessary to meet the vocational education needs of those areas without Federal assistance, and
> (ii) propose programs which are new to the area to be served and which are designed to meet new and emerging manpower needs and job opportunities in the area, and, where relevant, in the State and the Nation . . . (P.L. 94-482, Sec. 106(a)(5)(A)).

While more explicit than the 1968 Amendments, these directions remain ambiguous. What constitutes an "economically depressed" area or a "high" rate of unemployment is not defined, and liberal interpretations have enabled some states to label almost all recipients "economically depressed." For example, of 62 counties in New York, all but two -- Dutchess and Tomkins -- are defined by the 1979 Annual Plan as economically depressed.

Further weakening the ability of the two criteria to target funds is the lack of any strong correlation between location in an economically depressed area and location in an area with "new and emerging manpower needs." Indeed, one might expect the second to be more characteristic of economically vigorous communities with high rates of growth and low unemployment. Thus, one criterion may well be offsetting the other, effectively permitting uniform distribution of federal funds despite specific criteria for targeting. Such a possibility needs to be verified by empirical analysis, but even without hard data, it is easy to see how the two criteria could be used to cast a large net that would include most, if not all, localities.

Perhaps anticipating such difficulties, the Congress specified further criteria:

> . . . the State shall, in determining the amount of funds available under this Act which shall be made available to those applicants approved for funding, base such distribution on economic, social and demographic factors relating to the need for vocational education among various populations and the various areas of the State, except that --
>
> (i) the State will use as the two most important factors in determining this distribution (I) in the case of local educational agencies, the relative financial ability of such agencies to provide the resources necessary to meet the need for vocational education in the areas they service and the relative number or concentration of low-income families or individuals within such agencies, and (II) in the case of other eligible recipients, the relative financial ability of such recipients to provide the resources to initiate or maintain vocational education programs to meet the needs of their students and the relative number or concentration of students whom they serve whose education imposes higher than average costs, such as handicapped students, students from low-income families, and students from families in which English is not the dominant language (P.L. 94-482, Sec. 106(6)(5)(B)(i)).

Here again, the language is much more specific than previous law, but an important question remains unanswered. Are these criteria to be applied after a local agency has been identified as eligible by the previous two criteria -- location in an economically depressed area or proposing programs for new and emerging manpower needs? Or, are they to be applied independently with additional money going to localities with low financial ability regardless of need based on other criteria? Does the law require an approval process by which eligibility is first based on high unemployment and low financial ability, or does it merely require a process by which either high unemployment or low financial ability are sufficient for eligibility? A process in which eligibility is determined by meeting any one on several criteria will distribute funds more broadly and uniformly than a process requiring that all criteria be satisfied. Indeed, the former process is likely to lead to an outcome in which all applicants receive some funds, and depending on the weights assigned to each criterion, capita distribution.

Is it legal to fund all applicants in this way? BOAE has said yes. In the March 1980 draft of its Policy Manual for Federal Vocational Education Fund Distribution, the Bureau states:

> States may distribute Federal VEA funds to all applicants. Although P.L. 94-482 describes separate approval, selection, and funding stages, there is nothing in the Law or Regulations to prohibit a State from funding all applicants. Where all applicants are funded, States can use a combined prioritizing and funding process, as long as the two most important factors (1) relative financial ability and (2) low-income families (for LEAs) or (2) high cost students (for other eligible recipients) individually receive the greatest weight in the process. (BOAE Information Manual for Federal Vocational Education State Grant Fund Distribution Procedures, March 1980, p. 6).

BOAE also gives states the option of using a two-stage process of approval and funding but does not require it.

Despite BOAE's assertion that it is legal to distribute funds to all applicants, much doubt remains. Reporting on the 1976 legislation to amend the Vocational Education Act, the Senate Committee on Labor and Public Welfare states that the purpose of these criteria are to help States make "hard choices" about whom to fund, implying that only the neediest applicants are to receive funds:

> The Committee hopes that the specific provisions for the eligible recipient applications will provide the State board with the necessary information to make hard choices among competing applications for scarce Federal funds.

However, even this statement is ambiguous because the report continues:

> . . . Of course, successful on-going programs should continue to receive assistance. However, with the development of new vocational programs competing for limited dollars, State boards may have to decide to fund new and innovative programs, allowing State and local funds to pick up the costs of some operational programs.

Short of more explicit legislation, the question of whether all applicants may receive some federal funds cannot be answered. A clear response has import policy implications, affecting not only what types of distribution procedures are appropriate but also the effectiveness of Congress' efforts to target resources where needs are greatest. More will be said on these issues in Section II.

B. Criteria Affecting Funds Distribution

While it is unclear whether Congress intended all applicants to receive

federal funds, there is no doubt that it intended some to receive more than others. Applicants with large populations of handicapped and disadvantaged students, poor areas with high unemployment and difficulties in providing vocational education programs, and areas with new and emerging training opportunities are all to receive priority in distributing federal funds to eligible recipients. However, the legislation offers little guidance on operational definitions of these objectives or the weight each is to receive. Each criterion deserves some discussion.

1. Location in an Economically Depressed Area. States have enjoyed much discretion in defining economically depressed areas. Many have employed the criteria used to designate areas under the Public Works and Economic Development Act, criteria so broad that most areas of the state qualify. In its proposed policy manual on funds distribution, BOAE does not explicitly outlaw this practice and instructs states to define economically depressed areas in Annual Program Plans. Henceforth, states must include in their definitions measures of unemployment rates and inability to provide resources for vocational education programs. Thus, BOAE encourages states to abandon dichotomous variables and to employ continuous variables that will force states to recognize that some areas are more economically depressed than others. Implicit in these directions is the requirement that, among localities designated as economically depressed, states allocate greater resources to those with greater needs.

However, such a requirement is never explicitly stated, and the manual subsequently waffles and begs the question. It instructs states to adopt one of two approaches in approving applications. First, a state may fund only those applicants in economically depressed areas by ranking them according to need and using a "cut-off mark" to determine eligibility. The cut-off point is never defined; nor are states given any guidance as to how to determine it. Second, states may fund all applicants and include depressed areas as a "weighted" factor in the distribution formula. BOAE provides no instructions as to how this is to be done or what "weighted" means in operational terms.

2. New Programs. Similar ambiguities plague the definition of programs designed to meet new and emerging manpower needs. The intent of the requirement seems clear -- namely to discourage localities from continuing to operate outdated or unnecessary training programs and to anticipate labor market needs that might cause shortages in the absence of adequate numbers of trained workers. Such an interpretation is consistent with other sections of the Act that stress program planning based on careful assessment of current and future needs for particular job skills (see, for example, Sec. 107(b)). Unfortunately, the emphasis on "new" programs and BOAE's literal interpretation of the word creates incentives that potentially contradict the broader aim for sound planning that matches training to expected labor market conditions. Thus, too literal an interpretation would declare ineligible a locality that sought to expand an existing program to meet emerging new demands for workers with those particular skills. By BOAE's definition, and indeed the language of the legislation itself, such a program only qualifies if it is "new to the area." Similarly, an existing program that is radically reorganized -- for example, redesigned to use updated new equipment and curriculum at substantial additional costs

-- would not qualify for federal funding under a strict interpretation of the "new program" criterion.

Such outcomes are clearly inconsistent with concerns expressed elsewhere in the legislation. The Act begins with a declaration of purpose that leaves no doubt that Federal funds are intended, among other aims, to help states extend and improve existing programs, but the later emphasis on new programs as one of only two criteria for approving applications, discourages sensible planning. Instead, such heavy priority on "newness" may encourage potential recipients not only to rush into poorly developed programs for the sake of doing something new, but also to design elaborate new disguises for old programs that do not change at all.

The extent of such practices requires empirical analysis. Regardless of empirical findings, however, the emphasis on new programs is misplaced. Not only is it a poor criterion for encouraging localities to use existing resources efficiently but also it unfairly rewards localities with the most limited offerings. It is much more difficult for a large recipient with a widely varied program to develop new ones, though it may be important to expand existing ones. As written, the legislation is unnecessarily inflexible on this point.

3. Relative Financial Ability. One of the "two most important" factors affecting funds distribution, relative financial ability has two possible meanings, according to the VEA Regulations. First, it may be defined as local property wealth per capita, a measure similar to those used in school finance formulas seeking to neutralize the influence of tax base disparities on spending for education. Alternatively, it may be defined as total local tax effort, per capita local tax revenues divided by local per capita income. This latter measure, one of the criteria affecting allocations of federal revenue sharing, recognizes that property taxes are ultimately paid out of current income. Measuring the burden relative to income thus provides a better indicator of ability to pay than a measure of assessed value per capita. Assessed value per capita ignores not only revenues actually generated, but also variations in burden relative to local differences in the distribution of income.

Despite the superiority of the tax effort measure, BOAE urges states to use property wealth per capita to determine relative financial ability. The Bureau argues that a measure of total tax effort is too difficult to implement. Two major problems impede implementation. First, in many states, the jurisdiction responsible for education is not geographically coterminous with other jurisdictions responsible for other services. Consequently, aggregates of tax revenues for all local services are very difficult to calculate. Second, in many states, there are no current, accurate measures of local income for school districts. Typically, states levying income taxes can calculate distributions of income for counties and municipalities, but unless school district boundaries coincide with these jurisdictions, distributions for school districts cannot be determined. A few states have solved this problem by requiring taxpayers to include on their tax returns the name of the school district in which they reside. Others have developed trict boundaries; the programs permit easy and reasonably accurate estimates

of income distributions for school districts. In short, several states are capable of calculating per capita income for school districts, and BOAE could encourage, or indeed require, that these states use per capita income in measures of relative financial ability.

BOAE has prohibited states from employing assessed value per student, ADA or ADM, as a measure of relative financial ability. Such measures fail to recognize that age distributions vary greatly among jurisdictions. Consequently, districts with relatively few school age children may enjoy a fiscal advantage in providing educational services, but this advantage is offset by greater difficulties in financing other public services in greater demand by adults, especially the elderly. Further, measures employing ADA or ADM tend to penalize districts with large private school populations, high rates of absenteeism, and rapidly declining enrollments. Such places have relatively higher fixed costs for education. Thus, tax base per capita is a superior measure, more neutral with respect to demands for non-school services and variations in fixed costs.

Despite the superiority of the per capita measure, it is difficult for many states to calculate accurately. Most states do not have data on the resident population of school districts. Such data are available from the decennial census, but they become quickly dated. Only where school districts are coterminous with municipalities or counties can states secure accurate counts of resident population. BOAE recognizes this difficulty and permits states that can substantiate their inability to secure population data to substitute assessed value per student. The vast majority do employ this proxy.

4. Low-Income Families. The second of the two "most important" factors determining funds distribution is the "relative number or concentration of low-income families or individuals within such agencies." The major unresolved question regarding this criterion is relative to what -- the number of low-income families relative to the total population of the LEA, or the number of low-income families relative to the total number of low-income families in the state? BOAE has opted for the former, a choice that can lead to some rather perverse outcomes unless variables are carefully adjusted for the size of the LEA. To see why, consider the extreme case of a state with only two districts of vastly different size. One has a population of 100,000, of whom 800 are low-income individuals. The second has a population of 1,000, of whom 800 are low-income. Thus, the concentration of low-income individuals relative to the population of the district is 20 percent and 80 percent, respectively. By BOAE's rule, funds are to be directed to the second district, despite the fact that over 85 percent of the state's population of low-income individuals resides in the first.

The critical question here is whether the criterion is intended to direct funds to individuals or geographic areas. BOAE's procedure directs funds to areas with the possibility that very sizable numbers of target populations will receive little special assistance. Further, on the very reasonable assumption that population heterogeneity increases with size, a procedure that measures proportions of target populations within LEAs in-

evitably favors small jurisdictions. There may be some justification for this practice. If it can be shown that high concentrations of target populations within LEAs produces higher costs per student, some adjustment is called for. However, if the problem is that target populations generally require more costly programs, regardless of where they reside, then distributing funds on the basis of numbers relative to the state totals would be more equitable and effective.

A second difficulty affecting the implementation of this criterion is the lack of data that are sufficiently disaggregated to target funds precisely. Where states maintain income data only at the county level, the number of low-income individuals within LEAs within each county can only be obtained by pro-rating county totals among districts. Typically, pro-rating is based on the distribution of the county's total population among LEAs. Thus, to the extent that target populations are not evenly distributed in relation to the total population, some LEAs are penalized while others are favored. As was noted above, several states have procedures for obtaining more accurate measures of school district income distributions and BOAE could be urging universal adoption of these procedures.

5. Above Average Costs. Many LEAs eligible for federal funds receive no local revenues and are wholly supported by state funds. Hence, conventional measures of relative financial ability are not applicable, and where states allocate equal amounts per student, the criterion has no relevance at all. However, in such instances, the law directs states to consider "the relative number or concentration of students whose education imposes higher than average costs, such as handicapped students, students from low-income families, and students from families in which English is not the dominant language." Here again, BOAE has interpreted "relative" to mean concentrations within institutions rather than the size of the LEA target population relative to the state total. The practice has the same problems as those discussed above.

Additionally, BOAE presumes that LEAs do in fact incur above average costs in educating these students. The Bureau instructs states to count students; it does not require evidence that such costs are incurred or that additional funds based on such counts are actually to be spent on students identified. The failure to insist on direct evidence of above-average costs may ignore important differences among LEAs. Costs are likely to vary substantially -- by factors of two or more -- among types of students and types of services offered. Simple population counts are crude measures at best; at worst, they signify nothing.

6. Weighting Criteria. Assuming these criteria could be clearly defined and accurately measured, the problem would remain as to how each should be weighted in determining the distribution of funds. On this point, the legislation is extremely vague. States are directed to "give priority to" or consider "most important" various factors, but these phrases have no operational meaning. Until Fall 1979, the regulations simply repeated the language of the law and provided no additional insight. The draft of BOAE's policy manual issued in March 1980, fails to offer any guidance other than to specify which factors must receive the "greatest" weight.

Presumably, a formula giving weights of .26 to two variables, relative financial ability and number of low-income individuals, and weights of .24 to two others is legal for there is no specified minimum by which the weights of these factors must exceed those of others.

A more fundamental question is whether it is appropriate at all to try to solve a number of different objectives simultaneously through arbitrary weighting schemes. An alternative approach is to prioritize objectives and devote resources to realizing the first before proceeding to the second. Thus, Congress might specify that federal funds are to be used first to eliminate vocational education spending disparities produced by differences in relative financial ability. If resources remain after that objective is satisfied, they might then be applied to compensating for above average costs of educating special students. If some federal funds still remained, they might then be applied to supporting programs aimed at new labor market needs. Despite the relatively small proportion of vocational education dollars that federal funds represent, such prioritizing may not be far-fetched. Some states, after all, have already achieved substantial expenditure equalization through school finance reform, and in these states the criterion of relative financial ability has no meaning. What objective are they to pursue next? We suggest a form of this approach and develop it more fully in Section IV. One of its attractive features is that it avoids the issue of mathematical weights, which is usually arbitrary and is occasionally subject to abuse.

C. Distribution Mechanisms

Prior to the 1976 Amendments, states distributed funds to eligible recipients in a wide variety of ways. State plans rarely described the distribution procedures precisely, and it is practically impossible to reconstruct the distribution mechanisms actually used. However, generally one of two types of procedures was adopted. Funds were distributed either on the basis of applications for grants to support proposed projects or on the basis of a predetermined entitlement. Under the first, eligible recipients submitted a project proposal and budget which was reviewed by the state administration and approved, modified, or rejected. All those eligible did not necessarily receive funds, and state officials enjoyed substantial discretion in determining what projects would be approved. Under the second, state officials determined an entitlement for each eligible recipient, which then submitted an application against the funds. The entitlement might be based simply on a flat amount per student for each recipient or it might attempt, by mathematical formula or administrative adjustment, to vary entitlements among recipients depending on need or other criteria.

Although the 1976 Amendments explicitly forbade uniform distributions, the legislation did not preclude states from continuing to employ either of these approaches. Henceforth, states would be required to apply the various criteria discussed in the previous section to either the entitlement or project based distribution. The legislation nowhere specified how these criteria were to be applied, and indeed the regulations do little to clarify the type of mechanisms states are to employ. For the most part, the regulations issued in October 1977, merely repeated the

language of the Act.

However, in Appendix B of the Regulations, a peculiar word appears:

> Question No. 1: To what part of the Act does the Section 106(a)(5) funding formula apply?
>
> Answer: The section 106(a)(5) funding formula must be applied to all Federal funds distributed under sections 120, 134, 140 and 150. (Federal Register, Vol. 42, No. 191, Monday, October 3, 1977, p. 53865, emphasis added)

"Formula" appears nowhere in the Act and is used only once in the main body of the Regulations -- referring to the computation of expenditures for persons with limited English-speaking ability (Federal Register, Vol. 42, No. 191, Monday, October 3, 1977, Article 104.313(c), p. 53841). Seemingly, while never explicitly stating the requirement, without providing a single example of how the computations were to be performed, without offering any guidance as to what variables were to be included and how they should be weighted, BOAE had intended states to employ a formula to distribute federal funds. Yet it is odd to relegate such a formidable requirement to one sentence in the appendix to forty-three pages of detailed regulations. How were states expected to implement the requirement for distributing funds by formula? The question has been at the center of four years of regulatory debate between BOAE and the state agencies overseeing the distribution of funds.

What precisely is meant by the term "formula"? Though the Regulations offer few hints, we take the term to mean a clearly delineated method -- usually though not necessarily mathematical -- for allocating funds. Its chief feature is that it makes explicit and replicable each step in the allocation process. Ideally, it should produce the same outcome regardless of who performs the required computations; the need for subjective judgment is minimized and its influence tempered. At the very least, an outsider ought to be able to follow and understand how a particular outcome was produced.

To employ a formula effectively and fairly, there are some additional criteria that it should strive to meet:

1. Definitional Clarity. Each of the variables employed in the formulas -- i.e., the criteria governing funds distribution -- must be clearly defined. The definition should apply uniformly among eligible recipients within each state, and perhaps among states as well. Each variable should strive to reflect or measure accurately the intended phenomenon.

2. Ease of Understanding. In one sense, a formula "works" if it produces the outcome intended by the controlling legislation. Hence, one might argue that it is necessary only to understand the outcome rather than the procedures that produces it. However, often the intended outcome is not realized -- perhaps because objectives conflict or perhaps because mathematical or statistical errors have been made -- and it is

important to be able easily to identify the source of the problem. More importantly, there is not always consensus on the legislative intent, and it is therefore useful to be able to understand how a particular formula reinforces one interpretation or another. Consequently, formulas should be designed to allow easy understanding by federal, state, and local officials, legislators, parents, teachers, and others concerned with operating educational programs.

3. Use of Current and Reliable Data. Often it is possible to define clear criteria for distribution, but data are not available that are sufficiently current and reliable. Lagged data that deviate significantly from current conditions will produce unwanted results. Some data, while reliable in the aggregate, are suspect when disaggregated or prorated. Data may be missing for some states or for some recipients within states, and bias in the pattern of missing data will bias distributions based on such variables.

4. Geographic Specificity. Related to problems of data currency and reliability is the problem that data may not be available in a form that permits effective targeting of funds. At what level is it necessary to distinguish eligibility -- among states, counties, LEAs, schools, classrooms, or individuals?

5. Stability. Also related to problems of data reliability and geographic specificity is the formula's sensitivity to small changes in the measures employed. High sensitivity may be desirable, although this will lead to large differences in allocations among recipients and over time. Large changes may impair recipients' ability to plan effectively; on the other hand, formulas insensitive to real differences among recipients defeat objectives to target funds.

6. Unintended Incentives. Even formulas that meet all of the above criteria can create unintended incentives and consequences that counteract the intended objectives of the formula. The formula may encourage recipients to report false or misleading data, to relabel students, or shuffle financial accounts.

Even when these criteria for good formula design are respected, a formula may not produce the intended result. There is nothing inherently fair about formulas. The most important decisions affecting a formula's outcome -- the choice of variables, the mathematical specification of the relationships among variables, the values given to coefficients or exponents -- are all external to the formula itself; they are policy decisions that must be made by administrators and legislators and therefore subject to political debate and conflict. From this broader perspective, formulas are not objective at all, despite their apparent quantitative precision. Indeed, by including and excluding different variables and by manipulating values assigned to different coefficients, it is probably possible to design a formula that would produce any outcome desired, while still meeting the criteria outlined above and those specified in legislation. A formula per se is no guarantee of fairer or more effective allocation.

Unfortunately, this point has been missed by BOAE, as well as others

pressing for the adoption of formulas as the primary mechanism for distributing funds. Although formulas help to explain the steps followed by states to allocate funds, in the absence of unambiguous instructions about what variables to include and how they are to be prioritized or weighted, formulas are no more likely to produce desirable outcomes than any other method of distribution. In this sense, the concentration on developing different "models" of formulas may be misplaced; more fundamental issues must be resolved before these models have any real operational meaning.

D. Setaside Provisions

The setaside requirements of the 1976 Amendments are another area of on-going confusion and debate. The legislation contains three primary setaside provisions. First, at least 10 percent of each state's basic grant is reserved to pay not more than 50 percent of the excess costs of vocational education programs for the handicapped. Second, at least 20 percent of each state's basic grant is to be used to cover no more than 50 percent of the excess costs of programs for the disadvantaged. Third, the Act reserves 15 percent of each state's basic grant for not more than 50 percent of the costs of vocational education for persons who have completed or left high school or who are unemployed or already in the labor market (the postsecondary setaside). Additionally, a portion of the disadvantaged setaside is reserved for persons with limited-English proficiency, the amount varying with their number as a proportion of each state's population aged fifteen to twenty-four, inclusive.

The original legislation did not specify that funds reserved for the handicapped and disadvantaged could be used to cover only the excess costs of programs and services. Following the publication of proposed regulations in April 1977, a letter to Commissioner of Education Boyer from Representatives Perkins and Quie and Senators Pell and Javits made it clear that the setasides were intended to help cover the costs of "special forms of assistance, over and above the regular program." The Congressmen argued that any other interpretation would not lead to an expansion of services for the handicapped and disadvantaged and might lead to a reduction. Consequently, subsequent regulations required that the setasides for the handicapped and disadvantaged be applied only to the additional costs of special programs, services and activities.

Much confusion remained, however, especially as to whether the principle of excess cost applied to both mainstreamed programs and separate specialized programs. Consequently, in March 1978, OE issued a further interpretation. First, the interpretation reiterated the emphasis of the Vocational Education Act on mainstreaming:

> The State shall use, to the maximum extent possible, the funds expended for handicapped and disadvantaged persons to enable these persons to participate in regular vocational education programs (Federal Register, Vol. 43, No. 59, Monday, March 22, 1978, p. 12357).

For students placed in regular programs, excess costs refer to expenditure per student for non-handicapped or non-disadvantaged students in

vocational education.

When it is necessary to place a student in a separate specialized program, the entire cost of this program may be counted as excess costs, provided the average statewide (state and local) expenditure per student equals or exceeds the average per student expenditure for non-handicapped or non-disadvantaged students. Unfortunately, this interpretation creates a powerful incentive to isolate students rather than mainstream. Consider the following hypothetical example. Suppose a state spends $1,000 per student for non-handicapped students. The state has 1,000 handicapped students in vocational education and 10 percent of its basic grant amounts to $300,000, or $300 per handicapped student. If the state mainstreams these students, it must spend $1,600 per student, including an additional $300,000 of state-local expenditures to match the federal setasides dollar for dollar. However, if the state elects to place all students in specialized facilities, it need spend only $1,300 per student. In this case, average statewide state and local expenditure is the required $1,000 per student, $300 of which can be counted as the 50 percent match for the $300 per student of federal funds. The state need not spend the additional $300,000 required if students are mainstreamed. Consequently, the larger the setaside, the greater is the incentive to isolate students in special programs rather than mainstream them as the legislation would prefer.

The excess cost provision has made it difficult for some states to match federal setaside funds, and a few have threatened to return funds to OE. It is easy to see why they are experiencing difficulty. In effect, the operation of the excess cost provision creates a perverse incentive structure. On the one hand, spending small amounts per student in setaside dollars forces states to match at unusually high total matching ratios. Spending larger amounts decreases total matching ratios but forces states to raise substantial sums of new dollars. For example, assume a state spends an average of $1,000 per student for vocational education. Assume further that the federal setaside amounts to $50 per handicapped student in vocational education. For a mainstreamed student, the state must put up an additional $50, bringing the state-local total to $1,050, or a total matching ratio of 21:1. As the per student setaside increases, say to $300 in our previous example, this ratio declines greatly but states have substantially more difficulty generating additional funds.

In short, the excess cost provision is a clumsy mechanism for targeting funds. It is insensitive to existing levels of state spending and matching ratios for target groups and creates strong disincentives to use the money at all. Attempting to respond to the problem, Congress amended the Vocational Education Act in 1978 to allow states to exceed the 50 percent limit on the federal share for eligible recipients "financially unable" to provide programs for target groups. However, the amendment merely perpetuates the basic shortcomings of the excess cost notion and creates additional problems as to how "financially unable" recipients are to be defined.

A simpler and more effective approach might be to reserve setasides for special purposes -- services, programs, and activities -- but drop the matching requirements altogether. To avoid supplanting state-local

funds with federal funds -- the major concern of the Congress in insisting on the excess cost interpretation -- states could be required to maintain existing levels of support (on a per student basis adjusted for inflation), as well as document that state-local average expenditures per student for target groups equaled or exceeded average expenditures per student for non-handicapped and non-disadvantaged students. Such an approach would be consistent both with efforts to encourage mainstreaming and with Congressional objectives to provide necessary special services that facilitate participation in vocational education.

E. Summary

While by no means an exhaustive treatment of the ambiguities and problems complicating implementation of the 1976 Amendments, the discussion thus far serves to highlight some of the major issues. Important questions remain to be answered by Congress before one can reasonably expect states to adopt clear distribution procedures that respond effectively to the aims of the Congress:

1. Can federal funds be distributed to all LEAs and institutions, or must monies be directed first to those most in need on the basis of ability to pay and other criteria outlined in the legislation?

2. If universal distribution is permitted, what is the operational meaning of the "priority" assigned to the various factors affecting distribution?

3. If universal distribution is not permitted, is eligibility determined by satisfying only one of the several factors or must all be satisfied?

4. Are states permitted to use dichotomous variables -- e.g., location in an economically depressed area or operating a new program -- to determine eligibility or must they employ continuous measures of these characteristics that distinguish among different levels of need? How should such measures be defined?

5. Where data, such as measures of low-income families, are not currently available at the relevant level of geographic specificity, to what extent will proration or the use of proxies be permitted? Will states be required to collect such data? by what deadlines?

6. Does Congress intend to direct funds to needy individuals or needy areas? If areas, what types of distribution methods should states employ to avoid unintended concentration of all resources in a few small jurisdictions?

7. Is the presence of target populations sufficient evidence that recipients incur above average costs for certain students or must such costs be documented?

8. Should such objectives as overcoming the disadvantages of low relative financial ability or high concentrations of low-income families be priori-

tized and addressed sequentially, or should states seek to address all simultaneously?

9. If objectives are to be addressed simultaneously, how is each to be weighted?

10. Did Congress intend states to adopt a mathematically based formula to allocate funds, and if so, to what parts of the Act does such a formula apply? How much discretion are states to have in formula design and application?

11. If a formula is to be employed, how will the basic decisions be made regarding what variables to include and how to weight them?

12. Does the matching requirement for excess costs lead to the result intended by Congress? Would full federal funding of excess costs be more likely to realize Congressional intent, while greatly simplifying compliance and eliminating perverse incentives?

These are but a few of the unanswered questions. In light of such uncertainty, how have states responded? What procedures for distributing funds have actually been adopted? To that subject we now turn.

II. STATE DISTRIBUTION FORMULAS

Although never explicitly required by the 1976 Amendments, the hallmark of the new legislation has become the funds distribution formula. As set forth in the Regulations, distribution formulas are to govern the allocation of funds distributed under Sections 120, 134, 140, and 150 -- approximately 90 percent of the 495 million spent in 1977-78. No other aspect of vocational education funding has caused greater controversy and confusion. More than three and one-half years after passage of the legislation, BOAE began to provide states with some specific examples of acceptable procedures. Even these were not yet free of ambiguities and misspecification, and BOAE subsequently abandoned them. In this section, we analyze the types of formulas states have adopted. By way of background it is helpful to begin with a general look at intergovernmental fiscal relations in education, including the major factors affecting funds distribution and the general types of allocation formulas that have been developed.

A. Some General Concerns in Education Finance

During the past 15 years or so, a great deal of attention has been paid to improving the ways by which states distribute money for education to local school districts and institutions. Generally, these efforts have had two objectives, first to improve the distribution of state money with respect to local differences in costs and second to improve the distribution with respect to local differences in fiscal capacity to meet those costs. Thus, the gereral aim of school finance reform has been to design distribution systems that provide larger amounts of state aid to local recipients that fact higher costs in providing a given level of education or that possess less capacity to finance a given level of spending from local sources of revenue.

With regard to costs, the task for state government has been to distinguish between differences in expenditure that are attributable to cost differences and those which are attributable simply to differences in local preferences, toward either extravagance or parsimony. As a rule, states have considered two types of cost differences acceptable for compensating aid, costs attributable to differences among students and those attributable to differences among districts or institutions.

(1) Student Characteristics. Some students, such as the handicapped, require special and costly services. Districts with higher than average proportions of handicapped students have higher than average costs, other things equal. The argument has been extended to disadvantaged, to bilingual students, and to gifted students. An unresolved issue is the extent to which student preferences should be recognized as establishing differences in necessary costs. If, for example, students in a given district seek to enroll themselves in disproportionate numbers in expensive courses and programs (expensive on account, say, of the requirements for specialized teaching skills or capital equipment), should the state on that account provide the district with an extra amount of funds, or should the local authority be held responsible either to find the extra money or ration student places in the favored programs?

(2) District or College Cost Characteristics. It may require more dollars to provide a certain amount of instruction to students in some districts than in others. Sparsity of student population increases transportation costs and makes realizing scale economies difficult. Districts located in extremely cold or extremely hot climates face higher energy costs than do districts in temperate places. Central city districts often have higher costs for building maintenance because of the age of the structure and because of vandalism. These cost differences so far mentioned are related primarily to the physical aspects of the local authority.

Additionally, there is increasing interest in cost or price differences related to the market power or position of districts. It costs some districts more money to obtain services of teachers of given competence than others. In general, older industrial cities are in a weaker market position to hire teachers than middle class suburbs, teacher quality held constant. In measuring these price differences, one must separate the effects of local preferences toward hiring teachers of given types and toward having large or small classes -- policies that are within the control of at least some districts -- from conditions, such as the relative attractiveness of the district's students to teachers, that are beyond the capacity of the district to change. Only the latter conditions are appropriate to recognize in preparing an educational price index for a set of local authorities. Sophisticated formulas now in use in education take explicit account of all of the above differences in necessary expenditures. Lacking a well defined production function in education, we do not yet have the capacity to make precise estimates of true differences in costs, but we can at least make approximate estimates of the main sources of differentiated need.

To recount, the first objective in drawing up a well-functioning set of intergovernmental fiscal arrangements is to recognize interdistrict differences in necessary expenditures. The second objective is to take proper account of differences in local fiscal capacity. This second aim assumes, of course, that the grantor government expects the local authority to meet part (in some cases all) of the previously defined necessary expenditures from its own taxable sources. It is not required that things work this way. There are respectable arguments in education to the point that services should be fully paid for by federal and state governments. Education in Hawaii is fully funded by the state, and New Mexico, Florida, and Washington are states that come close to this condition. Because individual local educational authorities have lost virtually all power to set local tax rates and to determine the level of expenditures per student, it is reasonable to say that the educational system of California is financed fully by the state and federal governments. Nevertheless, local contribution is still regarded as an important source of revenue in most states. Accordingly, state governments try to equalize local taxable capacity by making bigger grants, other things equal, to local authority that are below average in local tax base per capita or per student and by making relatively smaller contributions to authorities that are rich in taxable resources.

However, varying state and federal grants inversely with taxable resources per student is no guarantee that these funds are properly dis-

tributed. Local taxes are levied mainly on real property, and at first blush, this seems a sufficient measure of local taxable resources. However, this measure ignores the possible significance of interdistrict differences in average household income or, alternatively, the proportion of families in the district below poverty level of income. Take two districts, A and B, and let them both have equally high assessed valuation per student. Let A be population by upper income people and let B be inhabited by lower income. By the fact that valuations are equal per student, we can logically assume that B has a substantial amount of industrial or commercial property, i.e., non-residential property per student. B can "export" part of its local tax burden and the tax payment per household in B may be rather low. Yet, the local tax borne by local families may be greater as a proportion of household income in B than in A.

States have responded to this problem in two main ways. The more precise adjustment is to offer income-specific property tax relief to low income families. The second is to adjust the actual assessed taxable values in the districts by an index based on district average household income figures. In the example above, district would have its total assessed valuation adjusted downward and A's would be raised. This action would serve to increase the entitlement of B to state aid and to reduce that of A.

A second problem in the measurement of local fiscal resources is summarized by the phrase, "municipal overburden." Other local services, such as fire, police, streets, libraries, health, and (sometimes) welfare are paid for from the same local tax base as is education. In central cities, expenditures per capita for these non-school services may be so high that there is little effective taxing power left once these requirements are met. Since protective services, at least, have absolute priority over education, the schools of central cities may be inadequately funded even though the tax base per student appears to be reasonably high. To an increasing degree, state governments are introducing a correction to their aid formulas to deal with the problem of municipal overburden.

With these considerations in mind, what types of grant-in-aid formulas have states employed? There are five general models:

1) Flat Grants

Flat grants provide equal distributions per capita or per student. Because flat grants recognize neither differences in necessary expenditures nor differences in locally taxable resources, they are seldom used at present, and are explicitly forbidden for use in vocational education. Only for small programs in which student need is not thought to be different from one district to another have they a place.

2) Fixed-Unit Equalizing Grants

In educational circles, this arrangement is known as the foundation program plan, but the more neutral label is to be preferred. Under

this system, the state guarantees a specified amount of funds per student, provided the district levies a minimum local tax. If the minimum local tax fails to raise the guaranteed amount per student, the state supplies the difference. For example, the state might guarantee $1,500 per student to all districts levying a local property tax of at least one percent of market value. A district with assessed value per student of $60,000 would raise only $600 from local sources; therefore, the state would supply an additional $900 per student. If the district chose to levy a higher rate, say 2 percent, it would still receive $900 from the state but would be able to spend an additional $600, or a total of $2,100 per student.

The general formula for Fixed-Unit Equalizing Grants is the following:

$$A_i = N_i u - r Y_i$$

where

A_i = state grant to the ith district

N_i = student count in ith district

u = state's guaranteed level of expenditure per student toward meeting the costs of the given service

Y_i = Assessed Value in the ith district

r = Computational tax rate

Thus, the first product on the right hand side stands for an estimate of necessary expenditures in the given district and the second product is an estimate of a fair local contribution. If r is set sufficiently low, then all districts can provide their students with the given service at no higher local tax rate than that required of the richest local authority. It is now common practice to adjust the value of u by the characteristics of students in a particular district and to adjust A_i by a cost of education index.

3) State-local Sharing Formulas (Reimbursement Rate)

With this type of formula, the state pledges to reimburse a certain percentage of expenditures determined by the local budget. The percentage, or ratio of state to local expenditures, varies depending on the relative financial ability of local districts. The percentage is relatively high in low wealth districts and relatively low in high wealth. In its pure form, the formula produces this result: any two districts that have the same expenditure per student also have the same local school tax rate--and vice-versa.

The general form of the formula is:

$$A_i = \left[1 - \frac{X y_i}{\bar{y}} \right] E_i$$

where

A_i = state grant to the ith district

X = arbitrary constant, $0 < x \leq 1$, representing approximately the statewide local share of the costs of the given service

y_i = assessed value per student in the ith district

$\bar{y}$ = state-wide average assessed value per student

E_i = total budget or total state-local budget in the ith district

There are many variations of the basic formula. Some modifications are adopted to stimulate low spending districts and to curb the extravagance of high spending. Other modifications eliminate high wealth districts from receiving any state aid at all; but when this is done, the result of equal expenditure-equal tax rate is not forthcoming. At first glance, this may seem paradoxical, but only until it is realized that A_i can take on negative values. In other words, this formula may dictate that high wealth districts turn over part of their local tax receipts to the state for redistribution to low wealth places. This is called recapture.

Differences in relative costs per student can be taken into account by directing separate sharing formulas toward programs that serve different categories of students. Alternatively, they can be recognized by assigning extra values or weights to high cost students and using a weighted student count to compute y_i. As before, differences in the educational price index can be dealt with by simply using the index to adjust A_i.

4) Levelling Up Formulas

Levelling up formulas proceed sequentially. State money is first directed to the poorest district, then when the poorest district is as "rich" as the second poorest, these two districts receive state money to bring them up to the level of the third poorest, and so on. The process stops when the state reaches some target, such as seeing to it that no district is poorer than the average district of the state, or when the state money runs out. Although New Hampshire distributes very little state aid for education, the money it does pay out is distributed in this fashion.

5) Weighted Population Formulas

This approach adopts some variation in the gereral model:

$$A_i = WADA_i \cdot \frac{A}{\Sigma WADA_i}$$

where $WADA_i = xADA_j + yADA_k + zADA_\lambda$,

A_i = State aid to the ith district,

$WADA_i$ = Weighted Average Daily Attendance in the ith district,

A = Total state funds available for distribution, and

x,y, and j are weights for different types of students j, k, and λ. Thus, for example, ADA_j might represent ADA for handicapped students who are given a weight of 2.0, ADA_k might represent ADA for disadvantaged students given a weight of 1.5 and ADA_λ might represent ADA for all other students weighted at 1.0. There is no limit to the number of student classifications that can be employed in the procedure. The primary policy decision is the weight to be accorded each classification. The formula is administratively convenient, simple to operate and easily applied to any amount of available money with no changes required in the formula if funding fluctuates.

There are numerous variations on each of these five formulas and each of the five types can be combined with one or more of the others. The actual specification can become quite complex, as will become apparent when we see how these models are employed in vocational education.

B. Characteristics of Formulas Used to Distribute Vocational Education Funds

The remainder of this section examines the common features in procedures used by each state to distribute federal funds for vocational education. No two formulas we have reviewed are exactly identical; however, some share one or more characteristics. Thus, this section develops several taxonomies that enable one to speak generally about funds distribution. The specific procedures adopted by each state are outlined in Section III.

For the most part, our analysis is based on procedures proposed for FY 1979. We use the word "proposed" to recognize that state authorities may have made within-year changes in its formula, possibly in response to comments from BOAE and that we may not have caught all of these changes. Hence, we cannot be absolutely certain that the formula we describe is the one employed by the given state in the given year. In a few states, either no formula was used in FY 1979 or procedures were so ambiguous that analysis was impossible. In these instances, procedures for FY 1980 were examined. For all fifty states, we reviewed Five Year Plans, Annual Plans, and any other documents describing distribution procedures. Additionally, in eighteen states, we followed up these document reviews with telephone calls to state officials for clarification and additional information. These eighteen states were the following:

Alabama	Massachusetts	Pennsylvania
California	Minnesota	South Carolina
Colorado	New Hampshire	South Dakota
Florida	New York	Texas
Illinois	North Carolina	Utah
Kansas	Oklahoma	Washington

Our analysis concentrates on three basic steps of formula design: 1) data selection, 2) transformation of data into standardized scores, and 3) transformation of point scores into dollar allocations or reimbursement rates. In the first step, the state determines which characteristics of the eligible recipients (i.e. school districts, community colleges, vocational-technical schools, etc.) will be used in the formula to determine relative levels of need. The number of students who come from low-income families, the rate of unemployment, and the assessed value of property in the area served by the eligible recipient are examples of some of the characteristics that a state may choose to employ.

In the second step, the raw data that were selected in Step] are converted to standardized scores in order to make them more usable in a formula. This is done because the widely divergent orders of magnitude of the raw data distort their relative levels of importance. For example, the average number of students from low-income families in a school district may be 10 times the size of the average rate of unemployment in a school district, (say, 100 students from low-income families vs. a 10% unemployment rate); but this does not mean that the number of students from low-income families should count 10 times as heavily as the unemployment rate in determining an eligible recipient's level of need for funding. Therefore, it is necessary to convert all characteristic measurements to a uniform point scale. For example, each eligible recipient might receive a score of between] and]0 points based on its unemployment rate and a score of between 1 and 10 points based on its number of students from low-income families.

1) Data Selection

Although the 1976 Amendments specify a number of criteria that are to influence the distribution of funds, the legislation does not describe what measures states are to use to implement these criteria. Regulations provide some directions; for example, states are instructed to use wealth per capita to measure relative financial ability. For the most part, however, states have enjoyed wide latitude in defining the variables they employ in distribution formulas. The Variable List at the beginning of Section IV defines several dozen measures often found in formulas. The descriptions of individual state's procedures include a number of additional measures that, in their details, are unique to the particular state under discussion.

The wide variety of measures employed makes taxonomy of variables rather uninformative. Rather, we have sought to determine what factors are included in each state's distribution formula. In some cases, a state may use only one variable to measure a particular factor; in other cases, a state may use several variables to build a composite score that is entered into the formula,

Table II-1
Criteria Proposed in Formulas Distributions
Section 120 Funds to Eligible
Recipients FY 1979

	Assessed Value Per Capita	Assessed Value Per ADA	Local Tax Effort	Income Factor	Employ. Factor	New Programs	Cost Factor	Depressed Area
Alabama			X	X	X	X		X
Alaska				X	X			
Arkansas				X	X			
Arizona		X		X		X		X
California		X		X	X			
Colorado		X		X	X		X*	X
Connecticut	X			X	X			
Delaware		X						
Florida	X			X	X			
Georgia				X				
Hawaii	SINGLE DISTRICT							
Idaho		X		X			X	
Illinois		X		X		X		
Indiana		X		X	X		X*	X
Iowa		X		X				
Kansas		X		X	X	X		
Kentucky		X		X	X		X	
Louisiana		X		X				
Maine		X		X				
Maryland		X		X				
Massachusetts		X		X	X			
Michigan	X		X	X				
Minnesota		X		X	X		X	
Mississippi			X	X	X		X	

	Assessed Value Per Capita	Assessed Value Per ADA	Local Tax Effort	Income Factor	Employ. Factor	New Programs	Cost Factor	Depressed Area
Missouri			X	X	X			
Montana		X	X	X			X	
Nebraska	X			X	X	X		
Nevada	X			X				
New Hampshire		X		X				
New Jersey				X	X			
New Mexico				X				
New York	X			X	X			
North Carolina	X	X		X	X			X
North Dakota		X		X		X	X	
Ohio		X		X	X			
Oklahoma		X	X	X	X		X	
Oregon		X		X	X			
Pennsylvania		X		X	X			X
Rhode Island		X		X	X		X	
South Carolina		X	X	X	X			
South Dakota		X	X	X				
Tennessee		X		X	X			
Texas		X						
Utah				X				
Vermont		X		X	X			
Virginia		X		X			X	
Washington	X		X	X	X	X		
West Virginia		X		X				
Wisconsin		X		X	X		X	X
Wyoming		X		X	X		X	
TOTALS	8	34	8	47	29	7	13	8

or it may enter several measures of general criterion directly into the formula. For example, one state may measure concentration of low-income families with a single measure of the number of families below the poverty level in each LEA; another state might employ three low-income measures -- a count of families below poverty, a count of children receiving AFDC, and a count of children eligible for free school lunches.

Table II-1 summarizes the types of factors each state uses in its distribution formula. The reader may refer to the descriptions of each state's procedures in Section III to determine how each state actually measures a particular factor. We have considered a state to employ a particular factor only where we are able to determine that it explicitly included the factor in its distribution procedures. In some instances, the descriptions of these procedures were too vague to discern whether a particular criterion was actually employed.

The first three columns of Table II-1 identify three types of measures typically used as relative financial ability factors. VEA Regulations specify that states may measure relative financial ability using either local property wealth per capita or per capita local tax revenue as a percentage of local per capita income. As was noted in Section I, many states are unable to determine the resident populations of local school districts. Hence, they have substituted property wealth per student as a measure of relative financial ability. Most states employing a wealth per student measure use average daily attendance (ADA) in the denominator, but some use average daily membership (ADM), and some use enrollment (E). In FY 1979, 34 states used wealth per student as a measure of relative financial ability; eight used wealth per capita; and eight used local tax effort (of which six also used either wealth per capita or per student). In two states that used wealth measures, we were unable to determine which of the two measures--per capita or per student--was employed. As best we could determine, four states used no measure of relative financial ability at all.

Only three states did not propose some sort of income factor, although the actual measures varied widely. Similarly, 29 states used a variety of measures as an employment factor including local unemployment rates, labor market projections, youth unemployment rates, and drop-out rates.

Perhaps reflecting the difficulty of quantifying a sensible "new program" factor, only seven states included this criterion in their distribution procedures. Moreover, among those claiming to use this factor, definitions were often vague, as were explanations of how the measure actually affected distributions of funds.

Thirteen states incorporated some measure of relative costs. For some states, this is simply a measure of differences in expenditures per student. A few employ more sophisticated measures of relative costs by program or type of student served.

Finally, eight states proposed a separate factor designating some eligible recipients as located in an economically depressed area. In every instance, these states also included other income and employment factors. As best we could determine, only three states did not use at least one measure related to designating an eligible recipient as located in an economically depressed area.

As has been noted previously, there is usually more than one way to measure any of these factors, and the number of options available to states raises a potentially serious problem. Where more than one measure is available, the choice of one measure over another is likely to favor a particular population or type of eligible recipient. For example, as a measure of relative financial ability, assessed value per student may have the effect of making inner-city schools look less needy than if assessed value per capita is used. In this case, the choice of the one method over the other implicitly carries with it a preference for helping schools outside large urban districts.

A similar problem exists with two possible methods of counting the number of students an eligible recipient serves. One measure, called FTE enrollment, is a count of the number of full-time equivalent students who are officially enrolled with a particular eligible recipient. Average Daily Attendance, or ADA, on the other hand, is a measure of average number of students who actually attend each day. An eligible recipient's ADA will, of course, be lower than its FTE enrollment if there is any absenteeism at all, and the more absenteeism a school has, the lower its ADA will be. It is often said that inner-city schools have a higher rate of absenteeism than suburban schools, meaning that inner-city schools would tend to look less needy if ADA is used in the denominator of measure of relative financial ability than if FTE enrollment is used instead.

If School S, a suburban school, has the same FTE enrollment as does School I, an inner-city school, and if School S also has a lower rate of absenteeism than does School I, then School S will have a higher ADA than School I. If the distribution of funds is based partly upon each school's number of students as reflected by its ADA, then School S with its high ADA will receive more money than School I, other things being equal. That is, even though both schools have the same FTE enrollment, the suburban school will receive more dollars per FTE enrolled student than the inner-city school if ADA is used to measure Level of Need. Selecting ADA as a measure of Level of Need is then a way to favor suburban schools over inner-city schools.

Where there are two or more possible methods of measuring a particular factor included in the formulas where each of these methods will tend to favor different groups of eligible recipients, and where it can be shown that any one of these methods is objectively proper, the choice of a particular method over the others implicitly carries with it an intention to favor one group of eligible recipients over others. We emphasize this point because it shows the objectivity of a formula as a method of distributing funds can sometimes be illusory. A formula may appear objective because it seems to eliminate the possibility of arbitrary funding decisions on the part of state officials, but several subjective and often arbitrary decisions (such as whether to use ADA or FTE enrollments) are almost always part of formula construction.

Thus, the specificity with which states explain the methods that they use to measure general characteristics takes on great importance. This has been especially evident in analyzing states that purport to measure program quality in their formulas. If a state is not explicit about the precise manner in which it measure program quality, then there is no way of knowing whether its decisions about program quality are arbitrary or biased. Where a state is extremely vague about the way in which it measures particular formula factor, we will say that it is using Malleable Data. The term

"malleable" is used to suggest that we have no way of knowing that the state does not adjust or mold its data set in order to achieve a particular distributional result.

2. TRANSFORMATION OF DATA INTO STANDARDIZED SCORES

States transform raw data into two types of standardized scores, non-continuous and continuous variables. Table II-2 summarizes approaches of each state.

a. Non-Continuous Variables. Twenty-nine states employed non-continuous variables in their distribution procedures. To calculate non-continuous variables, states typically followed one of six methods. Data are converted to whole number point scores only (as opposed to allowing the use of fractions).

(1) UNSPECIFIED METHOD

Here, the state converts all measures to a scale of, say, 10 points, but will not say how it does this. It may be that a well defined mathematical procedure is followed, but it is also possible that someone arbitrarily decides what point score to assign to each eligible recipient. In 10 states, we found no explanations of how these transformations are made.

(2) NON-PROCEDURAL POINT SCALE METHOD

Within this method, point scores are read from tables such as the following, but the procedure by which the scale was developed is not explained. For example, to convert a measure of the percentage of families below poverty level to a five-point scale, a state might use the following table:

Percent of Families Below Poverty Level	Point Score
2 - 5.9	5
6 - 9.9	4
10 - 14.9	3
15 - 19.9	2
20 or more	1

State plans offer no rationale for this particular method of transformation. When state officials are queried, they no longer remember the origins of the table. We found non-procedural point scales in use in 12 states.

(3) PROCEDURAL POINT SCALE METHOD

This is best explained through an example. A state wishes to convert its measurements to 10-point scales, and one of these measurements is unemployment. The highest rate of unemployment observed for any eligible recipient is 15% and the lowest rate is 5%. The following calculation is performed to determine the size of the steps in the scale:

$$\frac{15\% - 5\%}{10 \text{ points}} = 1\% \text{ / point}$$

TABLE II-2

METHODS OF DATA TRANSFORMATION
STATE SUMMARY

The following table indicates the type of data transformation method or methods that each State uses to accomplish Step 2. Some States use a data transformation method that is similar but not identical to one of the methods outlined in Section II(B)(2) of this report. For these States, we have marked the box for that data transformation method that is similar to the one actually used.

States which use more than one data transformation method have more than one box marked.

	NON-CONTINUOUS								CONTINUOUS							
	Unspecified	Non-Procedural Point Scale	Procedural Point Scale	Ranking	Quartile	Standard Deviation	Other Non-Continuous Methods		Proportion of Total	Proportion of Maximum Value	Ratio to Average Value	Standardized Value	Other Continuous Methods	No Formula Used	Does Not Convert Data Into Points	Procedure Too Vaguely Explained To Determine if Continuous or Not
Alabama		x							x				x			
Alaska	x															
Arkansas	x															
Arizona														x		
California									x		x					
Colorado		x														
Connecticut									x				x			

Table continued on next page

TABLE II-2 (cont'd.)

	NON-CONTINUOUS							CONTINUOUS							
	Unspecified	Non-Procedural Point Scale	Procedural Point Scale	Ranking	Quartile	Standard Deviation	Other Non-Continuous Methods	Proportion of Total	Proportion of Maximum Value	Ratio to Average Value	Standardized Value	Other Continuous Methods	No Formula Used	Does Not Convert Data Into Points	Procedure Too Vaguely Explained To Determine if Continuous or Not
Delaware								x		x					
Florida								x	x			x			
Georgia								x				x			
Hawaii													x		
Idaho		x													
Illinois		x													
Indiana					x										
Iowa											x				
Kansas			x												
Kentucky								x		x					
Louisiana	x														
Maine		x													x

Table continued on next page

TABLE II-2 (cont'd.)

	NON-CONTINUOUS								CONTINUOUS							
	Unspecified	Non-Procedural Point Scale	Procedural Point Scale	Ranking	Quartile	Standard Deviation	Other Non-Continuous Methods		Proportion of Total	Proportion of Maximum Value	Ratio to Average Value	Standardized Value	Other Continuous Methods	No Formula Used	Does Not Convert Data Into Points	Procedure Too Vaguely Explained To Determine if Continuous or Not
Maryland						x										
Massachusetts							x			x						
Michigan			x													
Minnesota	x	x														
Mississippi												x				
Missouri												x				
Montana		x														
Nebraska		x	x													
Nevada									x		x					
New Hampshire	x	-	x													
New Jersey	x										x					

Table continued on next page

TABLE II-2 (cont'd.)

	NON-CONTINUOUS								CONTINUOUS								
	Unspecified	Non-Procedural Point Scale	Procedural Point Scale	Ranking	Quartile	Standard Deviation	Other Non-Continuous Methods		Proportion of Total	Proportion of Maximum Value	Ratio to Average Value	Standardized Value	Other Continuous Methods	No Formula Used	Does Not Convert Data Into Points	Procedure Too Vaguely Explained To Determine if Continuous or Not
New Mexico	x															
New York									x		x					
North Carolina															x	
North Dakota											x					
Ohio				x												
Oklahoma		x	x													
Oregon									x		x					
Pennsylvania						x									x	
Rhode Island	x															
South Carolina									x							
South Dakota		x														
Tennessee		x														

Table continued on next page

TABLE II-2 (cont'd.)

	NON-CONTINUOUS							CONTINUOUS							
	Unspecified	Non-Procedural Point Scale	Procedural Point Scale	Ranking	Quartile	Standard Deviation	Other Non-Continubus Methods	Proportion of Total	Proportion of Maximum Value	Ratio to Average Value	Standardized Value	Other Continuous Methods	No Formula Used	Does Not Convert Data Into Points	Procedure Too Vaguely Explained To Determine if Continuous or Not
Texas														x	
Utah								x				x			
Vermont										x					
Virginia	x														
Washington			x					x		x					
West Virginia								x		x					
Wisconsin	x														
Wyoming		x	x												
TOTALS	10	12	7	1	1	2	1	14	2	11	3	5	2	4	1

The following scale results:

Unemployment Rate	Point Score
15%	10
14%	9
13%	8
12%	7
11%	6
10%	5
9%	4
8%	3
7%	2
6%	1
5%	0

Although this is an improvement over the first two methods, it is severely distorted by extreme values. For example, suppose that in the above, only one district had an unemployment rate of 15 percent and that all others had rates of 10 percent or less. Half the scale would then be determined by the value existing for one district. We found seven states using procedural point scales.

(4) RANKING METHOD

Using this procedure, one state ranked eligible recipients from highest to lowest on some raw score. For example, if there are 100 eligible recipients in the state, the district with the highest percentage of low income families (either as a percentage of the district or a percentage of the state total) receives a score of 100; the district with the lowest percentage receives a score of 1. The primary defect of this method is that if the actual rank--i.e., 100, 76, 44, 3, etc.--is used in a formula, it bears no relation to the raw data. Thus, in our example just cited, the highest ranked recipient receives a score 100 times the lowest, although the actual value of the recipients raw score might be only twice the lowest, or any other ratio. Ranking is a sensible method only for establishing cut-off points or for levelling up. Employing a ranking as an operational value is inappropriate and mathematical nonsense.

(5) QUARTILE METHOD

One state used this variant of the ranking method. Recipients are first ranked from highest to lowest and then divided into quartiles (or some other subdivision--quintiles, deciles, etc.). Recipients in the highest quartile are all given scores of 4, recipients in the lowest scores of 1. This procedure suffers from the same defects as the more general ranking method. Additionally, it ignores possibly important differences among recipients in each quartile.

(6) STANDARD DEVIATION METHOD

To assign points based on districts' numbers of low income families, this method finds the mean number of low income families per district (M) and the standard deviation of this figure (SD). Points are then assigned by the following scale:

No. of Low Income Families	Point Score
(M + 4SD) to (M + 5SD)	10
(M + 3SD) to (M + 4SD)	9
(M + 2SD) to (M + 3SD)	8
(M + SD) to (M + 2SD)	7
(M) to (M + SD)	6
(M - SD) to (M)	5
(M - 2SD) to (M - SD)	4
(M - 3SD) to (M - 2SD)	3
(M - 4SD) to (M - 3SD)	2
(M - 5SD) to (M - 4SD)	1

Deceptively precise, this method depends critically on the distribution of values around the mean and the relationship of the point score to the standard deviation. Thus, if the raw scores are normally distributed, approximately two-thirds of all recipients will have scores between 5 and 6 in the table illustrated above; fewer than 4 out of 100 would be likely to have scores of more than 7 or less than 4. Two states employed this approach.

None of these non-continuous methods constitutes an appropriate approach to transforming raw data. In addition to the defects already mentioned, all suffer from a common shortcoming. With non-continuous methods, a small change in a characteristic of an eligible recipient can sometimes mean a change of one whole point in its score, while other times a relatively large change in that characteristic will yield no change in the score and, therefore, no change in funding level. This practice lacks precision and can produce arbitrary results. The following example illustrates this point.

Table II-3

Percent of Families Below Poverty Level	Point Score
2.0 - 5.9	5
6.0 - 9.9	4
10.0 - 14.9	3
15.0 - 19.9	2
20.0 or more	1

According to Table II-3, if 5.9% of eligible recipient A's families, and 6.0% of eligible recipient B's families, and 6.1% of eligible recipient C's families are below poverty level, then A, B, and C receive 5, 4, and 4 points respectively. A difference of 0.1% between A and B gives A one whole extra point, a result that is likely to have a noticeable effect on their relative allocations of funds. On the other hand, the same 0.1% difference between B and C will not have the effect of giving B a funding advantage over C. This is arbitrary. In one case, a difference in the concentration of low income families will have an effect on relative funding levels, and in another case, the same difference will have no effect whatsoever.

This type of method creates the possibility that a state can manipulate the table to favor certain eligible recipients over others. For example, suppose that B and C are eligible recipients which have characteristics which are basically very similar except for a slight difference in their concentrations of low income families (0.1%) as indicated above. Now, if B is favored over C for political reasons, the state may wish to increase B's allocation without increasing C's. This could be done with a slight adjustment of the table so that instead of 5.9% being the cutoff, now eligible recipients with low income family concentrations of up to 6.0% would receive 5 points. This adjustment is just sufficient to give B an extra point without giving one to C. This type of manipulation is possible whenever a state uses the Non-Procedural Point Scale Method.

Because non-continuous methods contain several technical defects and because they are easily subject to manipulation, we conclude that such methods are inappropriate for transforming data that influence the distribution of funds.

b. Continuous Methods. As summarized in Table II-2, twenty-one states employ one or more of four continuous methods of data transformation.

(1) PROPORTION OF TOTAL METHOD

The simplest of the four continuous approaches, this method expresses each variable as a percentage. The critical issue is the definition of the denominator. For example, if the variable being transformed is the number of low-income families, this may be expressed either as a percentage of all families in the district or as a percentage of the total number of low-income families in the state. The first calculation measures relative concentration within districts, while the second measures relative concentration within the state. As was noted above in Section I.B.4, BOAE generally prefers the first approach, despite its tendency to direct resources to small districts and to bypass large numbers of target populations. Fourteen states use this method.

(2) PROPORTION OF MAXIMUM VALUE METHOD

This method expresses each recipient's value as a percentage of the highest value for all recipients. For example,

$$\text{Low income score}_d = \frac{\text{No. of low income families in district}_d}{\text{Highest no. of low income families observed in any district}} \qquad (4)$$

The method is equivalent to using the proportion of total method above, when the state total is used in the denominator. Mathematically, it is equivalent to assigning the highest score in the percentage of state total method a value of 1.0 and adjusting other values accordingly. For example,

	Raw Data	Proportion of Maximum Value	Proportion of State Total
A	2,000	1.0	40%
B	1,000	.5	20%
C	500	.25	10%
D	100	.05	2%
E	1,500	.75	30%
F	900	.45	18%
	5,000		

The relative values are unchanged. Recipient A's score is twice B's and four times C's regardless of which method is used. Two states employ this method.

(3) RATIO TO AVERAGE VALUE METHOD

The eleven states using this approach computed a recipient's score as the ratio of the recipient's value to the average value for the state. For example,

(a) Points assigned to eligible recipient d based on number of low income families $= \frac{\%\text{ of d's families that are low income}}{\%\text{ of state's families that are low income (i.e., average \%)}}$ (5)

or

(b) Points assigned to eligible recipient d based on assessed value of property $= \frac{\text{state average assessed value of property per capita}}{\text{assessed value of property per capita in district d}}$ (6)

Both of the above examples are constructed so that the number of points assigned to an eligible recipient varies directly with need (i.e., the greater the need, the greater the number of points assigned). Since a high concentration of low income families is indicative of high need, Example (a) is constructed to assign points in direct proportion to that figure by placing it in the numerator. Since a high assessed value of property per capita indicate low need, Example (b) is constructed to assign points in inverse proportion to that figure by placing it in the denominator. In employing the Ratio to Average Value Method for a particular measure, one chooses the structure of either Example (a) or Example (b) depending on whether the value of that measure varies directly or inversely with need. Also note that where the score is a ratio of

percentages, it is equivalent to the proportion of state total and proportion of maximum value methods.

(4) STANDARDIZED VALUE METHOD

Three states used a method that creates a standardized variable with a mean k and a standard deviation of 1, as illustrated in the following example:

$$\text{Points assigned to district d based on no. of low income families} = \frac{\text{no. of low income families in district d} - M}{SD} + k$$

The constant k is set such that k exceeds the value of the smallest observation minus the mean, the result divided by the standard deviation. This insures that no score will equal zero. Because of the need to employ a constant, this method is difficult to use for standardizing variables that have widely varying distributions; k will be larger for variables with very small or negative values.

All four continuous methods of data transformation avoid the major defects of non-continuous methods, and any single method will produce standardized measures of several variables. However, caution must be exercised not to mix methods for different variables that will be used in the same equation.

3. TRANSFORMING STANDARDIZED SCORES INTO DOLLAR ALLOCATIONS OR REIMBURSEMENT RATES

States employ three general methods for converting the scores computed in step two above into dollar allocations or rates of reimbursement: 1) a tabular method, 2) a reimbursement rate equation, and 3) a weighted points method. Table II-4 summarizes the distribution of these three approaches among the fifty states. In reviewing these three approaches to distributing funds, it is useful to keep in mind the two basic purposes of an explicit allocation procedure: 1) to treat eligible recipients similarly insofar as their needs are similar, and 2) to treat them in a way that is appropriately different insofar as their needs differ. Assuming a formula employs one of the continuous methods of data transformation on factors defining needs, the first purpose will be fulfilled. That is, the formula will treat similarly eligible recipients whose needs are similar. However, there is no reason to believe that formulas employing these methods will succeed in fulfilling the second purpose of treating eligible recipients whose needs are different in a way that is appropriately different. The formula itself cannot determine how many more dollars are needed by a more needy recipient in order to provide a vocational education program that is as effective as one provided by a less needy recipient. These parameters must be set outside the formula, and it is often difficult to determine how these decisions were made.

TABLE II-4

METHODS OF FUNDS DISTRIBUTION
STATE SUMMARY

The following table indicates the type of method or methods that each State uses in Step 3 to transform point scores into dollar allocations or reimbursement rates. Some States use a method that is similar, but not identical, to one of the methods outlined in Section II(B)(3) of this report.

	Tabular Method	Reimbursement Rate Equation Method	Weighted Points Method	Other Type of Formula Used	Unclear Whether a Formula is Used	No Formula Used
Alabama		x	x			
Alaska					x	
Arkansas		x				
Arizona						x
California			x			
Colorado		x				
Connecticut			x			
Delaware			x			
Florida				x		
Georgia			x			
Hawaii						x
Idaho		x				
Illinois				x		

Table continued on next page

TABLE II-4 (cont'd.)

	Tabular Method	Reimbursement Rate Equation Method	Weighted Points Method	Other Type of Formula Used	Unclear Whether a Formula is Used	No Formula Used
Indiana			x			
Iowa	x					
Kansas			x			
Kentucky			x			
Louisiana			x			
Maine			x			
Maryland			x			
Massachusetts			x	x		
Michigan	x					
Minnesota			x			
Mississippi		x				
Missouri			x			
Montana	x					
Nebraska		x				
Nevada			x			
New Hampshire			x			
New Jersey			x			
New Mexico			x			

Table continued on next page

TABLE II-4 (cont'd.)

	Tabular Method	Reimbursement Rate Equation Method	Weighted Points Method	Other Type of Formula Used	Unclear Whether a Formula is Used	No Formula Used
New York*			x			
North Carolina					x	
North Dakota	x					
Ohio	x					
Oklahoma	x					
Oregon			x			
Pennsylvania*	x					
Rhode Island			x			
South Carolina			x			
South Dakota			x			
Tennessee	x					
Texas						x
Utah			x			
Vermont			x			
Virginia	x					
Washington			x			
West Virginia			x			
Wisconsin	x					
Wyoming	x					
TOTAL	11	6	27	3	2	4

*The State's formula distributes funds to large planning regions, each of which contains many LEAs. The planning regions do not use a formula in distributing funds among LEAs.

Even when a formula gives money to a more needy eligible recipient at a higher rate than it is given to a less needy eligible recipient (and it is not certain that this will always happen), it is not clear that the amount of extra money it receives is commensurate with the amount of extra money that it needs in order to run an effective vocational education program. Though such a formula does treat differently eligible recipients whose needs are different, it is possible that the degree to which this is done is not appropriate to the degree of difference in their needs.

(1) TABULAR METHOD

The most poorly documented of all four approaches, this method used by eleven states (see Table II-4) consists of a printed table listing the reimbursement rate or amount per student an eligible recipient may receive for the total number of points computed when data are transformed using one of the methods described previously. Typically, no explanation of the derivation of the table is included in the State Plan, and telephone conversations with various state personnel usually did not produce much additional clarification. Although a more needy recipient generally receives a higher reimbursement rate or dollar allocation than a less needy one, as far as we know, this differential is set arbitrarily. It cannot be assumed that a clear rationale underlies the distribution. Therefore, we conclude that the Tabular Method is not an acceptable procedure unless it is accompanied by a clear explanation of how it was derived and of the thinking that led to this particular outcome.

(2) REIMBURSEMENT RATE EQUATION

This approach was used in six states and calculates a percentage of the recipients' costs that will be reimbursed by the state. It is a variant of the percentage equalizing model discussed at the outset of Section II. For most vocational education funds, the equation assumes the general form:

$$R_d = wA_d + yB_d + zC_d \qquad (8)$$

where R_d = the rate of reimbursement for recipient d,
A_d, B_d, and C_d are scores earned by recipient d for different measures of need (e.g., fiscal ability, concentration of low-income families, unemployment rate), and w, y, and z are constants set to weight each variable and control the statewide average rate of reimbursement.

The reimbursement method suffers from a major defect. Although a more needy recipient earns a higher rate than a less needy recipient, the more needy recipient does not necessarily receive more federal dollars than the less needy one, even if both apply the same tax effort. For example, suppose that a poor eligible recipient is assigned a reimbursement rate of 50% and a wealthy eligible recipient is assigned a reimbursement rate of 25%, that their general and student populations are exactly the same size, and that when they both apply the same reasonable level of tax effort (i.e., the same mill rate),

the poor eligible recipient is able to raise $1000, and the wealthy eligible recipient is able to take in $6000. If the poor eligible recipient spends its $1000, it will be matched by $1000 in federal funds. If the wealthy eligible recipient spends its entire $6000, it will receive $2000 in federal funds. So here, even though the poor eligible recipient appears to have an advantage in that its reimbursement rate is higher than that of the wealthy eligible recipient, in reality, it is at a disadvantage. Even though it applies the same tax effort as the wealthy eligible recipient, the poor eligible recipient actually receives fewer dollars than the wealthy one.

To be equitable, the poor eligible recipient's reimbursement rate would have to be sufficiently higher than that of the wealthy eligible recipient so that if they apply the same local tax effort, the poor eligible recipient will receive enough additional dollars to equalize local, state, and federal dollars for vocational education. If the Reimbursement Rate Equation Method accomplishes this goal in a particular case, it is only by coincidence since this purpose is not built into it.

There is an additional problem with this approach as adopted in the six states using it in 1978-79. Typically, states have narrowly constrained the range of reimbursement rates so that the poorest eligible recipient may be reimbursed at a rate of 52 percent while the wealthiest is reimbursed at a rate of 48 percent. The state may perform elaborate procedures of data collection, transformation, and manipulation to determine which rate applies to a particular recipient; however, the range of differences in rates of remibursement is so narrow that the practical outcome is almost equivalent to a uniform rate for all LEAs. Moreover, combined with the above mentioned problem that wealthy recipients usually raise more local money per student, narrowly restricting the range of reimbursement rates distributes substantially more dollars per student to wealthy LEAs than to poorer ones. Therefore, we conclude that the Reimbursement Rate Equation Method, as presently used by the states, is not an equitable means for distributing federal funds.

(3) WEIGHTED POINTS METHOD

By far the most popular approach to distributing federal funds for vocational education, some variation of the Weighted Points Method (WPM) is used by twenty-seven states. WPM allocates funds based on each recipient's total point score as a proportion of total points earned by all recipients in the state. Thus, the general form is

$$S_d = \text{Total Federal Funds} \times \frac{P_d}{\sum_{\substack{\text{all eligible} \\ \text{recipients } j}} P_j} \qquad (9)$$

where

$d \in j$: $j = 1, 2, \ldots, n$;

n = total no. of eligible recipients;

P_d = sum of weighted points received by d;

P_j = sum of weighted points received by j.

(If this notation is not familiar to the reader, it will suffice to understand that P_d refers to the total weighted points received by d, that $\sum P_j$ refers to the total of all weighted points received by all eligible recipients j.)

There are two variations on this basic form:

Variation 1:

$$S_d = \text{Total Federal Funds} \times \frac{P_d \times \text{Enrollment}_d}{\sum_{\text{all } j} (P_j \times \text{Enrollment}_j)} \qquad (9a)$$

This variation is preferalbe to the one shown in (9) in cases where the values of P do not reflect the relative sizes of the populations served.

Variation 2:

$$S_d = \text{Total Federal Funds} \times \frac{P_d \times \text{Approved Program Costs}_d}{\sum_{\text{all } j} (P_j \times \text{Approved Program Costs}_j)} \qquad (9b)$$

In effect, this variation makes the allocation S_d dependent on some prior determination of what the allocation should be: $^{\text{Approved Program Costs}}_{d}$. Unless Approved Program Costs are determined by a fair formula (and there is usually no reason to assume that they are), then it is doubtful that this variation gives State Officials a variable which they may be free to adjust until they get a distribution of funds that is desired for political reasons even though it is inequitable.

In all three equations -- 9, 9(a), and 9(b) -- P_d is the result of one of the data transformation equations of the general form:

$$P_d = wA_d + yB_d + zC_d \qquad (10)$$

where A, B, and C are scores on different measures of need, and w, y, and z are weights assigned to each score. To better understand how WPM works, it is helpful to rewrite formulas 9(a) and 9(b) in the general form:

$$\text{Dollars allocated to Eligible recipient} = \text{Total Funds Available} \times \frac{aA_d^* + bB_d^* + cC_d^*}{\sum_{\substack{\text{all eligible} \\ \text{recipients}}} (aA_i^* + bB_i^* + cC_i^*)} \qquad (11)$$

Our analysis of WPM will be much easier if we assume that the scores A^*, B^*, and C^* are on a scale between 0 and 1 such that $\sum A^* = \sum B^* = \sum C^* = 1$. By making this assumption, we reach the same conclusion that we would reach if A^*, B^*, and C^* were on a 5 point, 10 point, or any other uniform scale, but we are saved from performing some cumbersome algebra.

Given this assumption, (11) then becomes:

$$\text{Dollars allocated to Eligible Recipient} = \text{Total Funds Available} \times \frac{aA_d^* + bB_d^* + cC_d^*}{a + b + c} \qquad (12)$$

Then we can say that:

$$\text{Dollars allocated to Eligible Recipient d} = \text{Total Funds Available} \times (wA_d^* + yB_d^* + zC_d^*) \qquad (13)$$

where $w = \frac{a}{a + b + c}$

$$y = \frac{b}{a + b + c}$$

$$z = \frac{c}{a + b + c}$$

Notice w, y, and z are between 0 and 1 and that $w + y + z = 1$. (13) can then be converted to still another form:

$$\text{Dollars allocated to Eligible Recipient} = w \times \text{Total Funds Available} \times A_d^* + y \times \text{Total Funds Available} \times B_d^* + z \times \text{Total Funds Available} \times C_d^* \qquad (14)$$

When represented in this form, it is clear that the allocation to each eligible recipient consists of three components. The first component is in the first set of brackets. Here an amount

$$w \times \text{Total Funds Available} \quad (15)$$

has been earmarked for distribution on the basis of each eligible recipient's value of A*. A^*_d is then the proportion of this amount that eligible recipient d will receive. (Since we have assumed that $0 \quad A^*_d \quad 1$ and that $\sum_{\text{all } d} A^*_d = 1.$)

Similarly, an amount

$$y \times \text{Total Funds Available} \quad (16)$$

is distributed in proportion to eligible recipient's values of B*, and

$$z \times \text{Total Funds Available} \quad (17)$$

is distributed in proportion to eligible recipient's values of C*.

To make this clearer, we can say that there are actually three separate distributions of three separate funds defined as follows:

$$\text{"A" fund} = w \times \text{Total Funds Available} \quad (18)$$

$$\text{"B" fund} = y \times \text{Total Funds Available} \quad (19)$$

$$\text{"C" fund} = z \times \text{Total Funds Available} \quad (20)$$

This means that we have three sub-formulas, each of which allocates funds to eligible recipients:

$$\text{Allocation to eligible recipient d from the "A" fund} = \text{"A" Fund} \times A^*_d \quad (21)$$

$$\text{Allocation to eligible recipient d from the "B" fund} = \text{"B" Fund} \times B^*_d \quad (22)$$

$$\text{Allocation to eligible recipient d from the "C" fund} = \text{"C" Fund} \times C^*_d \quad (23)$$

The propriety of a state's use of WPM then depends on the propriety of each of the sub-formulas, which in turn depends on the propriety of the way in which the relevant score (A*, B*, or C*) is defined. Scoring procedures, therefore, play a critical role in WPM and deserve more elaborate discussion.

a. Proper Scoring Procedures. In selecting particular measures for each formula factor (A, B, C, etc. above), states to a great extent have adopted whatever data happen to be readily available. Although economical, this practice may seriously undermine efforts to target funds to specific populations and to monitor the effectiveness of targeting efforts. To illustrate the problem, consider the way a number of states use an unemployment factor in their formulas. Typically, some variation of the following is included:

$$U_d^* = \frac{\text{number of unemployed persons in eligible recipient d's district}}{\text{number of unemployed persons in State}} \quad (24)$$

This score is based on the total number of unemployed persons residing in an eligible recipient's district without regard to whether these unemployed persons are enrolled in or even given the opportunity to enroll in vocational education courses. This means that two eligible recipients with the same number of unemployed persons residing in their districts will receive the same number of dollars even if one of them offers extensive vocational education retraining programs for unemployed persons while the other offers none, other things being equal. Using this measure provides no incentive to recipients to actually enroll unemployed persons in vocational education.

An alternative definition for U* would be:

$$U_d^* = \frac{\text{number of unemployed adults who have enrolled for retraining with eligible recipient d}}{\text{number of unemployed adults who have enrolled for retraining in entire State}} \quad (25)$$

If this definition were used, funds would be distributed on the basis of the number of unemployed persons that eligible recipients are actually retraining. Since their allocation would be dependent on the number of these persons that they enroll, eligible recipients would have an incentive to seek these people out and perhaps establish special programs to serve them.

A similar problem arises when states include measures of relative financial ability that either do not reflect or are not adjusted for differences in number of students served. Thus, in some states when the formula is mathematically manipulated to isolate the sub-formula for ability to pay, the result resembles the following:

$$\text{Allocation to eligible recipient d from the "Ability to Pay" fund} = \text{Ability to Pay Fund} \times AP_d^* \qquad (26)$$

and

$$AP_d^* = \frac{\text{State Average Property Wealth per Student}}{\text{Property Wealth per Student for Eligible Recipient d}} \times K$$

(K is simply a reduction factor defined so that $AP^* = 1$.)

It is logically possible for a small town and a large city to have the same property wealth per capita thereby giving them the same value of AP^*. This means that both the small town and the large city will receive the same number of dollars from the "ability to pay" fund; even though the large city serves many more students than the small town. Several states do not appear to understand that it is not sufficient merely to include enrollment somewhere in the formula. Rather, numbers served must be related to each factor.

In order that the number of dollars per student that is allocated to each eligible recipient be equitable, the score associated with each sub-formula should be proportional to some relevant number of students (such as the number of disadvantaged vocational, handicapped vocational, or regular vocational students) enrolled with each eligible recipient. For example, if A^* is to be a disadvantaged score, it should be proportional to the number of disadvantaged students in each district. One way to define A^* to accomplish this is to say:

$$A_d^* = \frac{\text{number of disadvantaged vocational students served by d}}{\text{number of disadvantaged vocational students in entire State}} \qquad (27)$$

When this score is used, all eligible recipients receive the same number of dollars from the "disadvantaged fund" for each disadvantaged student that they serve.

It should be noted that some measure resembling (27) is necessary even if -- indeed, especially if -- BOAE insists that "relative concentrations" of target populations be measured as a percentage of the population within the area served by an eligible recipient rather than as a percentage of the entire state. BOAE's measure must be adjusted for size of population served; otherwise, it is likely that very small recipients will receive the bulk of setaside funds.

Adjusting scores for numbers of students served may not always be sufficient. Attempts to adjust scores that do not properly belong in the WPM approach can introduce additional difficulties. This problem is best illustrated by the treatment of relative financial ability.

b. Adjusting for Relative Financial Ability. Most states using WPM include a measure of relative financial ability in the calculation of points. As a typical example, suppose that a state establishes the "B" fund for general use on all types of students and seeks to distribute funds with regard to relative financial ability. The general procedure is some variation of the following:

$$B_d^* = \frac{\text{total number of students served by d}}{\text{total number of students in State}} \times \frac{\text{Property wealth per capita for entire State}}{\text{Property wealth per capita for eligible recipient d}} \qquad (28)$$

To evaluate this method of adjusting for ability to pay, consider two hypothetical eligible recipients, G and H, which are identical in every way including the number of students they serve, except that the value of property wealth per capita is twice as great for G as it is for H (i.e., G is "poorer" than H). The formula then allocates twice as much money to G as it does to H. Since H can raise twice as much money as G if they both apply the same tax effort (that is, if they both tax property at the same mill rate), G is given twice as much federal support as H. Now, it may appear that the purpose for doing this is to raise the financial standing of the poorer eligible recipient (G) up to the level of the wealthier eligible recipient (H), but it is not at all certain that G will actually receive sufficient funds to achieve this result. This can be demonstrated with some hypothetical figures.

First, we consider a case in which the result after distributing the federal money is that the poorer eligible recipient (G) is still worse off than the wealthier eligible recipient (H). Suppose that formula (28) results in G receiving $1000 per student and H receiving $500 per student. This is in keeping with the assumption that H's ability to pay is twice that of G. Suppose also that G and H both apply the same tax effort by using a "reasonable" mill rate, Mill Rate X, in order to raise revenue for vocational education. Finally, suppose that when apllying Mill Rate X, eligible recipient G raises $1000 per student and H takes in $2000 per student. Then the total amounts of federal and local funds that G and H have are, respectively, $2000 per student and $2500 per student. G, the poorer eligible recipient, has fewer total dollars per student than does H. To adjust this situation so that G and H are both left with the same number of dollars per student, we would have to take $250 per student away from H and give it to G, thereby leaving each with a total of $2250 per student in federal and local funds. The formula, however, does not do this.

Similarly, it is possible that a formula of this structure could distribute money such that a relatively poor eligible recipient is not just brought up to equity with other more wealthy eligible recipients but is actually put in a superior position.

Consider the positions in the above example, but with one small change: the assessed value of property for both G and H is now 1/4 of what it was before. This means that when they tax using the "reasonable" mill rate, they student, and H will raise only $500 per student in local funds. If, just as

before, the formula gives G $1000 per student and H $500 per student in federal funds, G will have a total of $1250 per student in federal and local funds while H has a total of only $750 per student. The formula has not reversed the relative situations of G and H so that G is now better off than H.

This is just as inequitable as the result of the other example in which G remains worse off than H. Remember that G and H are serving communities that are identical in every way except that their abilities to pay differ. They have the same number of low-income persons, so there is no reason to think that one has greater need than the others in this sense. In view of this, it is no more fair to leave G better off than H than it is to leave H better off than G.

This method of adjusting for relative financial ability is then arbitrary. It might equalize ability to pay, but it could also leave the poor eligible recipients worse off than the wealthy ones or leave the wealthy eligible recipients worse off than the poor ones. Indeed, there exists no equitable way to include relative financial ability in WPM procedures. Consequently, WPM is appropriate only if it is determined that ability to pay need not be considered in the distribution of funds (as in states that have achieved equalization or at the postsecondary level where local funds are not involved).

C. Selecting Weighting Coefficients. Once appropriate factors have been identified and properly scored, there remains the problem of how to weight each factor score. Recalling equation (10), assume that A*, B*, and C* are defined as follows:

$$A_d^* = \frac{\text{Number of regular vocational students enrolled with d}}{\text{Number of regular vocational students in State}} \quad (29)$$

$$B_d^* = \frac{\text{Number of disadvantaged vocational students enrolled with d}}{\text{Number of disadvnataged vocational students in State}} \quad (30)$$

$$C_d^* = \frac{\text{Number of handicapped vocational students enrolled with d}}{\text{Number of handicapped vocational students enrolled in State}} \quad (31)$$

It will be true that:

$$w \times \text{Total Federal Funds} = \text{Number of dollars available for all regular vocational students in State} \quad (32)$$

$$y \times \text{Total Federal Funds} = \text{Number of dollars available for all disadvantaged vocational students in State} \quad (33)$$

$$z \times \text{Total Federal Funds} = \text{Number of dollars available for all handicapped vocational students in State} \quad (34)$$

It will also be true that:

$$\frac{w \times \text{Total Federal Funds}}{\text{Number of regular vocational students in State}} = \text{Number of dollars allocated for each regular vocational student} \quad (35)$$

$$\frac{y \times \text{Total Federal Funds}}{\text{Number of disadvantaged vocational students in State}} = \text{Number of dollars allocated for each disadvantaged vocational student} \quad (36)$$

$$\frac{z \times \text{Total Funds}}{\text{Number of handicapped vocational students in State}} = \text{Number of dollars allocated for each handicapped vocational student} \quad (37)$$

Consequently, the values of the weighting coefficients w, y, and z determine the number of dollars that will be allocated for each type of student. When it is asked then what the appropriate values of w, y, and z are, it is equivalent to asking what number of dollars per student should be allocated for each type of student.

This is a matter that cannot be settled easily, because while it is clear that more dollars per student should be allocated for disadvantaged and handicapped students than for regular students, it is not clear how many extra dollars should be spent on these needy students. Ideally, one might say that the appropriate weight depends on how much more it costs to bring disadvantaged and handicapped students to a specified level of vocational ability than it does to bring regular students to that same level of ability. In practice, however, it is not so simple. Though the number of dollars spent will undoubtedly have an impact on level of vocational ability attained by students, it is not the only factor that will affect the levels of ability attained. For instance, individual characteristics of students will also be an important determinant of the levels of ability achieved. Among the disadvantaged, some students will be more highly motivated than others. Additionally, the ability of teachers, the degree to which they succeed in motivating their students, and the usefulness of the skills taught will also affect the levels of vocational ability attained.

Because of such factors, there is no unique level of vocational ability that a given type of student will attain given the number of dollars spent on his education. This makes it impossible to say precisely how many more dollars need to be spent on handicapped and disadvantaged students than on regular students in order that they all attain the same level of vocational ability. However, while it is not possible to make a precise determination of this type, some sort of estimate should be possible. That is, in spite of the fact that each student may have different funding needs, it is probably true that the average level of need for handicapped and disadvantaged students is

higher than that of regular students and that we can find some number of extra dollars that can be spent on these more needy students which will, on average, bring them to the same level of vocational ability as regular students.

This can be done using the WPM where w, y, and z are defined as follows:

$$w = \frac{R}{R + dD + hH} \quad (38)$$

$$y = \frac{dD}{R + dD + hH} \quad (39)$$

$$z = \frac{hH}{R + dD + hH} \quad (40)$$

where R = number of regualar vocational students

D = number of disadvantaged vocational students

H = number of handicapped vocational students

$d = \frac{\text{average cost of educating disadvantaged vocational student}}{\text{average cost of educating regular vocational student}}$

$h = \frac{\text{average cost of educating handicapped vocational student}}{\text{average cost of educating regular vocational student}}$

Using this approach to determine the values of the coefficients w, y, and z provides that, on the average, students with special needs will receive extra funds in proportion to the degree to which they impose excess costs on their institutions. The approach offers a rational means for justifying the weight assigned to different factors.

It is not evident that states presently using WPM have actually employed this type of method for determining weights. In fact, we have found no evidence that any state has a procedural method of setting these coefficients. Several state officials told us that they merely adjust the coefficients until they obtain a formula that distributes funds the way they want them distributed. We suspect that this practice is widespread.

SUMMARY

As will become apparent in Section IV, the ways states implement any of these three methods of distributing VEA funds differ greatly in their details. Nevertheless, it is possible to draw some general conclusions regarding the state of formula design as of the close of FY 1979.

A cautionary note: our summary observations are drawn entirely from theoretical analyses of the states' formulas; they are not based on empirical analysis of how much federal money different types of recipients actually got. This latter exercise is now underway in PONVER.

With this stipulation in mind, our conclusions are as follows. First, while some states clearly demonstrated better understanding of the complexities of formula design than others, no state was using a procedure free of technical difficulties, arbitrary judgements, unexplained calculations, questionable interpretations of federal law, or inaccurate and inappropriate data. Among the more serious difficulties are the following:

1. Failure to include explicitly in distribution procedures one or more of those factors such as relative financial ability, concentration of low-income families, location in an economically depressed area, or relative costs which are supposed to influence the allocation of VEA funds.

2. The use of ambiguously defined measures subject to arbitrary and possibly unlawful manipulation.

3. The use of non-continuous measures that fail to make adequate distinctions among recipients, are subject to insidious manipulation, and produce arbitrary results.

4. Failure to standardize scores that have widely varying magnitudes and hence introduce implicit weights into distribution procedures.

5. Insufficient explanations for the derivation of tables, ranges of reimbursement rates, and weights assigned to various factors.

6. The use of elaborate ranking procedures and mathematical manipulations that, despite their complexity, produce distributions that are nearly uniform because of constraints that are imposed externally on the range of permissible differences in allocations per student or rates of reimbursement.

Second, none of the three general models used in FY 1979 is capable of fairly incorporating all the criteria the Congress has specified to determine allocation of funds. Among the three, the Weighted Points Method is by far the superior approach. In addition to requiring explicit consideration of appropriate weights, it offers three attractive features:

1. It can be used to distribute any amount of money, and its parameters need not be changed to adjust to annual fluctuations in available funds. Hence, it is administratively convenient and avoids any long term commitment of a particular level of funding.

2. It provides some money to all eligible recipients. No cut-off need be established, which can be subject to arbitrary judgment and political interference.

3. If properly designed, it links dollars received directly to the number of students served. Thus, it provides a sensible system of incentives. This advantage holds only if states count the actual number of target populations served, as opposed to the number residing in the district.

Nevertheless, WPM as presently implemented suffers from several shortcomings:

1. Adjustments for differences in relative financial ability cannot be incorporated directly in the weighting procedure. Consequently, WPM must be combined with another method of equalizing relative financial ability, or it must be restricted to those situations where relative financial ability has been neutralized and is not a relevant concern.

2. What is administratively convenient for state officials is problematic for local administrators, who are unable to predict future allocations or secure long term commitments or funds.

3. It does not take into account differences in costs among different programs or different districts.

We shall turn to these issues in Section III, where an alternative method is suggested.

III. SOME CONCLUDING OBSERVATIONS ON A MORE EQUITABLE FUNDS DISTRIBUTION PROCEDURE

Ideally, we would want to distribute the VEA money in a way that creates a state of affairs in which all persons have equal access to equally effective vocational education courses for the purpose of enhancing their sets of marketable skills. By "equal success" we mean that there should be no barriers that prevent certain groups of persons from taking vocational education courses. For example, if adults are deprived of vocational education because their district only offers vocational education in daytime high school classes from which adults are prohibited, then this is a denial of equal access.

By "equally effective" we mean two things. First, certain courses teach skills that are of greater value in the job market than those taught by other courses. For example, graduates of a computer programming sequence may be better able to find jobs that pay more than those found by graduates of, say, a program in furniture upholstering. If so, the computer sequence is more "effective" than the upholstering program in helping students to find good jobs, and it will be important to make sure that all have an equal opportunity to take the computer courses, as a matter of fairness. Clearly it would not be desirable for a certain group of students, such as the disadvantaged, to be relegated to relatively ineffective programs, leaving only non-disadvantaged students in the more effective courses.

Second, in order to make vocational education equally effective for all students, courses must be designed to take account of the special needs of some students. Handicapped and disadvantaged students should be provided with the extra attention they need in order to acquire the same skills other students are able to acquire without extra attention. In this way, all students graduating from these programs will have had an equal opportunity to acquire a given level of marketable skills.

In order to achieve this ideal result within a State, at least three basic requirements would need to be met:

1) It would be necessary to make sure that all persons have access to a public institution offering vocational education. That is, no community should be without an institution capable of receiving VEA funds and providing vocational education courses.

2) It would be necessary to distribute in such a way that each institution would have the same total number of federal, state, and local dollars available for each student of each type (regular, handicapped, disadvantaged) that it served, thereby equalizing the abilities of institutions to pay for vocational education.

3) Each institution would have to provide vocational education in such a way that all persons that it serves have equal access to equally effective programs. It is not sufficient for institutions to have equal abilities to pay

for vocational education. They must actually tap this ability and provide the appropriate courses.

We offer the following Suggested Formula as a way of meeting requirement 2. However, in order to insure an equitable distribution of vocational education services, States would also have to follow auditing or accounting procedures that verify that requirements 1 and 3 are being met.

A. A SUGGESTED FORMULA

Every formula that we have observed in this study either implicitly or explicitly performs two basic functions. First, it defines need and ranks (or lists) eligible recipients in descending order of their respective levels of need. Second, it determines how much more money those near the top of this ranking will receive than those at the bottom of the ranking. However, although most states' formulas do perform these two functions, none performs both well. In performing the first function, an unnecessarily rough approximation of need is often used to rank eligible recipients. In performing the second function, most states give more money to those near the top of the ranking than to those at the bottom, but the size of this differential is determined arbitrarily rather than on the basis of some estimate of how many more dollars the poor eligible recipients need than do the wealthy ones. The following formula provides one way to perform both basic functions more effectively.

To address the first function, each eligible recipient's number of Pupil Units--a measure of the number of students served, in which students that impose excess costs are counted more heavily than other students--is determined. Then, eligible recipients are ranked in order of their total numbers of local and state dollars per Pupil Unit which are available for vocational education.

To perform the second function, it is assumed that the goal is to equalize eligible recipients' numbers of dollars per Pupil Unit so that if all eligible recipients used the money efficiently, persons in all parts of the State would have access to an equally effective level of vocational education. No money is given to a relatively wealthy eligible recipient until poorer eligible recipients have been given enough federal money so that they have the same total number of local, state, and federal dollars per student as that of the wealthier eligible recipient. The general procedures consist of five steps:

1.) Determine a Fair Local Contribution.

By requiring that assessed value of property per capita be used as the sole measure of ability to pay, BOAE is implicitly assuming that the value of a community's property is a good indicator of the amount of money that that community can draw upon to finance education. This is a bad assumption. A community's ability to pay for vocational education is dependent on the amount of money it has, and property value is just one of several determinants of that amount. Income and the level of savings and other investments also contribute to persons' abilities to pay education taxes. To determine how much people can afford to pay, we must look at all aspects of their financial lives, not simply the value of their physical property. This is especially important in cases

where communities have similar assessed values of property per capita, but different levels of income, savings, or investments. Two communities may have the same property value per capita, but if the persons in one community have higher incomes or more savings and investments than do the persons in the other community, then the one community is wealthier and has a greater ability to pay than the other.

Ideally then, we would want to base our determination of the number of dollars that a community can afford to raise on some expression of the total wealth and income of all persons and other taxable entities within that community. Realistically, however, it would probably not be possible for a state to collect all of the information necessary to develop such an expression. The amount of money that persons have tied up in bank accounts and investment portfolios is normally confidential, making it unlikely that a state would be able to find the precise net worth of persons with assets of this type. However, even though this type of information is not generally available, information on property value and income is generally available. Since there is reason to believe that an index reflecting a community's property value and income will also tend to be a good indicator of the total net worth of the persons and other taxable entities in that community, we will consider this kind of index adequate for our purposes.

The following is a suggested index of the level of fiscal ability on which a community i can draw:

Discounted Value of Property in Community i	+	Total Annual Wage and Salary income of Community i	(1)

where

Discounted Value of Property in Community i	=	Assessed Value of Property in Community i	x	Average annual rate of return on Property investments

The discounted value of property in community i can be thought of as the amount of annual income that either is or could be generated by renting out community i's property. Some people in community i probably rent out their property and receive what we will call an explicit income from this. That is, these people actually receive cash because they own property. Other people, such as those who live in homes that they own, can be said to receive an implicit income from their property. Even though they do not actually receive cash as a result of their property ownership, they are saved from the expense of renting a home, so that their income is enhanced indirectly by an amount equal to what they would otherwise have to pay to rent equivalent housing.

Suppose a woman owns a house which she could rent out for $500 per month but which she decides to live in instead. We could then say that she is receiving an implicit income of $500 per month as a result of owning her house. Even though she does not actually receive a check for $500 every month, she does

enjoy $500 worth of housing every month. It is just as if she received a check for $500 every month and chose to spend it all on housing rather than putting some aside for an automobile or clothing. Thus, we can say that she receives an implicit income of $500 per month.

Adding the discounted value of property to community income yields a total of the implicit and explicit incomes (from wages, salaries, and property ownership) of persons and other taxable entities in the community. This then serves as an index of the amount of money on which a community can draw in order to fund education. It should not matter that income from savings and investments is not used in this index. As long as it is proportional to the index we would have if income from savings and investments were included, it will serve as a good indicator of communities' relative abilities to pay.

This index can then be used in the following formula to find the amount of local revenue, LR, that each community could reasonably be expected to raise.

$$LR = \frac{\text{Statewide total of locally raised funds spent on Vocational Education last year}}{\text{Discounted Value of all taxable property in state} + \text{Total Wage and Salary Income of entire state}} \quad (2)$$

$$\times \left(\text{Discounted Value of Community i's taxable Property} + \text{Total Wage and Salary Income of Community i} \right)$$

The value

$$\frac{\text{Statewide totaly of locally raised funds spent on vocational education last year}}{\text{Discounted Value of all taxable property in state} + \text{Total Wage and Salary Income entire state}}$$

represents the proportion of the sum of explicit and implicit incomes (from wages, salaries, and property) that each community could reasonably be expected to spend on vocational education.

2.) Determine an Eligible Recipients' Total Pupil Units. Each student is assigned a number of points reflecting the relative costs that his or her education imposes on the eligible recipient. Eligible recipient i's total number of pupil units, TPU, is equal to the number of points assigned to all of its students. This is a variation of WPM discussed in Section II; however, it is limited to weighting student characteristics and excludes characteristics of LEAs.

Suppose there are three relevant "cost groups" of students: "regular," handicapped, and disadvantaged. Suppose also that it costs twice as much to provide vocational education to a handicapped student as it does to do the same for a regular student, and it costs fifty percent more for disadvantaged students than it does for a regular student. The following Pupil Unit system would then be established:

Cost Category of Student	Pupil Units
Regular	1.0
Handicapped	2.0
Disadvantaged	1.5

If this is the system used, the Total Pupil Unit figure for eligible recipient i (TPU_i) would be calculated as follows:

$$TPU_i = \text{No. of regular Voc. Ed. FTE Students at i} \times 1.0 + \text{No. of handicapped Voc. Ed. students at i} \times 2.0 + \text{No. of disadvantaged Voc. Ed. students at i} \times 1.5 \quad (3)$$

Note that this is only an example. In practice, there could be more cost categories, and the number of pupil units assigned to each could be different.

3.) Determine an Eligible Recipient's Ability to Pay. Here, ability to pay, AP_i, will be defined in a way that is different from that used in the formulas discussed earlier. It will be expressed in terms of the number of dollars per Pupil Unit that each eligible recipient could reasonably be expected to spend on vocational education. It will include not simply the amount of local funds that are available to finance vocational education, but also the number of dollars received from the state for this purpose.

The amount of money received from state sources is just as important as the ability to raise revenue from local sources in determining an eligible recipient's relative need.

$$AP_i = \frac{LR_i + SF_i}{TPU_i} \qquad (4)$$

where SF_i = the amount of state funds received by eligible recipient i.*

4.) Priority Ordering. Eligible recipients would be listed in ascending order of their respective values of AP_i. Those which have the most money to spend per student (per Pupil Unit really) will be at the bottom of the list, and those with the least to spend will be at the top.

5.) Levelling up. We will refer to the eligible recipient at the top of the list as "a", the eligible recipient that is second from the top will be called "b", the third "c", and so on.

The process of levelling up begins by giving recipient "a" enough federal funds so that it has as many dollars per Pupil Unit as does recipient "b". Then "a" and "b" are both given enough federal funds so that they each have as many dollars per Pupil Unit as does "c". Then "a", "b", and "c" are each given just enough federal dollars so that they each have as many dollars per Pupil Unit as does eligible recipient "d". This process is continued until funds are exhausted.

* In some states, an eligible recipient can determine its value of SF_i. Each eligible recipient receives a block of funds from the State and decides how much of that block it will use for general education and how much it will use for vocational education, thereby determining its value of SF_i. Under the Suggested Formula, an eligible recipient could increase its allotment of federal funds if it were allowed to shift some of its state money away from vocational education and into general education. This would lower its value of SF_i and make its need appear to be greater. Federal vocational education money would then displace rather than augment state spending for vocational education. To prevent this from occurring, eligible recipients would have to be barred from decreasing the amount of state funds that they devote to vocational education.

B. QUESTIONS ABOUT THE SUGGESTED FORMULA

The following are some questions that might be raised with regard to the Suggested Formula:

1. Since the Suggested Formula does not use any measure of economic depression such as unemployment rates as a factor, does it fulfill the intent of the legislation?

Yes. The Suggested Formula determines the number of dollars per student that each eligible recipient will receive. The total number of dollars allocated to an eligible recipient will depend on the number of students it serves. Insofar as the number of students enrolled in vocational education programs varies with the level of unemployment, the Suggested Formula will provide more money to a high unemployment eligible recipient than to a low unemployment eligible recipient, other things being equal.

In the formulas used by some states, the number of dollars allocated to eligible recipients varies with the level of unemployment, without regard for whether vocational education programs are actually provided for those unemployed persons. In these states, instead of actively recruiting unemployed adults who are in need of retraining, an eligible recipient could spend the extra money it receives because of its high unemployment rate on the adolescents in its secondary level vocational programs. This would be of no benefit to the unemployed adults for whom the money is intended.

However, with the Suggested Formula, it will not be sufficient for eligible recipient to just have an extra high level of unemployment to qualify for a larger allocation. In addition, it must actually enroll extra people in its vocational education programs as a result of that high level of unemployment in order to get extra money. Presumably, the reason for saying that depressed areas should have priority in the distribution of funds is that these areas have more people in need of vocational education than do other areas. But it is reasonable to give extra funds on this basis only if they are used on programs for unemployed persons.

More generally, the Suggested Formula allocates funds on the basis of the characteristics of the students rather than on the basis of the characteristics of the general population. The population of an area served by an eligible recipient can be thought of in three groups: 1) current vocational education students, 2) potential vocational education students, and 3) persons who are neither current nor potential vocational education students.

The number of persons in Group 1 should certainly be considered in determining an eligible recipient's relative level of need since it is fair to assume that these people would be among the actual beneficiaries of federal funding. However, it is not so certain that the number of persons in Group 2 should be considered. Since they are only potential students (e.g., adults who might enroll in a vocational education program if it were

offered to them but who are not currently enrolled), it is reasonable to increase the eligible recipient's allotment of federal money on behalf of these people only if this money is actually used for their benefit. If an eligible recipient receives some extra amount of funds because it has many potential students but then uses some or all of that money on current students, it is not realizing the objective for which those funds were allocated. The number of Group 2 students should then be considered only insofar as they are actually served by the eligible recipient. Finally, it is obvious that the number of Group 3 persons has no bearing on an eligible recipient's level of need and should not be weighed as a factor.

Although an eligible recipient should receive funding on the basis of the characteristics of persons it actually serves, it should also be given an incentive to recruit additional persons who could benefit from vocational education. The Suggested Formula addresses both these aims. By assessing financial need on a per student rather than a per capita basis, funding is based only on the characteristics of the students actually served. However, the more students an eligible recipient serves, the greater its federal allotment will be, giving it an incentive to serve as many students as possible.

For this incentive to operate as powerfully as possible, in performing Step 2, it will be necessary to calculate TPU_i using enrollment data pertaining to the period for which funds are to be used.* It would not be appropriate to determine the federal allotment for this year on the basis of the number of persons who were enrolled last year. To do so would not be in the interest of an eligible recipient which plans to increase its vocational education enrollment for the upcoming year by recruiting among groups such as adults or disadvantaged persons. In determining the distribution of funds for an upcoming school year, the enrollment levels that eligible recipients expect to attain should be used to determine TPU_i. That these expected levels are actually attained should be verified at the end of the year, and adjustments in the levels of funding should be made to correct any discrepancies.

2. If an eligible recipient spends more than the "reasonable" amount of local money on vocational education, is it rewarded with extra federal money?

No. An eligible recipient locally raising an amount that is x dollars more than what could "reasonably" have been raised will simply have x more dollars to spend on vocational education. The federal allotment to that eligible recipient will not be affected. There is an analagous result for an eligible recipient which raises x dollars less than the reasonable amount.

A criticism of this might be that eligible recipients do not have sufficient incentive to apply extra tax effort since their federal allotment is the same regardless of effort applied. If it is felt that the allotment of federal funds should be dependent on actual tax effort applied, a sixth step could be added to the Suggested Formula, as follows:

Step 6. A new federal allotment per Pupil Unit is determined for each recipient of federal funds "j" as follows:

$$\text{New Federal Allotment Per Pupil Unit for eligible recipient j} = \text{Federal allotment per pupil for eligible recipient j (from Step 5)} \times \frac{\text{Actual number of local dollars spent by j}}{LR_j} \quad (5)$$

Note that if $LR_j = 0$, as would be the case for most community colleges, the the allocation to eligible recipient "j" would not be changed.

The federal allotments are adjusted in proportion to the ratio of the actual number of dollars spent by the eligible recipient to the number of dollars that it could "reasonably" have raised (LR_j). If there are not sufficient federal funds to make these New Federal Allotments, then all of the New Federal Allotments would be decreased proportionately until there is just enough federal money to cover them. If there is money left over because many eligible recipients "j" spent less than LR_j on vocational education, then this extra money would be distributed through the levelling up procedure again. However, in view of the fact that there is a maintenance of effort requirement preventing recipients from reducing local effort, it seems unlikely that there would ever be money left over for this reason.

3. In measuring relative abilities to pay, most states do not consider the amount of state money that eligible recipients receive for vocational education. Why does the Suggested Formula consider level of state funding as well as local ability to raise revenue in measuring ability to pay?

In order to get a complete picture of an eligible recipient's ability to pay for vocational education programs, it is necessary to look at the total number of dollars available to it from all sources. To fail to consider the amount of money that is received from the state could result in misallocations of federal funds. For example, if two eligible recipients have just slightly different abilities to pay and are otherwise identical, but one receives state aid while the other does not, it would not be appropriate to treat them as if their financial needs were identical. The eligible recipient which receives state aid should receive no federal money until the other eligible recipient is given enough federal money to eliminate the difference in their total money holdings.

Additionally, it is desirable to consider the distribution of state money in measuring relative abilities to pay because it helps prevent the state from juggling the allocation of state funds in a way that might undermine efforts to increase the abilities of poorer eligible recipients to pay for vocational education. For example, suppose that a State has 13 eligible recipients labeled "a" through "m" as in Step 6 and that it uses the Suggested Formula to distribute the federal money among them. Now compare that distribution of funds to the one that would have occurred if,

before using the Suggested Formula, x State dollars had been taken from "a" and given to "m". The difference in the two distributions is that compared to the first, the second will show a shifting of x federal dollars from "m" to "a", thereby cancelling the effect of the transfer of x State dollars from "a" to "m". Therefore, the total number of local, state, and federal dollars held by each eligible recipient remains unchanged by the shifting of state money from "a" to "m".

4. The Suggested Formula basically distributes funds among eligible recipients in proportion to the number of students that each serves (neglecting for a moment that allocations are also adjusted to account for the number of excess cost students that each serves). Is this fair to rural districts which may experience higher per student costs than urban districts since urban districts have more students and may therefore be able to take advantage of certain economies of scale?

Setting up a machine shop of a given size will cost any district, urban or rual, the same number of dollars. If an urban district making this investment is able to serve 90 students a day by allowing six different groups of fifteen students to use the facility at different times of the day while a rural district making the same investment has only fifteen students who will use the shop each day, then the equipment cost per student for the rural district will be six times that faced by the urban district. Also, the urban district may be able to hire a teacher who specializes in machine shop to teach it all day, whereas the rural district would probably have to hire a machine shop teacher who could take on other teaching or administrative responsibilities, as there are not enough students to occupy a machine shop teacher all day. Since the teacher hired by the rural district would have to have a more diverse set of skills than the urban district teacher, it may be that the rural teacher will be less proficient at teaching machine shop than the urban teacher. To the extent that this is true, the rural district is getting less for its money than the urban district.

The purpose of the above example is to demonstrate that it may be true that urban districts are able to use their teachers and equipment more efficiently than rural districts and therefore face lower costs. Insofar as there are indivisible set-up costs associated with establishing and maintaining vocational education programs, schools with relatively few students (rural districts) will face higher per student costs than districts with relatively many students (urban districts). With the money they save from exploiting these economies of scale, urban districts would then be able to provide a higher level of vocational education. That is, it would be possible for them to offer a wider selection of courses and invest in a wider range of equipment than would be possible if they faced the same cost structure as the rural districts.

If this is seen as inequitable, one way to correct this situation is to give more dollars per student to rural districts than to urban districts in such a way that each rural district will be able to provide the same quality and diversity of vocational education as is available in urban districts. The drawback with this solution, however, is that it would probably be inefficient. In order to achieve this result, it would be necessary to provide rural districts with funding to buy a great deal of

equipment which would probably be left idle for much of the time since there are few students in these districts to employ it. This would be wasteful. It is our conclusion that instead of giving rural districts more dollars per student on the basis of the belief that they are unable to achieve the same economies of scale as the urban districts, rural districts should be encouraged to pool their resources in order that they too will be able to exploit economies of scale. Instead of each rural district having its own machine shop which remains idle most of the time, it would be more cost efficient for rural districts which are near to each other to share a centrally-located machine shop which would be used intensively and whose cost would be shared by the participating districts. Many States already do this. Instead of each district attempting to run its own vocational education programs, an area training center is established to serve two or more districts. These centers, which are normally jointly financed by the districts served, permit rural areas to exploit economies of scale just as the urban districts do.

There are other ways in which urban and rural districts probably face different costs. Rural students generally have to travel farther between home and school than do urban students, thereby making their transportation costs higher. On the other hand, urban districts are generally forced to pay teachers more than rural districts do, either because of the high cost of urban living or the presence of teacher unions in many cities. It may be appropriate to incorporate factors such as these into the formula, however, if this is done it will be important that all factors creating differences in the costs faced by urban and rural districts be used. Clearly it would not be appropriate to adjust the allocations to account for ways in which rural districts' costs are higher than those of urban districts without also adjusting the allocations to account for the ways in which urban districts' costs are higher than those of rural districts.

5. BOAE requires that funds be distributed on the basis of property wealth per capita even in states that have, through their own finance procedures, equalized districts' abilities to pay. Since poor school districts in these states have already been given sufficient state funds to bring them up to par with wealthy districts, it does not seem fair to give those poor districts a further advantage by giving them more federal dollars per student than the wealthy districts. To do so would be to overcompensate the poor districts, thereby putting the wealthy districts at a relative disadvantage. Could this same criticism be made of Suggested Formula I?

No. The ability to pay factor AP_i in Suggested Formula I is defined in a way that takes equalization into account. If a State has enacted true equalization, the same number of dollars per weighted student will be allocated to each eligible recipient, regardless of its relative level of property wealth per capita. Consider the following example.

Relative ability to pay for eligible recipient$_i$ is defined as

$$\frac{LR_i + SF_i}{TPU_i}$$

Suppose that eligible recipients "p" and "w" are identical in size and composition, so that $TPU_p = TPU_w$, but that "p" is poor and "w" is wealthy. We will say that $LR_p = \$100,000$ (meaning that "p" could reasonably be expected to raise \$100,000) and that $LR_w = \$200,000$. Suppose also that $SF_p = \$110,000$ (meaning that "p" is given \$110,000 in state funds) and that $SF_w = \$10,000$. Then

$$LR_p + SF_p = \$210,000$$

$$LR_w + SF_w = \$210,000$$

And since

$$TPU_p + TPU_w, \text{ then}$$

$$\frac{LR_p + SF_p}{TPU_p} = \frac{LR_w + SF_w}{TPU_w}$$

meaning that the abilities of "p" and "w" to pay for vocational education have been equalized because the state has given \$100,000 more to "p" than to "w". Therefore, "p" and "w" are considered to have equal need for federal funds. Under suggested Formula I, "p" and "w" will get the same number of dollars. "p" is not given preference or unfair advantage over "w".

C. SUMMARY

The distribution procedure outlined in this section addresses a number of the issues raised throughout this report. Among its main features are:

1) It relies on data that are readily available in most states. The only variable likely to pose any problem is that measuring wage and salary income, or an adequate proxy. This difficulty will remain regardless of the distribution mechanism employed and underscores the need for developing current income data for LEAs.

2) It requires attention to the relative costs of providing adequate vocational education to different types of students and requires state officials to develop and justify explicit weights for different target populations.

3) It provides a comprehensive measure of relative financial ability that adjusts for the lack of a direct correspondence between property wealth and income.

4) It offers an objective, easily administered decision rule for distributing funds: all funds will be used to bring the poorest to the level of the second poorest, the first and second to the level of the third, and so forth until funds are exhausted.

5) It makes receipt of funds dependent on the number of students served, thus providing incentives to increase enrollments of target populations.

6) It permits introducing differences in costs among different vocational education programs and requires these be documented on the basis of costs per student.

7) It greatly simplifies administration, accountability, and public understanding of procedures for distributing federal funds while simultaneously incorporating primary Congressional concerns about compensating LEAs for relative financial ability and increasing aid to target populations.

IV. FORMULA DESCRIPTIONS

This section describes the formulas used by each of the 50 states in FY 1979. It analyzes each set of procedures in terms of the three steps discussed in Section II: 1.) Data Selection, 2.) Transformation of Data into Point Scores, and 3.) Transformation of Point Scores into Dollar Allocations. A number of variables are common to several states, and Table IV-1 lists these, the abbreviations used throughout the text, and the general definition. Additional variables, unique to each state, are defined as they are encountered.

With regard to subscripts and superscripts, the following rules are followed:

1. The variables AL, defined in the Variable Definition List as "allocation in dollars" and RR, defined as reimbursement rate expressed as a percentage, will have two subscripts. The first subscript refers to funding purpose, and the second subscript indicates the recipient.

EXAMPLES

$AL_{sd,\ d}$ = allocation of funds for "special disadvantaged" programs (sd) to eligible recipient d.

$RR_{ws,\ d}$ = rate of reimbursement for work-study programs (ws) run by eligible recipient c, expressed as a percentage.

2. Other variables will have only one subscript indicating the eligible recipient to which it refers.

EXAMPLE

The Variable Definition List defines ADA as average daily attendance.

ADA_d = average daily attendance of eligible recipient d.

3. The superscript * is used to indicate that a particular value is a score rather than actual raw data.

EXAMPLE

ADA^*_d = the point score assigned to eligible recipient d on the basis of its average daily attendance.

To understand the comments that follow the description of each formula, it is necessary to be familiar with Section II-B, Characterisitcs of Formulas.

Table IV-1

VARIABLE DEFINITION LIST
(including subscripts)

AD	=	number of adults
ADA	=	average daily attendance
ADM	=	average daily membership
AE	=	attendance entitlement; largest of average daily attendance counts of previous year or second previous year or previous three year average
AFDC	=	number of AFDC recipients
AL	=	allocation in dollars
AP	=	ability to pay
AV	=	assessed value of taxable property
b	=	basic funds
CAFDC	=	children in AFDC families
ch	=	consumer and homemaking funds
CHADA	=	average daily attendance in consumer and homemaking programs
CHE	=	consumer and homemaking enrollment
DE	=	disadvantaged enrollment
DH	=	disadvantaged and handicapped to receive additional services
dis	=	disadvantaged funds
DO	=	number of dropouts
DP	=	level of education attained by teaching personnel
DR	=	dropout rate
DVE	=	disadvantaged vocational enrollment
E	=	enrollment
ECS	=	excess cost students; number of students who impose excess costs
F	=	number of families
FTE	=	full time equivalent
H	=	number of handicapped adults
h	=	handicapped funds
HE	=	handicapped enrollment
IE	=	impact of programs on employment
LEE	=	local education expenditures (net)
LESA	=	number of students of limited English-speaking ability
LFG	=	labor force growth rate
LIF	=	number of low income families
m	=	multipurpose funds
MFI	=	median family income
P	=	number of pupils
PC	=	approved program costs
PCI	=	per capita income

Table IV-1 continued

POP = population
PU = number of pupil units

SFE = state funds expended (less capital expenditures)
SR = state revenue; amount of money received by eligible recipient from the state

RYU = rate of youth employment

U = number of unemployed persons
UR = unemployment rate
URC = unemployment rate for county (in which eligible recipient is situated)
UY = number of unemployed youth

VADA = vocational average daily attendance
VPM = vocational pupil minutes per week

WS = work-study funds

ALABAMA

1. DATA SELECTED:

Secondary

Level of Need:

UR, depressed area, RYU, DR, number of low income children, vocational enrollment, LESA

Ability to Raise Revenue:

Economic Index

Program Quality:

Number of new programs

Postsecondary

Level of Need:

Number of high cost students, general enrollment, enrollment

Ability to Raise Revenue:

relative state vocational funding

2. TRANSFORMATION OF DATA INTO POINT SCORE:

Secondary

The state ranks each eligible recipient to establish a priority for the distribution of funds. The ranking is determined for all federal funds, except Special Disadvantaged, Work study and Co-operative funds, as follows:

$$\text{Eligible Recipient's Rank Value (ERRV)} = \left(\frac{1 \text{ if not in depressed area}}{2 \text{ if in depressed area}}\right) \times \text{unemployment rate} \times (1 + \text{number of new programs})$$

The eligible recipient's ranking for Special Disadvantaged,

Work study, and Co-operative Funds are computed as follows:

$$ERRV_{special\ ed} = (ERRV) \times (\text{Rate of Youth Unemployment}) (1 + \text{Rate of School Dropouts})$$

Postsecondary

The postsecondary institution total dollar entitlement is the sum of the state allocation and the Federal Vocational Education Supplement (FVES). The FVES is determined by calculating the following factors:

Step 1: The Ability to Raise Revenue factor (hereinafter refered to as "A") is the relative state postsecondary vocational dollars expended in every service area.

$$\text{for each recipient } i,\ x_i = \frac{\text{state postsecondary vocational \$/person for } i}{\text{total vocational dollar/person for } i}$$

$$A = \frac{x_i}{\sum_{\text{all } i} x_i}$$

Step 2: The concentration of high cost students in each institution (B) is the relative number of students receiving financial aid enrolled in the institution.

$$B = \frac{\text{Number of vocational students receiving financial aid in institution}}{\text{Total \# of postsecondary vocational students receiving financial aid in state}}$$

Step 3: The enrollment concentration in vocational programs (C) is the ratio of vocational students enrolled to total students enrolled.

for each recipient i, $x_i = \frac{\text{student FTE enrolled in voc-ed in i}}{\text{total institutional FTE enrolled in i}}$

$$C = \frac{x_i}{\sum_{\text{all } i} x_i}$$

Step 4: The need for vocational education is the relative vocational education enrollment.

$$B = \frac{\text{Institution's FTE vocational enrollment}}{\text{Total FTE vocational enrollment in all state two year colleges}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Secondary

After the districts have been ranked, the federal funding level for each is determined as a function of the number of low income children (LIF) in the area served, the vocational enrollment grades 7-12 (VE) and the eligible recipient's ability to pay (AP) as defined by the Economic Index. The funds are then distributed in a "leveling up" fashion, with the top ranking recipient receiving their total reimbursement, then the next ranking recipient, etc., until all the funds are distributed.

Each eligible recipient's (i) funding level is determined as follows:

$$\left(\frac{LIC_i - LIC_{min}}{LIC_{max} - LIC_{min}}\right) + \left(\frac{VE_i}{VE_{tot}}\right)(.857) + \left(\frac{AP_{max} - AP_i}{AP_{max} - AP_{min}}\right)\left(\begin{matrix}\text{Maximum}\\ \text{Available}\\ \text{Percentage}\end{matrix}\right)$$

where "max" and "min" indicate the greatest and least amounts, respectively, in any district in the state, and "tot" is the state total

across all districts. The maximum allowable percentage is the maximum percentage of an eligible recipient's budget request that can come from the federal government, leaving the amount required by regulation for state and local maintenance of effort.

The Ability to Pay is equal to the Economic Index, which is calculated for each school district d as follows:

$$\text{Economic Index for school district d} = \text{Economic Index for county c} \times \frac{\text{Enrollment in school district d}}{\text{Total enrollment in county c}}$$

$$\text{Economic Index for county c} =$$

$$\left[\frac{\text{Sales tax paid in county c}}{\text{Sales tax paid in state}} \times 6 + \frac{\text{Value of automobile licenses in county c}}{\text{Value of automobile licenses in state}} \times 5 + \frac{\text{Assessed value of public utilities in county c}}{\text{Assessed value of public utilities in state}} \times 3 + \frac{\text{Personal Income Tax paid in county c}}{\text{Personal Income Tax paid in state}} \times 1 + \frac{\text{Value added by manufacturing in county c}}{\text{Value added by manufacturing in state}} \times 1 + \frac{\text{Value of farm products in county c}}{\text{Value of farm products in state}} \times 1 \right] \div 17$$

The above computation is used twice, once for the regular fund ranking and again for the Special Disadvantaged, Work study and Cooperative ranking.

A separate calculation is performed to determine the reimbursement per district for persons with Limited English Speaking Ability (LESA).

$$\frac{\text{LESA age 15 - 24}}{\text{Total State population age 15-24}} \times \frac{\text{LESA age 15 - 24 in district}}{\text{total state LESA population age 15 - 24}} \times \text{federal disadvantaged setaside funds}$$

The total allocated to each district is deducted from the Disadvantaged Setaside Funds.

Postsecondary

The Federal Vocational Education Supplement (FVES) for each institution is calculated as the sum of various factors described above, multiplied by the total federal dollars budgeted for postsecondary institutions.

FVES =(.30A + .30B + .25C + .15D) x funds available

A,B,C, and D as defined above.

COMMENTS ON THE ALABAMA PROCEDURE:

Step 1: No Comments.

Step 2: Secondary i) There is no definition for depressed area. ii) At the secondary level, Alabama uses the Non-Procedural Point Scale Method of data transformation, which is non-continuous.

Postsecondary i) The type of student receiving financial aid used in determining the concentration of high cost students is described in the state plan. ii) The definition of "persons" used in the denominator of calculating the ability to raise revenue is not given. iii) At the postsecondary level, Alabama uses the Proportion of Total method of data transformation, which is continuous.

Step 3: Secondary i) The "leveling up" method for reimbursement

might deny partial reimbursement to ready a deserving district. ii) The maximum allowable percentage factor is based on the original funding level requested by each eligible recipient. Inclusion of this factor in the formula could induce inflated requests by recipients; thus, this variable is considered malleable. iii) There is no reason given for deflating the vocational enrollment ratio by .857. iv) Alabama uses the reimbursement rate equation method of funds distribution of the secondary level.

Postsecondary i) The reasons for the varying weights applied to each factor are not explained. ii) Alabama uses the weighted points method of funds distribution at the postsecondary level.

The vocational education funds are distributed as follows:

a) The above formula apply to funds from Subparts 2,3, and 5.

b) Subpart 4 funds are distributed by the above formula, with additional points given at the discretion of the evaluators. This restricts the number of programs funded because the amount of Subpart 4 funds allocated to the state is small. Nonetheless, the criteria used in the distribution of these monies must be considered malleable.

ALASKA

1. DATA SELECTED:

Level of Need:

1. The percentage of students served who are handicapped or disadvantaged.
2. The school dropout rate or youth unemployment rate.
3. For LEAs: The concentration of low income families.
   For other eligible recipients: Concentration of handicapped, low income, and LESA students.

Ability to Raise Revenue:

4. Relative Ability to Pay (not clearly defined in state plan)

Quality of Programs

5. Whether program is designed to meet emerging manpower needs in local area.
6. Likelihood that program will fulfill goals set out in Five-Year Plan.
7. Whether past program evaluations have been used to develop this proposal and whether proposal includes a self-evaluation procedure.
8. Whether the following groups were consulted in drawing up the proposal: local vocational educational advisory committees, the local community, the population to be served, other training or educational agencies in the area to be served, local manpower councils, and other agencies.
9. Whether proposed activities can take place within the time period specified.

Other Criteria

10. Whether the following budget requirements are met:

a. budget is balanced

b. derivations of the amounts requested are explained

c. sources of all funds to be used are specified

d. amount of requested funds that would be used specifically for students with special problems is specified

e. budget meets maintenance of effort requirement

2. TRANSFORMATION OF DATA INTO POINT SCORES:

For each of the above 10 criteria, each eligible recipient receives a score, but there is no explanation of a procedure by which this is done.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Unspecified.

COMMENTS ON ALASKA'S PROCEDURE

Step 1: For criterion 2, it is unclear whether the school dropout rate or the youth unemployment rate is used. Criteria 4, 5, 6, 7, 8, 9, and 10 are vaguely defined and are, therefore, Malleable Data.

Step 2: Unspecified Method.

Step 3: Unspecified Method.

This entire procedure is extremely vague.

ARKANSAS

1. DATA SELECTED:

LEAs:

Data are collected for each eligible recipient on five criteria, however, the exact measures used are not specified:

Ability to Raise Revenue:

Ability to provide resources (not clearly defined in state plan)

Quality of Programs:

Impact of programs on employment

Degree of personnel (referring to level of education attained by teachers within the LEA)

Institutions other than LEAs:

As far as we were able to determine, Arkansas does not use a formula to distribute funds to these eligible recipients.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

LEAs:

For each of the five criteria listed in Step A, each eligible recipient is assigned a score of between 0 and 26 points. These will hereafter be referred to as AP^*, LIF^*, IE^*, DH^*, and DP^*. The procedure by which these scores are determined is not explained.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

LEAs:

For each eligible recipient d, a reimbursement rate, z, is calculated:

$$Z_d = \frac{5\,AP_d^* + 5\,LIF_d^* + 4\,IE_d^* + 2\,DH_d^* + DP_d^*}{5 \times 44.2}$$

In theory, the mean value of Z will be 1.0.

Programs Fundable Under Subparts 2,3, or 5:

$$RR_{235,d} = Z_d \times 53.5$$

Programs Fundable Under Subpart 4:

$$RR_{4,d} = Z_d \times 98.5$$

(The OE has required Arkansas to revise the Subpart 4 procedure for FY 80)

If there are not sufficient federal funds to reimburse eligible recipients at these rates, state funds will be used to make up the difference.

COMMENTS ON THE ARKANSAS PROCEDURE:

Step 1: The plan is extremely vague as to what is being measured. Data used are "malleable."

Step 2: An Unspecified Method is used here.

Step 3: The procedure here is conceptually equivalent to the Reimbursement Rate Equation Method.

ARIZONA

1. DATA SELECTED:

Secondary(LEAs)

PD, UR, AV, DE, ADM

Postsecondary

PD, UR, AV, LIF, E (full time equivalent)

Counties:

PD,UR, AV, LIF, ADM

Youth in Poverty:

PD, UR, POP (percent aged 16 - 21 by county)

Additional data are collected from all applicants on need for project, target populations to be served, linkages of project with CETA, how project helps overcome sex stereotyping, whether project incorporates goals statements and procedures for evaluation. All of the above data are obtained from a checklist to be marked "yes" or "no." Additional data are also collected on a "newness factor," indicating whether the project is new to state, new to county, new to district, or new to the given school.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

In Arizona, categories of 120, 134, 140, and 150 funds appear to be distributed all on the basis of project applications. Review of projects takes place in three main stages. Transformation of data into point scores occurs mainly in Stage 1.

a) Technical Review: On the basis of a "yes," "no" checklist dealing with need, target groups served, statement of goals, etc.

(see above), projects are awarded points up to a maximum of 100.

b) Economic Depression. This is a county wide measure. Maximum points are thirty. The measure is based on percent of families in the county in 1977 below poverty level and average local area unemployment rates in county in 1978. Each measure has a scale running from 15 for the county with the highest percentages to 4 for the county with the lowest. Economics depression index is the sum of these two scales.

c) Newness Factor. Points are awarded under the following scale:

New to State	30 points
New to County	20 points
New to District	10 points
New to School	5 points

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

For each project application, the sum is taken of points earned under Technical Review, Economic Depression and Newness Factor. Projects scoring 60 and below are not considered for funding. The remainder enter stage 2.

Four schedules are established as follows:

Schedule I	Secondary
Schedule II	Community Colleges (Postsecondary)
Schedule III	Counties
Schedule IV	Youth in Poverty

Projects in these schedules are ranked in three groups, A, B, and C on the basis of a "need" factors.

For secondary projects, Schedule I, the need factor is

$$\frac{AV}{\text{High School ADM}} \times \frac{1}{\%\ \text{Needy Students}}$$

Needy students are counted on the basis of data from the hot lunch program. Group A includes the 56 most needy districts, Group B the next 21 and Group the remaining 7.

In Schedule II, Community Colleges (Postsecondary), the need factor is

$$\frac{AV}{\text{Full Time Equivalent Students}} \times \frac{1}{\%\ \text{Needy Families}}$$

Needy families, presumably, is a count of families below poverty level in the county. The five neediest community colleges comprise Group A, the next two neediest comprise Group B, and the remaining two, Group C.

Schedule III, Counties, is basically similar to Schedule II. Group A includes eight counties, B has four, and C has two.

Schedule IV, Youth in Poverty uses a need factor of the county's percent of total persons aged 16 - 21 in state in 1978. Nine counties are in Group A, three in B, and two in C.

Regardless of schedule, sixty-five percent of available money is assigned to Group A, twenty-five percent to Group B, and ten percent to Group C. That is, Group A of Schedule I is eligible for 65 percent of the total of funds allocated to Schedule I projects, and Group A of Schedule II is likewise eligible for 65 percent of Schedule II money, etc.

Stage 3 of funds distribution applies administrative discretion. The annual state plan, states: "the funding officers will determine, according to the above procedure, the final distribution

of funds to these approved projects (LEA's) " (Arizona Annual Plan FY 1980, p. 76).

COMMENTS ON THE ARIZONA PROCEDURE:

It is not clear how the allocation of funds to Schedules I, II, III, and IV is made, that is, how much federal money is put on projects in high schools relative to projects administered by community colleges and other eligible recipients. Generally, the procedures for allocating funds are not well specified. They appear arbitrary and subject to considerable discretion on the part of administrators and evaluators.

1. DATA SELECTED:

Secondary Institutions:

Level of Need:

ADA, AFDC, CHADA, HE, LESA, VADA

Ability to Raise Revenue:

AV

Community Colleges:

Level of Need:

ADA, CHE, DVE, LIF, VADA, U

Ability to Raise Revenue:

AV per ADA

2. TRANSFORMATION OF DATA INTO POINT SCORES:

a. Secondary Level Eligible Recipients:

For each secondary eligible recipient (district) d, the following scores are determined:

$$ADA_d^* = \frac{ADA_d}{\text{State total secondary ADA}}$$

$$AFDC_d^* = \frac{AFDC_d}{\text{State total AFDC}}$$

$$AV_d^* = \frac{\text{State Average (AV/ADA)}}{AV_d/ADA_d} \left(\frac{1}{\sum_{\substack{\text{all secondary} \\ \text{districts i(including d)}}} \frac{\text{State Average(AV/ADA)}}{AV_i/ADA_i}} \right)$$

$$= \frac{ADA_d}{AV_d} \left(\frac{1}{\sum_{\substack{\text{all secondary} \\ \text{districts } i \\ \text{(including d)}}}^{n} \frac{ADA_i}{AV_i}} \right)$$

where n = number of secondary districts

$$CHADA_d^* = \frac{CHADA_d}{\text{Total State Secondary CHADA}}$$

$$HE_d^* = \frac{HE_d}{\text{Total State Secondary HE}}$$

$$LESA_d^* = \frac{LESA_d}{\text{Total State LESA}}$$

$$VADA_d^* = \frac{VADA_d}{\text{Total State Secondary VADA}}$$

b. Community Colleges:

$$AV_c^* = \frac{\text{State Average AV/ADA}}{AV_c/ADA_c} \times$$

$$\left(\frac{1}{\sum_{\substack{\text{all coummunity colleges} \\ j \text{ (including c)}}} \frac{\text{State Average (AV/ADA)}}{AV_j/ADA_j}} \right)$$

$$= \frac{ADA_c}{AV_c} \left(\frac{1}{\sum_{\substack{\text{all community colleges} \\ j \text{ (including c)}}}^{m} \frac{ADA_j}{AV_j}} \right)$$

where m = number of community colleges in state

$$CHE_c^* = \frac{CHE_c}{\text{State total community college CHE}}$$

$$DVE_c^* = \frac{DVE_c}{\text{State total community college DVE}}$$

$$LIF_c^* = \frac{LIF_c}{\text{State total community college LIF}}$$

$$U_c^* = \frac{U_c}{\text{State total community college area U}}$$

$$VADA_c^* = \frac{VADA_c}{\text{State total community college VADA}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

a. Allocations to Secondary Level Eligible Recipients

A separate formula is used for each of 5 funding categories.

1. Regular Program Funds Distribution

For each eligible recipient d find W_d.

$$W_d = \left(\begin{array}{c}\text{Regular Program}\\ \text{funds available}\\ \text{for secondary use}\end{array}\right) \times \left[.17\ ADA_d^* + .25\ AFDC_d^* + .21\ AV_d^* + .20\ LESA_d^* + .17\ VADA_d^*\right]$$

If $W_d < \$6,000$, then the allocation of regular program funds to eligible recipient d ($AL_{rp,d}$) is \$0.

If $W_d \geq \$6,000$, then $AL_{rp,d} = W_d$

$AL_{rp,d}$ for FY79 is not to exceed 130% of the value of $AL_{rp,d}$ for FY78.

2. Disadvantaged Set-Aside Distribution

For each eligible recipient d find X_d.

$$X_d = \begin{pmatrix}\text{Disadvantaged Set-aside}\\ \text{funds available for}\\ \text{secondary use}\end{pmatrix} \times \left[.30\ AFDC^*_d + .26\ AV^*_d + .20\ LESA^*_d + .24\ VADA^*_d\right]$$

If $X_d < \$3,000$, then the allocation of disadvantaged set-aside funds to eligible recipient d ($AL_{ds,d}$) is \$0.

If $X_d \geq \$3,000$, then $AL_{ds,d} = X_d$.

3. Special Disadvantaged Funds Distribution

For each eligible recipient d fund Z_d.

$$Z_d = \begin{pmatrix}\text{Special Disadvantaged}\\ \text{funds available for}\\ \text{secondary use}\end{pmatrix} \times \left[.30\ AFDC^*_d + .26\ AV^*_d + .20\ LESA^*_d + .24\ VADA^*_d\right]$$

If $Z_d < \$3,000$, then $AL_{sd,d}$ (sd = special disadvantaged) is \$0.

If $Z_d \geq \$3,000$, then $AL_{sd,d} = Z_d$.

4. Handicapped Funds Distribution

For each eligible recipient d, find A_d.

$$A_d = \left(\begin{array}{l}\text{Handicapped Funds}\\ \text{available for}\\ \text{secondary use}\end{array}\right) \times \left[.25\ AFDC_d^* + .21\ AV_d^* + .17\ HE_d^* + .20\ LESA_d^* + .17\ VADA_d^*\right]$$

5. Consumer and Homemaking Funds Distribution

For each eligible recipient d, find B_d.

$$B_d = \left(\begin{array}{l}\text{Consumer and Home-}\\ \text{making funds avail-}\\ \text{able for secondary use}\end{array}\right) \times \left[.25\ ADA_d^* + .25\ AFDC_d^* + .21\ AV_d^* + .20\ LESA_d^* + .17\ CHADA_d^*\right]$$

If B_d < $1,000, then $AL_{ch,d}$ (ch = consumer and homemaking) is $0.

If B_d ≥ $1,000, then $AL_{ch,d} = B_d$.

$AL_{ch,d}$ for FY79 is not to exceed 130% of the $AL_{ch,d}$ figure for FY78.

b. Allocations to Community Colleges

A separate formula is used for each of 5 funding categories.

1. Regular Program Funds Distribution

For each community college c,

$$AL_{rp,c} = \left(\begin{array}{l}\text{Regular Program Funds}\\ \text{available for}\\ \text{Community colleges}\end{array}\right) \times \left[.23\ AV_c^* + .50\ LIF_c^* + .05\ U_c^* + .22\ VADA_c^*\right]$$

2. Disadvantaged Set-Aside Distribution

For each community college c,

$$AL_{ds,c} = \left(\begin{array}{l}\text{Disadvantaged set-aside}\\ \text{funds available for}\\ \text{community colleges}\end{array}\right) \times \left[.23\ AV_c^* + .22\ DVE_c^* + .50\ LIF_c^* + .05\ U_c^*\right]$$

3. Special Disadvantaged Funds Distribution

For each community college c,

$$AL_{sd,c} = \left(\begin{array}{l}\text{Special Disadvantaged}\\ \text{funds available for}\\ \text{community colleges}\end{array}\right) \times \left[.23\ AV_c^* + .22\ DVE_c^* + .50\ LIF_c^* + .05\ U_c^*\right]$$

OR $11,000, whichever is greater.

4. Handicapped Funds Distribution

For each community college c,

$$AL_{h,d} = \left(\begin{array}{l}\text{Handicapped Funds}\\ \text{available for}\\ \text{community colleges}\end{array}\right) \times \left[.23\ AV_c^* + .50\ LIF_c^* + .05\ U_c^* + .22\ VADA_c^*\right]$$

5. Consumer and Homemaking Funds Distribution

For each community college c,

$$AL_{ch,c} = \left(\begin{array}{l}\text{Consumer and Homemaking}\\ \text{funds available for}\\ \text{community colleges}\end{array}\right) \times \left[.23\ AV_c^* + .132\ CHE_c^* + .088\ DVE_c^* + .50\ LIF_c^* + .05\ U_c^*\right]$$

COMMENTS ON THE CALIFORNIA PROCEDURE

Step 1: No Malleable Data Used.

Step 2: Continuous Methods Used.

Step 3: i) WPM Used. Use of the following scores may cause inequities in the distribution of funds since they do not limit themselves to reflecting the number of vocational students served, but count general education students as well:
ADA*, AFDC*, HE*, LESA* ;

ii) Use of the following scores may cause inequities since they are based not just upon the characteristics of the vocational student body, but rather upon the population as a whole:
U*, LIF* ;

iii) Use of the following score may cause inequities since it does not reflect the number of students served by an eligible recipient:
AV*;

iv) Aside from AV*, no score was adjusted for differences in ability to pay.

v) Although very precise weights are employed, the plan does not explain how these weights were determined.

COLORADO

1. DATA SELECTED:

First, for each eligible recipient it is determined whether it serves:

a). an economically disadvantaged area and/or

b). an area with a "high" rate of unemployment (high unemployment is not defined)

Secondary Institutions:

Level of Need:

LIF, F, DR, RYU, AE

Ability to Raise Revenue:

AV per Attendance Entitlement

Postsecondary and Adult Progrms at State Supported Institutions:

Level of Need:

FTE, DE, HE, RYU, DR, PC

Postsecondary and Adult Programs at District Junior Colleges:

Level of Need:

FTE, DE, HE, RYU, DR

Ability to Raise Revenue:

AV per FTE

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary Institutions:

Each eligible recipient d is assigned point scores according to the following tables (see next page):

AV_d/AE_d State Average (AV/AE)	Relative Financial Ability Points$_d$
.25 - .62	1
.63 - 1.00	2
1.01 - 1.40	3
1.41 - 1.78	4
1.79 and above	5

LIF_d/F_d	Low Income Family Points$_d$
.02 - .059	5
.96 - .099	4
.10 - .149	3
.15 - .199	2
.20 and above	1

Total Points$_d$ = Relative Financial Ability Points$_d$ + Low Income Family Points$_d$

Postsecondary and Adult Programs:

Each State Supported Institution is assigned points according to the following tables:

PC_s/FTE_s	Relative Cost Points$_s$
$1000 - 1500	1
$1501 - 2000	2
$2000 - 3000	3
$3000 and above	4

$\frac{DE_s + HE_s}{FTE_s}$	Disadvantaged and Handicapped Points$_s$
.30 - 1.0	1
.16 - .29	2
.06 - .15	3
0 - .05	4

Total Points$_s$ = Relative Cost Points$_s$ + Disadvantaged and Handicapped Points$_s$

Each District College c is assigned point scores according to the following tables:

AV_c/FTE_c	Relative Financial Ability Points$_c$
0 - $100,000	1
$100,001 - $300,000	2
$300,001 - $400,000	3
$400,001 and above	4

$\frac{DE_c + HE_c}{FTE_c}$	Disadvantaged and Handicapped Points$_c$
.30 - 1.0	1
.16 - .29	2
.06 - .15	3
0 - .05	4

Total Points$_c$ = Relative Financial Ability Points$_c$ + Disadvantaged and Handicapped Points$_c$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Step 1. Determine value of reimbursement rate, r, for each eligible recipient.

Secondary Institutions:

For each eligible recipient d, r is read from the following table:

Total Points$_d$	r_d
10	34
9	36
8	38
7	40
6	42
5	44
4	46
3	48
2	50
1	

Postsecondary and Adult Programs:

For each eligible recipient s (State Supported Institution) or c (District Community College), r is read from the following table:

Total Points$_{s \text{ or } c}$	$r_{s \text{ or } c}$
2	58
3	55
4	52
5	49
6	46
7	43
8	40

Step 2. For each eligible recipient x is a secondary eligible recipient, d, a state supported institution, s, or a district junior college, c, reimbursement rates are assigned as follows:

If YU_x > average YU set $yu_x = 1$, otherwise $yu_x = 0$

If DR_x > average DR set $dr_x = 1$, otherwise $dr_x = 0$

If x is economically depressed, set $ed_x = 30$, otherwise set $ed_x = 0$

If x has a "high" rate of unemployment, set $hu_x = 30$, otherwise set $hu_x = 0$

If any of the following types of programs are for the purpose of meeting new and emerging manpower needs, then the value of RR for that program is increased by 10 above the amount determined below:

Work Study Programs:

$$RR_{ws,x} = r_x + 10yu_x + 20dr_x + ed_x + hu_x$$

(ws = work-study)

Handicapped and Disadvantaged Programs:

$$RR_{hd,x} = r_x + 25 + ed_x + hu_x$$

Cooperative Programs:

$$RR_{co,x} = r_x + 8yu_x + 20dr_x + ed_x + hu_x$$

Special Disadvantaged Programs:

$$RR_{sd,x} = r_x + 40yu_x + 60dr_x + ed_x + hu_x$$

Displaced Homemaker Programs:

$$RR_{dh1x} = r_x + 60 + ed_x + hu_x$$

Support Services for Women:

$$RR_{sw,x} = r_x + 60 + ed_x + hu_x$$

Other Programs:

$$RR_{o,x} = r_x + ed_x + hu_x$$

If the total federal funds are not sufficient to reimburse eligible recipients at these rates, then the rates are decreased proportionately until reimbursing at the new rates exhausts the available federal funds.

COMMENTS ON THE COLORADO PROCEDURE

Step 1: i) No criterion is given defining an economically depressed area. Determination of whether an area is economically depressed could be made subjectively as far as we know.

ii) No criterion is given defining "high" unemployment. Determination of whether an area has a high rate of unemployment could be made subjectively as far as we know.

iii) The value of the variable PC (program cost) might be subjectively determined. The criteria for determining why one institution's cost per student should be allowed to be higher than that of another institution are not given.

iv) All other data are Non-Malleable.

Step 2: The Non-Procedural Point Scale Method, a Non-Continuous Method, is used.

Step 3: i) It is not clear whether Colorado performs Step C exactly as shown in this report because the description of the procedure given in the Colorado Annual and Five Year Plan '78 - '82 and a clarification of this description by one Colorado

official are in conflict with an explanation given to us by another Colorado official. The point of conflict is whether the reimbursement rates RR are the precise reimbursement rates used or whether they are the maximum rates that could be used. For example, in the case of a work-study program, it is not clear whether eligible recipient x will be reimbursed at a rate exactly equal to $RR_{ws,x}$ or at a rate that is greater than or equal to r_x but less than or equal to $RR_{ws,x}$.

If it is true that the values of RR only represent maximum rates of reimbursement at which eligible recipients could be but are not necessarily funded, then this leaves unspecified the manner in which an eligible recipient's rates of reimbursement are determined. This suggests that the reimbursement rates are subjectively chosen from some objectively determined range of acceptable rates. In addition, there are the problems associated with the fact that the procedure for determining the values of RR is conceptually equivalent to the Tabular Method.

ii) Use of the following data may cause inequities, because they reflect not only the number of vocational students served, but also the number of general education students served: FTE, DE, HE.

iii) Use of the following data may cause inequities in the distribution of funds, because they reflect the characteristics of the population as a whole rather than the characteristics of the persons who actually receive vocational education: LIF, F, DR, RYU.

Use of the following data may cause inequities since they reflect not just the number of vocational students served, but also the number of general education students served as well:

FTE; DE, HE

. Use of the following data may cause inequities in the distribution of funds since they reflect the characteristics of the population as a whole rather than just the characteristics of the persons who actually receive vocational education:

LIF F DR RYU

CONNECTICUT

1. DATA SELECTED:

LEAS:

Level of Need

ADM, POP , CAFDC, LIF, UR (POP is based on 1970 Census)

Ability to Raise Revenue

AV, POP , MFI (MFI is based on 1970 Census)

(note: In Connecticut AV is called Equalized Net Grand List)

Local Effort

LEE, AV

Postsecondary Institutions:

Ability to Pay

SFE, FTE

Level of Need

LIF, UR

2. TRANSFORMATION OF DATA INTO POINT SCORES:

LEAs:

For each LEA ℓ, calculate the following scores:

Size Score adjusted for Ability to Pay and Tax Effort

Step 1. Find the ability to pay factor AP for each LEA.

$$AP_{\ell} = \frac{\overline{AV}}{P_{\ell}} \times \frac{MFI_{\ell}}{\text{State MFI}}$$

(Note that ability to pay is determined in terms of both property value and income)

Step 2. Find the highest observed value of AP and call it

$$AP_w \quad (w = \text{wealthiest})$$

Step 3.

$$X_\ell = \left(ADM_\ell + \frac{P_\ell}{2} + \frac{CAFDC_\ell}{2}\right) \times \left(AP_x - AP_\ell\right) \times \frac{LEE}{AV_\ell}$$

Unadjusted size factor; ability to pay adjustment factor; tax effort adjustment factor

Step 4. Adjusted Size Score

$$S^*_\ell = \frac{X_\ell}{\sum_{\text{all LEAs}} X}$$

Low Income Score

$$LIF^*_\ell = \frac{LIF_\ell}{\text{State LIF}}$$

Unemployment Score

$$UR^*_\ell = \frac{UR}{\sum_{\substack{\text{all LEAs} \\ i}} UR_i}$$

Postsecondary Institutions:

For each postsecondary institution C (for college), calculate the following scores:

State Funding Expenditures Score

$$SFE^*_C = \frac{V_C}{\sum_{\substack{\text{all postsec.} \\ \text{institutions}}} V}$$

where $V_C = \frac{SFE_C}{FTE_C}$

Low Income Score

$$LIF_c^* = \frac{LIF_c}{\text{State LIF}}$$

Unemployment Score

$$UR_c^* = \frac{UR_c}{\sum_{\text{all postec. institutions}_j} UR_j}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

LEAs:

$$AL_{m,\ell} = \begin{matrix}\text{Federal funds}\\ \text{available for}\\ \text{LEAs}\end{matrix} \times (.50\ S_\ell^* + .40\ LIF_\ell^* + .10\ UR_\ell^*)$$

Postsecondary Institutions:

$$AL_{m,c} = \begin{matrix}\text{Federal funds}\\ \text{available for}\\ \text{Postsecondary}\\ \text{Institutions}\end{matrix} \times (.34\ SFE_c^* + .33\ LIF_c^* + .33\ UR_c^*)$$

COMMENTS ON CONNECTICUT'S PROCEDURE:

Step 1: No Malleable Data Used.

The use of 1970 census data on population and incomes may be inappropriate if there have been significant demographic changes since 1970.

Step 2: All methods are Continuous.

Step 3: The Weighted Points Method is used.

i) The use of the following scores may lead to an inequitable distribution of funds because they are based not just upon the characteristics of the

vocational student body, but rather upon the population as a whole.

S^*, LIF^*, UR^*

An additional problem arises because this score is based on the unemployment rate rather than the number of unemployed persons. As it stands, this formula will give the same number of dollars to two eligible recipients with the same unemployment rate even if one of them is larger than the other, thereby having more unemployed persons (assuming that the other factors S_ℓ^* and LIF_ℓ^* are held constant). The likely effect will be to arbitrarily give more dollars per student to small communities than to large communities.

iii) In the Postsecondary Formula, ability to pay is defined in terms of the number of State dollars an institution receives (as reflected by SFE^*). The greater the allocation of State funds, the greater the allocation of federal funds will be. The appropriateness of this will depend on the fairness of the distribution of State funds. If in the distribution of State funds some institutions are unfairly favored over others, then these favored institutions will also be at an unfair advantage in the distribution of federal funds. If Connecticut uses a formula for distributing the State funds, it should be shown in the State Plan since that formula, if it exists, determines SFE* which in turn determines the allocation of federal funds.

iv) Connecticut determines ability to pay on the basis of property wealth and income. As previously discussed, this method is more desireable than determining ability to pay, as most States do, solely on the basis of property wealth. However, this method of adjusting for ability to pay will still lead to arbitrary differences in the net financial positions of eligible recipients.

DELAWARE

1. DATA SELECTED:

Secondary Schools:

Level of Need

VPM

Ability to Raise Revenue

AV, P

Other Eligible Recipients

Needs of Individuals

E

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary Schools:

Vocational Pupil-Minute Score adjusted for Ability to Pay

$$VPM_d^* = \frac{VPM_d}{\text{State VPM}} \times \frac{\frac{\text{State Total AV}}{\text{State Total Secondary P}}}{\frac{AV_d}{P_d}}$$

Other Eligible Recipients:

Enrollment Score

$$E_c^* = \frac{E_c}{\text{State Total E for all "other eligible recipients"}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Secondary Schools:

$$AL_{m,d} = \text{Funds Available for Secondary Schools} \times VPM_d^*$$

Other Eligible Recipients

$AL_{m,c}$ = Funds Available for Other Eligible Recipients x E_c^*

COMMENTS ON THE DELAWARE PROCEDURE:

Step 1: i) No Malleable Data Used. ~~ii)~~ No information is collected to determine which institutions serve relatively many students who impose excess costs. iii) VPM is probably and ideal measure of the size of the student population served since it counts only students in vocational courses and weights them according to the amount of time they spend in those courses.

Step 2: Continuous Methods are used.

Step 3: i)The Weighted Points Method is used. In the Secondary School formula, the Vocational Pupil-Minute Score is adjusted for ability to pay using the method discussed and shown to be inequiable on p. 28 of Section II.

ii) In the formula for other eligible recipients, funds are distributed strictly on the basis of enrollment. Each eligible recipient receives the same number of dollars per full time student. This is clearly in violation of the legislation which says that funds are not to be distributed on a per capita basis.

iii) On page 55 of the Administrative Provisions 1978-79 section of Delaware's State Plan for Vocational Education in Compliance with Federal Regulations (Document 95-01/78/07/12), the state seems to be suggesting that the proportion of students that impose excess costs does not vary significantly among other eligible recipients and that therefore it is not necessary to consider this factor in distributing funds among them. At four institutions, 27% of the students impose excess costs, at three institutions the figure is 24%,

and at one it is 20%, and at the remaining one no student imposes excess costs. We are not convinced that this level of variation is insignificant. Additionally, these data do not account for the fact that the level of excess costs imposed will vary among types of students. This formula may then be unfair to the institutions at which a high percentage (27%) of the students impose excess costs or any institution which has higher concentrations of students who impose higher excess costs.

iv) The use of enrollment data which counts general education as well as vocational education enrollment may cause inequities in the distribution of vocational education funds, unless the ratio of vocational enrollments to general enrollments is constant across all eligible recipients.

FLORIDA

1. DATA SELECTED:

Level of Need

LIF, UR, POP (ages 14-65), LESA, P, AD, DO, UY

Ability to Raise Revenue

AV per number of families

Non-Classifiable Data

LFG

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Ability to Pay Score - AP^*

$$AP_d^* = \frac{1 + (\text{lowest } \frac{AV}{F}) - \frac{AV_d}{F_d}}{\text{highest } \frac{AV}{F}}$$

Low Income Family Score - LIF^*

$$LIF_d^* = \frac{LIF_d}{\text{highest LIF}}$$

Unemployment Rate Score - UR^*

$$UR_d^* = \frac{UR_d}{\text{highest UR}}$$

Labor Force Growth Rate - LFG^*

$$LFG^* = \frac{LFG_d}{\text{highest LFG}}$$

Population Score - POP^*

$$POP_d^* = \frac{POP_d}{State\ POP}$$

Limited English-Speaking Ability Score - $LESA^*$

$$LESA_d^* = \frac{LESA_d}{State\ LESA}$$

Handicapped Pupils Score - HP^*

$$HP_d^* = P_d \times .085$$

Handicapped Adults Score - HA^*

$$HA_d^* = AD_d \times .065$$

(Note that the handicapped scores are determined on the basis of an estimated proportion of the population that is believed to be handicapped.)

Dropout Score - DO^*

$$DO_d^* = \frac{DO_d}{Highest\ DO}$$

Unemployed Youth Score - UY^*

$$UY_d^* = \frac{UY_d}{Highest\ UY}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Basic Formula

$$AL_{b,d} = Basic\ Funds \times \frac{V_d}{\Sigma V}$$

where $V_d = (2AP_d^* + LIF_d^* + UR_d^* + LFG_d^*)\ POP_d^*$

Disadvantaged Formula

$$AL_{dis,d} = \text{Disadvantaged Funds} \times \left[.9366 \frac{V_d}{\Sigma V} + .0634\ LESA^*\right]$$

Handicapped Formula

$$AL_{h,d} = \text{Handicapped Funds} \times \frac{W_d}{\Sigma W}$$

$$\text{where } W_d = \frac{V_d}{\text{Highest } V} + \frac{HS_d^* + HA_d^*}{\text{Highest } (HS^* + HA^*)}$$

Work-Study Formula

$$AL_{ws,d} = \text{Work-Study Funds} \times \frac{X_d}{\Sigma X}$$

$$\text{where } X_d = \frac{V_d}{\text{Highest } V} + DO_d^* + UY^*$$

Consumer and Homemaking Formula

$$AL_{ch,d} = \text{Consumer and Homemaking Funds} \times \frac{Y_d}{\Sigma Y}$$

$$\text{where } Y_d = (AP_d^* + LIF_d^* + UR_d^*)\ POP_d^*$$

Special Disadvantaged Procedure

To find allocation to county:

Step One: Find P_d

$$P_d = \frac{V_d}{\text{Highest } V} + DO_d^*$$

Step Two: If $P_d < .0982$, allocation to county d = 0. End of Procedure.

If $P_d \geq .0982$, continue to Step Three.

Step Three: Find Q_d

$$Q_d = \frac{V_d}{\text{Highest } V} + UY^*$$

Step Four: If $Q_d < .1011$, allocation to county d = 0. End of Procedure.

If $Q_d \geq .1011$, continue to Step Five.

Step Five: Allocation to County d = Funds Available $\times \frac{R_d}{\Sigma R}$

where $R_d = P_d + Q_d$ if $P_d \geq .0982$ and $Q_d \geq .1011$.

$R_i = 0$ otherwise.

Allocation to Community Colleges

Each county is required to turn over a portion of the federal funds it received under the Basic Grant, Disadvantaged, Handicapped, and Work-Study formulas to the community college which serves its population. Suppose county d, along with zero, one, or more other counties make up community college area u which is served by community college u. Then Proportion of County d's federal money that must be turned over to community college u =

$$= 1 - \frac{SFTE_d}{\frac{SFTE_d}{SFTE_u}(CFTE_u) + SFTE_d}$$

where $SFTE_i$ = Secondary School FTE of community college area i or county i, whichever is appropriate

$CFTE_i$ = Community College FTE of community college i.

COMMENTS ON THE FLORIDA PROCEDURE:

Step 1: No Malleable Data Used.

Step 2: Continuous methods used.

Step 3: WPM used. i) A discrepancy in the Florida State Plan suggests that the above-described community college procedure is not the one actually used. Florida officials were unable to explain the discrepancy. ii) It seems that counties need not turn over to community colleges any of the funds received under the Special Disadvantaged Formula. ~~iii~~) It is not clear whether counties are permitted to keep for secondary school purposes 100% of the funds distributed by the consumer and homemeking formula or whether some of this money must be turned over to community colleges.

GEORGIA

1. DATA SELECTED:

LEAs:

Level of Need
LIF

Ability to Raise Revenue
AV

Other Eligible Recipients:

Level of Need
LIF, H, LESA

2. TRANSFORMATION OF DATA INTO POINT SCORES:

LEAs:

Assessed Value

$$AV_d^* = \frac{\text{State Total AV} - AV_d}{\sum_{\text{all LEAs}_i} (\text{State Total AV} - AV_i)} = \frac{1 - \frac{AV_d}{\text{State Total AV}}}{n - 1}$$

where n = number of LEAs in State

The denominator n-1 is used in order to make $\Sigma AV^* = 1$

Low Income

$$LIF_d^* = \frac{LIF_d}{\text{State Total LIF}}$$

Other Eligible Recipients:

Low Income

$$LIF_c^* = \frac{LIF_c}{\text{State total LIF}}$$

Handicapped

$$H_c^* = \frac{H_c}{\text{State Total H}}$$

LESA

$$LESA_c^* = \frac{LESA_c}{\text{State Total LESA}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

LEAs:

$$AL_{m,d} = \text{Total Federal Funds for LEAs} \times (.5\ AV_d^* + .5\ LIF_d^*)$$

Other Eligible Recipients:

$$AL_{m,c} = \text{Total Federal Funds for "Other Eligible Recipients"} \times (1/3\ LIF_c^* + 1/3\ H_c^* + 1/3 LESA_c^*)$$

COMMENTS ON GEORGIA's PROCEDURE:

Step 1: No Malleable Data used.

Step 2: Only Continuous Methods used.

The method used to determine AV* is unique.

Step 3: Weighted Points Method.

i) The score AV^* does not reflect an eligible recipient's number of students. Use of this score works to the disadvantage of relatively large eligible recipients.

ii) Use of the following scores may cause inequities in the distribution of funds since they reflect the characteristics of the population as a whole rather than just the characteristics of the persons who actually receive vocational education:

LIF^*, H^*, $LESA^*$

HAWAII

Hawaii is unique among the 50 states in that it has a single, centralized school system. There are no local school districts and no local boards legally empowered to receive federal vocational funds. The closest analogy to mainland practice is to consider that in educational matters the state of Hawaii functions as a large city school district. The schools within a city have no local taxing powers; neither do the schools of Hawaii. The central state administration of Hawaii determines allocations of state and federal money to the schools. Thus, in the conventional sense, there are no formulas in Hawaii to distribute the state's share of federal vocational appropriations to school districts.

IDAHO

1. DATA SELECTED:

Secondary

AV / ADA, CAFDC, delinquent children, foster children, program evaluation (see below), excess cost by occupational program (see below), extended employment factor (see below).

Postsecondary

Same as for Secondary, less AV (postsecondary institutions have no local taxing powers).

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary

a) Ability to Raise Revenue:

Points are determined as follows:

AV/ADA	Points
Lowest 20 percent	40
Low Middle 20 percent	35
Middle 20 percent	30
High Middle 20 percent	25
Highest 20 percent	20

b) Low Income Factor:

From data in the LEAs Title I report, showing the count of students from low income families, AFDC children, delinquent children, and foster home children, the percentage of such children in total school enrollment of the district is taken. These percentages are converted to points as follows:

Percent of Disadvantaged Children	Points
0	20
.03	21

Percentage of Disadvantaged Children	Points
.05	22
.06	23
.07	24
.08	25
.09	26
.10	27
.11	28
.12	29
.13	30
.14	31
.15 - .16	32
.18	33
.19 - .21	34
.22 - .23	35
.24 - .26	36
.28	37
.30 - .33	38
.38 - .43	39
.46 - .57	40

c) Evaluation:

State vocational education administration in Idaho conducts an annual evaluation of programs by schools. Matters dealt with include administration, facilities, equipment, curriculum, instructional materials, selection/enrollment/placement of students, professional development of staff, and employer satisfaction with graduates of training programs. Highest evaluations receives 20 points and lowest 10. Internal intervals are presumed to be proportional.

d) Excess Cost Factor:

Points are awarded for "excess costs," i.e., differentials in average program costs by major program category, in accordance with the following scale:

Distributive Education
Health

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Industrial Arts	8
Office Occupations	10
Home Economics	12
Agriculture	18
Trade and Industry	20

e) Extended Employment Factor:

Points are awarded in relation to the individual teacher's employment in vocational education beyond the regular school employment dates. The scale is as follows:

Extended Employment	Points
1 week	2
1 month	7
2 months	14
3 months	20

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

The following is the set of maximum points:

Criterion	Maximum Points
a) Relative local financial ability	40
b) Low income factor	40
c) Evaluation factor	20
d) Excess cost factor	20
e) Extended employment factor	20
Total	140

For secondary level programs, points are translated into reimbursement rates by the following formulas:

RR = total points from factors for each program x total contact hours of the program x state factor

where

$$\text{state factor} = \frac{\text{Total money available for secondary programs}}{\text{Total points statewide from factors x contact hours}}$$

For the postsecondary programs, reimbursement rates are computed in essentially the same fashion, except that no account is taken of relative local financial ability. Postsecondary programs are funded fully from state and federal revenues.

The Idaho plan indicates that extra federal reimbursement may be provided for new programs to help local institutions meet start-up costs. On the other hand, the emphasis on contact hours in the formula restricts dollars available for small programs and many new programs may be small.

COMMENTS ON THE IDAHO PROCEDURE:

Step 1: Inclusion of an evaluation factor introduces Malleable Data.

Step 2: Idaho employs the Non-Procedural Point Scale, a non-continuous method.

Step 3: Reimbursement Rate Used.

ILLINOIS

1. DATA SELECTED:

Level of Need

For each eligible recipient collect the following data:

FTE

For each public school (regular) find:

Number of Title I, ESEA eligibles living within district.

For each community college find:

a). Number of Title I, ESEA eligibles enrolled in high schools within community college district.

b). Total enrollments of high schools within community college district.

For each area secondary vocational center find:

a). Number of Title I, ESEA eligibles enrolled in participating high schools.

b). FTE enrollment of participating high schools.

For each vocational course collect the following data:

E, HE, DE, PC

Find out if:

1). the course is cooperatively run by two or more eligible recipients.

2). the course is being offered for the first time by the institution in question.

Select "level" that applies to the course:

Level 1: Occupational training courses

Level 2: Occupational related courses

Level 3: Occupational orientation courses

Level 4: Occupational information courses

For each Adult course find:

Number of Student-Teacher contact hours.

For each secondary course find:

Number of Carnegie Units earned by each student.

For each postsecondary course find:

Number of Semester or Quarter hours of credit earned by each student.

Ability to Raise Revenue

For each eligible recipient find:

AV/FTE.

Quality of Program

For each vocational course, find the "labor market need" for the skills taught.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Basic Funding Rate Score (BFR^*)

Assign to each vocational course a "Priority" rating of A, B, C, or D on the basis of the "labor market need" for the skill it teaches and its program cost PC. A is the highest priority rating and D is the lowest priority rating.

Then for each vocational course VC, read the value of BFR^*_{VC} from the following table on the basis of its Level and Priority and the type of institution that offers it.

(continued on next page...)

BFR* Table [1]

Level and Priority	Elementary (Students)	Secondary (Carnegie Units)	Postsecondary (Credit) Sem.Hr.	Qtr.Hr.	Adult (Class Hr.)
1A	N/A	$50.00	$7.50	$5.00	$0.30
1B	N/A	30.00	4.50	3.00	0.18
1C	N/A	15.00	2.25	1.50	0.09
1D	N/A	0.00	0.00	0.00	0.00
1	N/A	-----	-----	-----	N/A
2	N/A	0.00	0.00	0.00	N/A
3	N/A	10.00	1.50	1.00	0.06
4	$0.75	N/A	N/A	N/A	N/A

([1]Correspondence, Thomas Wittmuss, Statistician, AVTE Operations Unit, State Board of Education, Illinois Office of Education, July 16, 1979.)

Student Unit Scores (TSU*, DSU*, HSU*)

For each vocational course, find its unit factor.

For an adult course, unit factor = number of student-teacher contact hours.

For a secondary course, unit factor = number of Carnegie Units earned by each student.

For a post-secondary course, unit factor = number of semester or quarter hours of credit earned by each student.

For an elementary-level course, unit factor = 1.

Total Student Unit Score (TSU*)

$$TSU^*_{vc} = E_{vc} \times \text{unit factor}_{vc}$$

Disadvantaged Student Unit Score (DSU*)

$$DSU^*_{vc} = DE_{vc} \times \text{unit factor}_{vc}.$$

Handicapped Student Unit Score (HSU*)

$$HSU^*_{vc} = HE_{vc} \times \text{unit factor}_{vc}.$$

Ability to Pay Score (AP*)

For each vocational course vc, find AV/FTE for the entire district of the eligible recipient that offers the course (FTE is measured for the entire district rather than just for the course in question). The value of AP* for the course is then read from the far right column of the following table on the basis of the type of district offering the course and its value of AV/FTE.

Range of Assessed Valuation Per Student

Elem. Districts	H.S. Districts	Unit Districts	Comm.Coll. Dist.	Factor
14,000 and less	35,00 and less	10,000 and less	225,000 and less	.8
14,001 - 21,000	35,001 - 53,000	10,001 - 15,000	225,000 - 260,000	.7
21,001 - 28,000	53,001 - 70,000	15,001 - 20,000	260,001 - 320,000	.6
28,001 - 35,000	70,001 - 88,000	20,001 - 25,000	320,001 - 380,000	.5
35,001 - 42,000	88,001 -106,000	25,001 - 30,000	380,001 - 440,000	.4
42,001 - 49,000	106,001 -123,000	30,001 - 35,000	440,001 - 500,000	.3
49,001 - 56,000	123,001 -141,000	35,001 - 40,000	500,001 - 550,000	.2
56,001 - 63,000	141,001 - 158,000	40,001 - 45,000	550,001 - 660,000	.1
63,001 - 70,000	158,001 - 176,000	45,001 - 50,000		.05
70,001 and over	176,001 and over	50,001 and over	660,001 and over	0

Low Income Score (LI*)

For each vocational course, find the Low Income Ratio as follows:

For a vocational course offered by a local school district,

$$\text{Low Income Ratio} = \frac{\text{District's number of Title I, ESEA eligible students}}{\text{District's FTE}}$$

For a vocational course offered by a community college..

$$\text{Low Income Ratio} = \frac{\text{Number of Title I, ESEA eligibles enrolled in high schools within community college district}}{\text{FTE of high schools within community college district}}$$

For a vocational course offered by an area secondary vocational center,

$$\text{Low Income Ratio} = \frac{\text{Number of Title I, ESEA eligibles enrolled in high schools at participating school districts}}{\text{FTE of participating high schools}}$$

For a vocational course offered by a state agency, a technical institute operated by a State university, or an institution with no Title I, ESEA eligibles

Low Income Ratio = .25

Then the low income score (LI*) is read from the following table:

$\text{Low Income Ratio}_{VC}$	LI^*_{VC}
.80 - 1.00	.5
.60 - .7999	.4
.40 - .5999	.3
.20 - .3999	.2
0 - .1999	.1

Cooperative Program Score (CP*)

If course is cooperative run by two or more eligible recipients,

$CP^*_{VC} = 0.3$ (tentative FY '79 value).

Otherwise,

$$CP^*_{vc} = 0$$

Initial Program Score (IP*)

If the course is being taught by the eligible recipient for the first time,

$$IP^*_{vc} = 0.3$$

Otherwise,

$$IP^*_{vc} = 0$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

For each vocational course vc, find X_{vc}.

$$X_{vc} = BSR^*_{vc} \times [TSU^*(1 + AP^* + LI^* + CP^* + IP^*) + (0.5 \times DSU^*) + (0.5 \times HSU^*)]$$

$$AL_{m,vc} = X_{vc} \times \frac{\Sigma X}{\text{Total funds available}}$$

COMMENTS ON ILLINOIS' PROCEDURE

Step 1: Data pertaining to "labor market need" is malleable.

Step 2: No clear explanation of how priority rating is determined.

Step 3: Method is similar but not identical to the WPM.

INDIANA

1. DATA SELECTED

Secondary

Level of Need:

Economically Disadvantaged POP, URC, DO, AP

Ability to Raise Revenue:

AV/ADM

Postsecondary

Level of Need:

Economically Disadvantaged POP, AP, ECS

Ability to Raise Revenue:

FTE (voc. ed.), No. of hours of Voc. ed. instruction

2. TRANSFORMATION OF DATA INTO POINT SCORES

TABLE I

PROGRAM, SERVICE OR ACTIVITY / Criteria Rating Elements	Economically Disadvantaged Population by County	Unemployment Averages by County	Dropout Averages by LEA	Student Needs (% being served)	Maintain 75-76 Funding Level	Relative Financial Ability to Pay	Relative Number of Higher Cost Students
Postsecondary Institutional Programs	+1					+1	
Adult Programs in Postsecondary Institutions	+1	+1				+1	
Adult Programs in Secondary Institutions	+1	+1				+1	
Continuing Secondary Programs	+1	+1				+1	
Equipment-Secondary	+1	+1				+1	
Local Travel-Secondary	+1	+1				+1	
Projects for Disadvantaged and Handicapped-subpart 2	+1	+1				+1	

PROGRAM, SERVICE OR ACTIVITY (cont.)	Economically Disadvantaged Population by County	Unemployment Averages by County	Dropout Averages by LEA	Student Needs (% being served)	Maintain 75-76 Funding Level	Relative Financial Ability to Pay**	Relative Number of Higher Cost Students
Work-Study	+1					+1	
Special Programs for the Disadvantaged-subpart 4	+1					+1	
New Secondary Programs	+1	+1				+1	
New Consumer and Homemaking Programs	+1	+1				+1	
Postsecondary Programs by Secondary Institutions	+1					+1	

Criteria Rating Elements*

* Each criteria rating element is quartiled and aggregated for each eligible recipient. The aggregate criteria rating is used for distribution of Federal funds. See Distribution of Federal Funds, Appendix F, (pages 132-133) of this Annual Program Plan

** Public Law 94-482, Section 106(a)(5)(B)(i) requires that the State will use as an important factor in distributing Federal funds, the relative financial ability of eligible recipients to provide the resources necessary to meet the need for vocational education in the areas they serve.

The State first sets aside an amount of money for each of the 12 categories listed under "Program, Service or Activity" in Table I above. Then, for each of these twelve categories for which it is eligible for funding, each eligible recipient receives a "Criteria Rating" based on the criteria that are X's for the category in question. For example, in distributing funds for Postsecondary Institutional Programs, three criteria rating elements determine point scores: 1) Economically Disadvantaged Population by County; 2) Relative Financial Ability to Pay; 3) Relative Number of Higher Cost Students.

The number of points that an eligible recipient receives for a criteria rating element. For example, applicants for funding for "Adult Programs in Secondary Institutions" are ranked in descending order of the percentages of their respective populations that are economically disadvantaged. Those in the top quartile (top 25%), which in 1978 consisted of those with dis-

advantaged rates of 9.1% or more, are assigned a four point rating. Those in the quartile that is third from the bottom, and whose disadvantaged rates are between 7.2% and 9.0% inclusive, are assigned a 3 point rating. Those in the next highest quartile get 2 points and those in the lowest get 1 point. Then, since there is a "+1" in the box at the intersection of the "Adult Programs in Secondary Institutions" row and the "Economically Disadvantaged Population by County" column of Table I, one point is added to each of the assigned points ratings. Four points is raised to five, three is raised to four, and so on. According to the plan, a "+1" is shown in certain boxes because it is necessary to give some factors additional weight as required by the legislation. As explained at length in our comments below, adding one point to the quartile rating does not have the effect of giving these factors additional weight.

The Criteria Rating for an eligible recipient's application for a particular type of program is determined by adding the points it earned for each criteria rating element that is X'd on the chart for that type of program. For example, if an eligible recipient applying for funding under the category "Adult Programs in Secondary Institutions," received 5 points for its rank based on the criteria rating element "Economically Disadvantaged Population by County," 4 points from "Unemployment Averages by County," 3 points for "Dropour Averages by LEA," and 2 points for "Relative Financial Ability to Pay," then its Criteria Rating would be 5 + 4 + 3 + 2 = 14.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary

Approved Salaries x Criteria Rating = Approved Points

$$\text{Approved Points} \times \frac{\text{Total Funds Budgeted for Secondary Programs}}{\text{Sum of Approved Points for All Applicants for Secondary Program Funding}} = \text{Reimbursement}$$

Equipment for Secondary Programs

Approved Ammount x Criteria Rating = Approved Points

$$\text{Approved Points} \times \frac{\text{Total Funds Budgeted for Equipment for Sec. Programs}}{\text{Sum of Approved Points for All Applicants for Equipment for Secondary Programs}} = \text{Reimbursement}$$

Local Travel

Actual Approved Miles x $.10 x Percentage Based on Criteria Rating = Reimbursement

Work-Study Programs

Eligible recipients are first listed in descending order of their Criteria Ratings. Then, starting at the top and moving down the list until funds are exhausted, eligible recipients receive 50% of the cost of their Work-Study programs. The other 50% is supplied locally.

Postsecondary Programs

FTE x No. of Vocational Instruction Hours x Criteria Rating = Approved Points

$$\text{Approved Points} \times \frac{\text{Total Funds Budgeted for Postsecondary Programs}}{\text{Sum of Approved Points for All Applicants for Postsecondary Funding}} = \text{Reimbursement}$$

Adult Vocational (Noncredit) Programs (AVNP)

Instructional Hours x Credit Rating = Approved Points

$$\text{Approved Points} \times \frac{\text{Total Funds Budgeted for AVNP}}{\text{Sum of Approved Points for All Applicants for AVNP Funding}} = \text{Reimbursement}$$

Disadvantaged and Handicapped Programs

The specification for this formula is the same as that shown for Work-Study Programs.

COMMENTS ON THE INDIANA PROCEDURE

Step 1: No malleable data used.

Step 2: Indiana uses a non-continuous Quartile ranking method. Although the state maintains that adding points to scores on some criteria weights these criteria more heavily, it can be demonstrated that: 1) adding points does not give extra weight to any particular criterion, and 2) adding points actually increases allocations to eligible recipients who are already relatively well off. As an illustration of the kind of faulty mathematics that plagues many states' data transformation procedures, it is worth examining the reasons for this seemingly paradoxical outcome.

Suppose that in determining the criteria ratings for institutions applying for funding for Adult Programs in Secondary Institutions, instead of adding one point to the points earned for each of the three criteria rating elements which has a "+1" in its box, we added three points to the points earned for the criteria rating element that does not have a "+1" in its box, "Dropout Averages by LEA." By Indiana's theory, this would decrease the weight given to the three factors with "+1" in their

boxes and increase the weight given to "Dropout Averages by LEA." In fact, however, that does not happen. Since the total of points that determine the Criteria Rating (and, ultimately the actual allocation size) remains the same, this change in the "weights" can have no effect on the distribution of funds.

We may then wish to know what change adding these extra points has on the overall distribution of funds compared to what the distribution would be if they were not added. Suppose that for Adult Programs in Secondary Institutions there are only two applicants, X and Y, and that the following is true:

c = cost of program that X and Y each wnat for their districts

x = X's Criteria Rating for this program

x - 3 = X's Criteria Rating for this program, less the three points that are added for "weighting"

y = Y's Criteria Rating for this program

y - 3 = Y's Criteria Rating for this program, less the three points that are added for weighting and

j = total funds available to be distributed for these programs.

Then,

ax = X's approved points and

ay = Y's approved points

ax + ay = total approved points

$\frac{j}{ax + ay}$ = point value

$\frac{j}{ax + ay}$ (ax) = number of dollars allocated to X

If we substitute x - 3 for x and y - 3 for y, we find that:

$$\frac{j}{a(x-3)+a(y-3)}\ a\ (x-3)$$ = number of dollars that would have been allocated to X if we did not add extra points for "weighting"

Then the expression:

$$D = \frac{j}{ax+ay}\ (ax) - \frac{j}{a(x-3)+A(y-3)}\ a(x-3)$$

is equal to the increment that accrues to X from having the extra 3 "weighting" points added to its criteria rating. This reduces to:

$$D = \frac{3j\ (y-x)}{(x+y)(x+y-6)}$$

This is true since j is never negative and neither x nor y will ever be less than 4. Consequently, when X has fewer criteria points and therefore has less need than Y, X will actually get more money under Indiana's curent formula than it would have received if Indiana did not add extra weighting points. This is money that would otherwise have gone to Y, the needier eligible recipient.

Step 3: The Weighted Points Method is used.

1. DATA SELECTED:

Level of Need:

LIF

Ability to Raise Revenue:

AV per student enrollment

2. TRANSFORMATION OF DATA INTO POINT SCORES:

The process is as follows:

Compute

$$X_{1d} = \frac{\text{Assessed Value for district d}}{\text{enrollment for district d}} \Big/ \frac{\text{State total assessed value}}{\text{State total K-12 enrollment}}$$

$$X_{2d} = \frac{\text{No. of Low Income families in d}}{\text{Population of d}} \Big/ \frac{\text{No. of Low Income families in state}}{\text{Population of state}}$$

Calculate the mean and standard deviation for the values of X_1 (U_1, S_1), and the mean and standard deviation for the values of X_2(U_2, S_2).

$$Z_{1d} = -\frac{X_{1d} - U_1}{S_1}$$

$$Z_{2d} = \frac{X_{2d} - U_2}{S_2}$$

Rank Score for d = $Z_{1d} + Z_{2d}$

List eligible recipients in descending order of their rank scores. The list is divided into quartiles, and those with the highest rank scores are said to be in quartile 1. (It is not clear whether secondary schools and merged area schools are both included in the same list in Step 5 for quartiling or whether a separate list and quartiling is done for each type of school.)

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Each eligible recipient is assigned a percentage rate of reimbursement on the basis of its quartile standing for its non-Special Needs programs.

Secondary Schools		Merged Area Schools	
Quartile 1	21.50%	Quartile 1	16.50%
Quartile 2	20.75	Quartile 2	15.75
Quartile 3	19.25	Quartile 3	14.25
Quartile 4	18.50	Quartile 4	13.50

Each eligible recipient is assigned a base percentage rate of reimbursement for its Special Needs programs.

Quartile 1	51.50
Quartile 2	50.75
Quartile 3	49.25
Quartile 4	48.50

Reimbursement rates determined will be increased by 1.0 if the eligible recipient has a number of disadvantaged and handicapped students that is above the state average.

In addition, reimbursement rates determined will be increased by 2.0 or less, depending on ". . . the extent to which mainstreaming occurs . . . ," for handicapped students.

In addition, reimbursement rates determined above will be increased by 2.0 or less depending on the extent to which support services are provided for disadvantaged and handicapped students.

COMMENTS ON THE IOWA PROCEDURE:

Step 1: Ranking employs no malleable data. However, we were unable to determine whether objective criteria are used to adjust reimbursement rates for mainstreaming and special support services.

Step 2: Standardized value, a continuous method, is used.

Step 3: A Tabular Method is employed.

i) The formula distributes Subpart 2 funds only and applies only to secondary districts.

ii) The range of reimbursement rates varies by only 3 percent between the first and fourth quartiles.

iii) The Plan offers a very vague explanation of specific procedures and distribution criteria.

KANSAS

1. DATA SELECTED:

All Levels

Level of Need:

LIF, UR

Ability to Raise Revenue:

AV/FTE

Program Quality:

New or Expanding Programs

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Level of Need

Two components determine the level of need -- the concentration of low income families (LIF) as measured by the percent families in poverty, and the percent of unemployment in the district (UR). Each of these elements is ranked separately and then assigned points (LIF* and UR*) as follows:

LIF*:

% Poverty	Scale	120 and 150 Funding Points	Special Program Funding Points
16.13 and above	6	5.70	3.0
16.12 - 14.29	5	4.75	2.0
14.28 - 12.46	4	3.80	1.0
12.45 - 11.10	3	2.85	0
11.09 - 9.77	2	1.90	-1.0
9.76 - 8.14	1	.95	-2.0
8.13 and below	0	0	-3.0

UR*:

%Unemployment	Scale	120 and 150 Funding Points	Special Program Funding Points
4.0 and above	5	3.33	1.0
3.2 - 3.9	4	2.66	.5

UR* (con't.)

%Unemployment	Scale	120 and 150 Funding Points	Special Program Funding Points
2.3 - 3.1	3	1.99	0
1.5 - 2.2	2	1.33	-.5
1.4 and below	1	.60	-1.0

Ability to Raise Revenue

The ability to raise revenue of each district is measured by calculating the assessed valuation per FTE. Kansas prefers to call ability to raise revenue "local ability." The local ability values are scaled and assigned funded points (AV*) as shown below:

AV* Local Ability	Scale	120 and 150 Funding Points	Special Program Funding Points
14,999 and below	10	11.82	4.0
15,000 - 24,999	9	10.64	3.0
25,000 - 34,999	8	9.46	2.0
35,000 - 44,999	7	8.27	1.0
45,000 - 54,999	6	7.09	.5
55,000 - 64,999	5	5.91	0
65,000 - 74,999	4	4.73	-.5
75,000 - 84,999	3	3.55	-1.5
85,000 - 94,999	2	2.36	-2.5
95,000 and above	1	1.18	-3.5

Special Programs include funds for Cooperative, Handicapped, Disadvantaged, Special Disadvantaged, Work Study, Guidance and Counseling, and Displaced Homemakers.

Program Quality

This criterion is included only in the distribution formula for 120 and 150 programs. A district can receive points both for introducing new programs and for expanding existing ones. The scale values for each

category are totalled, and then assigned funding points (MN*).

New and/or Expanding Programs Criteria	Scale	New + Expanding Programs Scale	Funding Pts.
New Programs:			
New Program meeting critical needs, emerging occupations, manpower demands.	3	5	1.67
		4	1.34
		3	1.00
Program new to area/manpower demand	2	2	.67
		1	.34
		0	0
Expanding Programs:			
Program new to area/manpower demand.	2		
Existing program converted to meet new manpower demand	2		
Expansion of existing program	1		

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

120 and 150 Funded Programs

For each program application "a," each of the above criteria is weighted and adjusted by a factor showing the relationship by size and funding points of one particular program "a" to all program applications.

These adjusted and weighted criteria are then summed and multiplied by the total funds available (either 120 or 150) to determine the funds allocated to each "a."

(Continued next page)

$$\text{Dollars Allocated for Program Application a} = \text{Regular Program Funds Available} \times \left[.65 \frac{AV_a^* \times FTE_a}{\sum_{all\ i} (AV_i^* \times FTE_i)} + .20 \frac{LIF_a^* \times FTE_a}{\sum_{all\ i} (LIF_i^* \times FTE_i)} + .10 \frac{UR_a^* \times FTE_a}{\sum_{all\ i} (UR_i^* \times FTE_i)} + .05 \frac{MN_a^* \times FTE_a}{\sum_{all\ i} (MN_i^* \times FTE_i)} \right]$$

Special program/project funding

The reimbursement rate as a percent for the LEA_d is the total of the above criteria points added to 50, which is the matching funding requirement of the state.

$$\text{Reimbursement Rate for } LEA_d \text{ expressed as a \%} = LIF^* + UR^* + AV^* + 50$$

This reimbursement rate, which ranges from 42.5% to 58%, is then multiplied by the total costs of the special project to determine the federal funds used to support the project.

COMMENTS ON THE KANSAS PROCEDURE:

Step 1: i) No malleable variables are used. ii) The source of the unemployment data is the State Department of Human Resources. The source of the poverty data is the U.S. Department of Agriculture, 1975.

Step 2: i) The reasons for the specific scales and weights of the various factors are not explained. ii) The reason for using different

point scales for "120 and 150" funding and "special programs" funding is not explained. iii) Kansas tranforms its data using the procedural point scale method, which is non-continuous.

Step 3: i) Kansas transforms its points into dollar allocations using the weighted points method. ii) The reason for using the specific transformation procedure is not explained. iii) For the 120 and 150 fund allocation procedure, there is no indication whether each district is limited in the number of program applications they can submit.

KENTUCKY

1. DATA SELECTED:

E, Employment (County), Low Income Individuals, AV, UR, Average Current Expenditures, DR, Non-Attending School Population (absenteeism), POP (aged 15-64), Handicapped POP (aged 6-18), State Funds Budgeted per Post-Secondary Institution, FTE Students (Post-Secondary), Handicapped Students (Post-Secondary), Students from LIF (Post-Secondary), Basic Educational Opportunity Grants per Post-Secondary Institution.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Kentucky uses one set of formulas to distribute federal money to LEA's and another set to distribute federal funds to Other Eligible Recipients.

Distribution to LEA's

There are six factors computed as shown below. Mostly the factors use continuous, non-malleable data, but there is one instance of a variable being converted to a point score, namely, "degree of economic depression." There are three "characteristics."

Characteristic No. 1

Location in any county that has an annual unemployment rate of 6 percent or above for the past year.

Characteristic No. 2

Location in an "area of persistent unemployment," defined as an unemployment rate during the most recent calendar year at 6 percent or more and (a) at least 50 percent above national average unemployment rate for three of the preceding four calendar years or (b) at least 75 percent

above national average unemployment rate for two of the preceding three calendar years or (c) at least 100 percent above national average unemployment rate for one of the preceding two calendar years.

Characteristic No. 3

Location within any county in the Appalachian Region of Kentucky.

LEA's are given a point score for economic depression under the following table:

Number of Characteristics	Point Score for Economic Depression
0	1
1	1.1
2	1.2
3	1.3

The six factors used in distributing federal funds to LEA's are these:

Factor 1 =

$$\left(\frac{\text{3 year Average County Employment}}{\text{3 year Average State Employment}}\right) \times \left(\frac{\text{Enrollment of District}}{\text{Enrollment of County}}\right)$$

Factor 2 =

$$\left(\frac{\text{Low-Income Individuals in County}}{\text{Low-Income Individuals in State}}\right) \times \left(\frac{\text{Enrollment of District}}{\text{Enrollment of County}}\right)$$

Factor 3 =

$$\left(AV_s/E_s \div AV_d/E_d\right) \times \left(\text{Economic Depression Score}\right)$$

Factor 4 =

$$\left(\frac{\text{District Average Current Expenditure}}{E_d} \div \frac{\text{State Average Current Expenditure}}{E_s}\right)$$

Factor 5 =

$$\left(\frac{\text{Sum of School District's Low-Income Individuals, School Dropouts, and Non-Attendees}}{\text{Sum of State's Low-Income Individuals, School Dropouts, and Non-Attendees}} \div \frac{\text{School District's Population Aged 15-64}}{\text{State's Population Aged 15-64}}\right)$$

Factor 6 =

Factor 2 x

$$\left[\left(\frac{\text{District's 3 year Average Handicapped POP Aged 6-18}}{\text{State's 3 year Average Handicapped POP Aged 6-18}}\right) \div \left(\frac{\text{School District's Population Aged 15-64}}{\text{State's Population Aged 15-64}}\right)\right]$$

Distribution to Other Eligible Recipients

For Other Eligible Recipients, two factors only are computed.

Factor 1 =

$$\frac{\text{State Average Budgeted Amount for Expenditures}}{\text{FTE Students in State}} \div \frac{\text{Institution's Average Budgeted Amount for Expenditure}}{\text{FTE Students in Institution}}$$

Factor 2 =

$$\frac{\text{Rehabilitation Clients + BEOG Students in Institution}}{\text{FTE Students in Institution}}$$

NB: Rehabilitation Clients are defined as handicapped students, students from LIF, and LESA students.

3. TRANSFORMATION OF POINT (OR FACTOR) SCORES INTO DOLLAR ALLOCATIONS:

Distribution to LEA's

The non setaside portion of Section 120 funds and Section 150 funds are distributed under the following formulas:

P_d =

Factor 1 + (1.1) x Factor 2

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 2}) \times (\text{Factor 3})}{5}\right]$$

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 2}) \times (\text{Factor 4})}{10}\right]$$

and S_d = (federal funds available) $\times \frac{P_d}{\sum P_j}$

The disadvantaged setaside portion of Section 120 money, Section 130 funds, and Section 140 money are distributed under the following formulas:

P_d =

Factor 1 + (1.1) Factor 5

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 5})\ (\text{Factor 3})}{5}\right]$$

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 5})\ (\text{Factor 4})}{10}\right]$$

and S_d = (federal funds available) $\times$

$$\frac{P_d}{\sum P_j}$$

The handicapped setaside of Section 120 money is distributed under the following formulas:

P_d =

Factor 1 + (1.1) Factor 6

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 6})\ \ (\text{Factor 3})}{5}\right]$$

$$+ \left[\frac{(\text{Factor 1} + \text{Factor 6})\ \ (\text{Factor 4})}{10}\right]$$

and S_d = (federal funds available) x

$$\frac{P_d}{\sum P_j}$$

Distribution to Other Eligible Recipients

The following formulas are used to distributed federal funds to Other Eligible Recipients:

P_d =

Factor 1 + Factor 2

and

S_d = (federal funds available) x $\frac{P_d}{\sum P_j}$

COMMENTS ON KENTUCKY'S PROCEDURE:

1. For the most part, non-malleable data and continuous methods are used. However, the extreme complexity of the formulas for LEA's makes a priori interpretations of the distribution pattern practically impossible.
2. Matching ratios are set by the state and are different from one recipient to another. In general, LEA's that are economically depressed or poor in property wealth receive lower

local matching ratios. In the case of Other Eligible Recipients lower local matching ratios are awarded for low state support per FTE student or for a high proportion of high cost students, or both. For all recipients, putting up a new or innovative program earns a lower local matching ratio.

LOUISIANA

1. DATA SELECTED:

AV/ADM, MFI, LIF, various measures on effectiveness of vocational education programs within the state.

2. TRANSFORMATION OF DATA INTO POINT SCORES

Each year all eligible recipients are given the opportunity to submit requests for funding of regular vocational education programs. The application is embedded in a "local plan." The relative worth of each local plan is assessed by the Division of Vocational Education of the Louisiana State Board of Elementary and Secondary Education. The four broad criteria are relative ability to pay, relative concentration of low income families, the effectiveness of vocational education programs, and manpower needs and job opportunities.

There is a standard rating scale used for each application. For each criterion, whether, for example, the criteria of "located in area of high unemployment," program recognizes "vocational education needs of handicapped," or "program meets needs of eliminating sex bias and sex stereotyping," a five point scale is used by the state administrator. There is a separate rating scale for consumer homemeking. Points are averaged by two-digit occupational code. They are weighted by the following scale:

Relative Abiljty to Pay	5
Relative Concentration of Low income Families	4
Effectiveness of Vocational Ed. Programs	3
Manpower Needs and Opportunities	2

In addition there are special rating sheets specifically for the handicapped, cooperative education programs, disadvantaged set-asides, and teacher training. All use a five point scale.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

The total points of a parish are increased by a "base allotment" of 100 to obtain a "total weighted factor." The total weighted factor is multiplied by enrollment of the parish to determine an "adjusted weighted factor." Presumably, a parish's entitlment to federal funds is its proportionate share of the statewide total of adjusted weighted factors.

COMMENTS ON THE LOUISIANA PROCEDURE:

The Louisiana procedure appears to be more highly subjective than that of many states. State officials are expected to rank applications with regard to such matters as "vocational education needs of unemployed youth." We are unable to ascertain the kinds of data on which such a judgment would be made, much less the techniques of data analysis. Possibly the assessment is made on the basis of verbal statements in an application, but this procedure allows for considerable discrepancy in the judgments made by one reviewer compared to another. It is possible that different data sources are employed to rank proposals of different parishes. Under the heading "Relative Ability to Pay," the following statements appear: "Wealth of the area shall be determined by : a) tax assessments furnished annually by the Louisiana Tax Commission, or b) Personal Income by Parish and Economic Area, or c) Estimates of Louisiana buying income. Source of data shall be the Statistical Abstract of Louisiana or other reliable source" (Emphasis added). The addition of an arbitrary weight

of 100 to a parish's point score reduces considerably the allocative impact of the point scores, practically assuring that all 66 eligible recipients receive some federal funds.

MAINE

1. DATA SELECTED:

Level of Need

LIF

Ability to Raise Revenue

AV per pupil

2. TRANSFORMATION OF DATA INTO POINT SCORES:

A score AV* is assigned on the basis of the assessed value of property per pupil.

Assessed Value/Pupil	AV*
500,000 & up	1
400,000-499,999	2
300,000-399,999	3
200,000-299,999	4
100,000-199,999	5
90,000-99,999	6
80,000-89,999	7
70,000-79,999	8
60,000-69,999	9
50,000-59,999	10
40,000-49,999	11
30,000-39,999	12
20,000-29,999	13
15,000-19,999	14
10,000-14,999	15
0-9,999	16

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

$$\text{Allocation to County C for program type P} = \text{Total Funds available for type P program} \times \frac{LIF_C^* + AV_C^*}{LIF^* + AV^*}$$

where

P = various categories of programs for which the state has allowed the money to be used such as secondary, handicapped, and disadvantaged programs.

COMMENTS ON THE MAINE PROCEDURE:

Step 1: No Malleable Data

Step 2: A Non-Procedural Point Scale, a non-continuous method, is employed to transform assessed values. Raw, continuous counts of low-income families are employed in the formula.

Step 3: WPW used. Formula allocates funds to each of 16 counties. We are unable to determine how funds are subsequently distributed to LEAs.

1. DATA SELECTED

Maryland uses a set of closely related formulas with many common variables that do not correspond precisely to our standard notation. Where necessary, additional definitions are supplied below:

EP_d = expenditure per student for vocational education

EA_d = expenditure per student for all education

VE_d = FTE enrollment in regular vocational programs

AD_d = FTE enrollment in adult vocational programs

HAC_d = FTE enrollment in consumer and homemaking programs

$VFTE_d$ = FTE enrollment in postsecondary and postsecondary adult programs

DE_d = number of full-time equivalent disadvantaged persons

HE_d = number of full-time equivalent handicapped persons

ED_d = economically depressed area

LIF

AV_d

NTE_d = net taxable income

E_d

$WS_d = \frac{AV_d + NTE_d}{E_d}$ = wealth per student

MO_d = manpower need and job opportunities

DR_d

UR_d

$CE/FTET_d$ = receipts for current expenses per FTE student of entire postsecondary institution.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

All of the above data are normalized so that they have mean = 0 and standard deviation = 1. Points are assigned relative to tne number of standard deviations from the mean an eligible recipient's normalized variable is, in accordance with the following scale:

Standard Deviation	Points
-5	0
-4	1
-3	2
-2	3
-1	4
Mean = 0	5
+1	6
+2	7
+3	8
+4	9
+5	10

For example, where drop-out rate is used as a variable, a district whose drop-out rate is 5 standard deviations above the mean will get 10 points, one whose drop-out rate is 0 (normalized) will get 5 points and one whose drop-out rate is 5 standard deviation below the mean will get zero points.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Up to 33% of federal funds may be allocated according to the following formula:

Local Education Agency Points = P_{dl} = 1.5 WS + DOR + MO + UR + EA + EP + ED + 1.5

$$S_{dl} = \text{Total Federal funds Allocated by Formula 1} \times \frac{P_{dl}}{\sum_{\substack{\text{all eligible} \\ \text{recipients } j}} P_{j,l}}$$

At least 67% of federal funds must be distributed by a set of formulas, which we will label 2a, 2b, 2c, 2d, and 2e.

$$2a = P_{dis,d} = DE\ (1.5\ WS + DOR + MO + UR + EA + EP + ED + 1.5\ LIF)$$

$$2b = P_{postsec.,\ d} = VFTE\ (CE/FTET + MO + 1.5\ WS + UR + EP + ED + 1.5\ LIF)$$

$$2c = P_{h,d} = HC\ (1.5\ WS + DR + MO + UR + EA + EP + ED + 1.5\ LIF)$$

$$2d = P_{ch,d} = HAC\ (1.5\ WS + DR + UR + EP + EA + ED + 1.5\ LIF)$$

$$2e = P_{residual,d} = VE\ (1.5\ WS + DR + MO + UR + EA + EP + ED + 1.5\ LIF)$$

then $P_{d2} = P_{dis,d} + P_{postsec,d} + P_{h,d} + P_{ch,d} + P_{res.,d}$

and $S_{d2} = \text{Total Federal Funds Allocated by Formula 2i} \times \dfrac{P_{d2}}{\sum_{\text{all eligible recipients } j} P_{j,2}}$

COMMENTS ON THE MARYLAND PROCEDURE:

Step 1: No malleable data is used.

Step 2: A non-continuous standard deviation method is employed.

Step 3: Weighted Points Method is used.

i) The need for two main formulas, 1 and 2 is nowhere made clear, except with regard to the statement that formula 1 exists "To assure all eligible recipients are provided funds. . . ."

ii) The variables EP and EA are defined under a paragraph labeled "excessive costs." Yet, both are entered separately in the formulas. If one wished to reimburse recipients for excessive costs, a fairer procedure is to use a variable (EP - EA).

iii) The State Plan defines relative financial ability as

$WS_d = \frac{AV_d + NTE_d}{E_d}$ and enters this in its formulas with a weight of 1.5.

If the state actually follows this procedure, the formula awards more money to high wealth districts than to low wealth. Moreover, because EA (expenditures per student) is usually highly correlated with WS, including EA in the formula as described further increases allocations to wealthy districts. In other words, as described by the Plan, the formula completely contradicts federal intent.

iv) The use of standard deviations confines the variation in point scores to a narrow band whenever the underlying distribution of a variable is bell-shaped. Very few districts will have scores more than $\pm$ two standard deviations. Hence, the use of standard deviations makes it likely that most recipients will get about the same number of dollars per student.

MASSACHUSETTS

1. DATA SELECTED

LEAs

Level of Need:

E, U, UR, POP

Ability to Raise Revenue:

AV/E, MFI

Non-LEAs

No formula in FY 79

2. TRANSFORMATION OF DATA INTO POINT SCORES

LEAs

Eligible recipients are ranked in ascending order of their values of AV/E. The eligible recipient at the top of the ranking (the poorest eligible recipient) is ranked number one, x = 1, the eligible recipient second from the top, x = 2, the eligible recipient third from the top x = 3, and so on.

Additionally, eligible recipients are ranked in ascending order of MFI. Each eligible recipient is then assigned a value of Y in the same fashion as values x are assigned. For the eligible recipient with the lowest value of MFI, Y = 1, Y = 2 for the eligible recipient with the second lowest value of MFI, and so on.

For each eligible recipient d, a Z_d is computed, where

$$Z_d = X_d + Y_d.$$

Eligible recipients are then ranked according to the value of Z. Each value of Z is assigned an associated number of points, W. The

following table shows how a value ow W is assigned for a particular value of Z.

Percentile Position of of Z_d on the Z list[1]	W_d
0 - 2	26 - 30
2 - 16	21 - 25
16 - 50	16 - 20
50 - 84	11 - 15
84 - 98	6 - 10
98 and above	1 - 5

[1] Z_d is in the 98th percentile if it is greater than 98% of the other values of Z on the List. (The State offers no more accurate way of assigning values of p than these general ranges. Presumably though, if a particular value of Z is on the low side of a range shown in the left column of the above table, it will be assigned a value of W that is on the low side of the analogous range in the right column).

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

$$AL_{m,d} = \frac{\text{No. of Dollars Deemed Appropriate for Boston}}{E_{Boston} \times W_{Boston}} \times E_d \times W_d$$

The state specifies the percentage of AL that each eligible recipient is to spend on Subpart 2, Supbart 3, and Subpart 5.

Subpart 4 funds are distributed by a different procedure. Each eligible recipient d must meet four requirements to qualify for Subpart 4 funds:

1. $POP_d > 50,000$
2. $W_d > 20$
3. $U_d > 1500$
4. $E_d > 3000$

Subpart 4 money is distributed among eligible recipients who meet these

four requirements such that the number of dollars per student allocated to an eligible recipient is proportional to its unemployment rate.

$$\text{Subpart 4 allocation to eligible recipient} = \$60 \times \frac{UR_d}{\text{Highest UR observed}}$$

COMMENTS ON THE MASSACHUSETTS PROCEDURE:

Step 1: No Malleable Data Used.

Step 2: This is a non-continuous method which is not classifiable in terms of the methods discussed in Section II.

Step 3: Massachusett's formula is difficult to classify. Unless it is true that

$$\frac{\text{No. of Dollars Deemed Appropriate for Boston}}{E_{Boston} \times W_{Boston}} = \frac{\text{Total Funds to be Distributed}}{\sum_{\substack{\text{all LEAs} \\ i}} E_i \times W_i} \qquad (A)$$

there will either not be sufficient funds to make all of the allocations determined in Step 3 or there will be funds left over after the allocations are made. If the funds are not sufficient, this leaves unanswered the question of which LEAs will get less than the amount determined for them in Step 3.

If equation (A) is true, however, than Step 3 is a Weighted Points Method that can be written as follows:

$$AL_{m,d} = \text{Total Funds Available} \times E_d^*$$

$$\text{where } E_d^* = \frac{E_d \times W_d}{\sum_{\substack{\text{all} \\ \text{LEAs } i}} (E_i \times W_i)}$$

If E is a measure of vocational plus general enrollment rather than just vocational enrollment, its use in the formula may lead to inequities, if the ratio between the vocational enrollment and the general enrollment is not the same for all eligible recipients.

MICHIGAN

1. DATA SELECTED:

Secondary Institutions

Level of Need

DO, U, YU, DE

Ability to Raise Revenue

AV per resident member, FF (Federal Forests in District), TC (Transportation Costs), EPP (Expenditure per pupil)

Postsecondary

Level of Need

SE, LIF, ECS, OD (Office occupations; distributive education), PVT (Pupils in Voc/Tech programs), h (health)

Ability to Raise Revenue

AV per vocational education student

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary

Step 1

For each district d, find the number of Student Units $SU_{p,d}$ for each of its programs p.

Step 2

Total Student Units for district d = $TSU_d = \sum_{\text{all programs } p} SU_{p,d}$

Step 3

Find the number of points TP_d, that each district earns on each of the eight scales:

1) Relative Financial Ability

Average equalized valuation per resident	Points
$11,000	10
15,000	9
19,000	8
23,000	7
27,000	6
31,656	5
35,000	4
39,000	3
43,000	2
47,000	1
51,000+	0

2) Property Tax Millage

Rates from 18 to 38+ mills earn from 0 to 10 points, with one point for every 2 mills in excess of 18.

3) Amount of State and Federal Forests in District

Percentages from 0 to 45+ earn from 0 to 10 points, with one point for every 4 percentage points in excess of 0.

4) Excessive transportation costs

Costs from $30 to $130+ earn from 0 to 10 points, with one point for every $10 in excess of $30.

5) Expenditures per pupil

Average expenditures per pupil from $1,500 to $500 earn from 0 to 10 points, with one point for every $100 below $1,500.

6) Needy students (students receiving free and partially paid school lunches)

Percentages of needy students from 2 to 47+ percent earn from 0 to 10 points, with one point for every 3 percentage points in excess of 2 percent.

7) Title I ESEA Eligibles

Percentages of ESEA eligibles from 3 to 23+ percent earn from 0 to 10

points, with one point for every 3 percentage points in excess of 3 percent.

8) Dropout Rate

Dropout rates from 0 to 10+ earn from 0 to 10 points, with one point for every 1 percentage point in excess of 0.

Post-Secondary Formula

Non-Equipment Expenses:

Each institution receives an allocation for each of the following vocational education cost categories.

1) Office Occupations; Distributive Education
2) Voc-Tec
3) Health

Step 1

Ability to Pay Score AP*

No. of Students in Voc-Tech programs	Assessed Value AP*
0-249,999	1.10
250,000-499,999	1.08
500,000-749,999	1.06
750,000-999,999	1.04
1,000,000-1,249,999	1.02
1,250,000-above	1.00

Step 2

Low Income Score LI*

No. of Occ. Ed. Students at institution receiving BEOG / Total no. of Occ. Ed Students at institution	LI*
.20 and above	1.10
.16-.19	1.08
.12-.15	1.06
.08-.11	1.04
.04-.07	1.02
0 -.03	1.00

Step 3

Sex Equity Score SE*

For each institution, find a value of SE* for each of its 3 cost categories.

Percent of enrollees who are female	SE*
96-100	1.00
86-95	1.02
76-85	1.04
66-75	1.06
56-65	1.08
45-55	1.10
35-45	1.08
25-34	1.06
15-24	1.04
5-14	1.02
0-4	1.00

Step 4

For each postsecondary institution i, find a Weighted Enrollment Score WE* for each cost category-

$$WE^*_{od,i} = SU_{od,i} \times 1.21 \times AP^*_i \times LI^*_i \times SE^*_i$$

$$WE^*_{vt,i} = SU_{vt,i} \times 1.88 \times AP^*_i \times LI^*_i \times SE^*_i$$

$$WE^*_{h,i} = SU_{h,i} \times 1.78 \times AP^*_i \times LI^*_i \times SE^*_i$$

where od = office occupations and distributive education programs
vt = voc-tech programs
h = health programs

3. TRANSFORMATION OE POINT SCORES INTO DOLLAR ALLOCATIONS:

Secondary

$$\text{Allocation to district } d = \text{Total Funds Available for Seconding} \times \frac{TSU_d \times TP_d}{\underset{\text{all } i}{(TSU_i \times TP_i)}}$$

Postsecondary

$$\text{Allocation to institution } i \text{ for office occupations and distributive education programs} = \text{Total funds available for Postsecondaries} \times \frac{WE^*_{od,i}}{WE^*_{od} + WE^*_{vt} + WE^*_{h}}$$

$$\text{Allocation to institution } i \text{ for voc-tech programs} = \text{Total Funds Available for Postsecondaries} \times = \frac{WE^*_{vt,i}}{\sum WE^*_{od} + \sum WE^*_{vt} + \sum WE^*_{h}}$$

$$\text{Allocation to institution for health programs} \quad \text{Total Funds Available for Postsecondaries} \times = \frac{WE_{hi}}{\sum WE^*_{od} + \sum WE^*_{vt} + \sum WE^*_{h}}$$

Equipment Expenses

Step 1

Arrange institutions in descending order of their values of

$$AP^* + LI^* + SE^*$$

Step 2

The institution at the top of the list is assigned a reimbursement rate of 55%. The institution at the bottom of the list is assigned a reimbursement rate of 45%. Those inbetween are reimbursed proportionately.

COMMENTS ON THE MICHIGAN PROCEDURE

Step 1: No malleable data used.

Step 2: A non-continuous Procedural Point Scale is used, whereby all variables are transformed to scales ranging from 0 to 10. The mid-point, 5, is set at the state average and variables earn points by dividing the values of the variable into equal intervals on either side of the mid-point.

Step 3: The Weighted Points Method is used.

i) At the secondary level, each of the eight scales receives equal weight. However, assessed value, property tax millage, publicly owned forests, and expenditures per pupil are all measures of relative financial ability, although only the first is explicitly labeled as such. In effect, measures of financial ability influence half the points earned by the eight scales. The Plan does not explain how these particular variables were chosen, nor does it recognize the implicit weighting.

ii) At the postsecondary level, each of the three variables -- AP, LI, and SE -- enters the equation with equal weight. No explanation is offered for this decision.

MINNESOTA

1. DATA SELECTED:

Secondary and Postsecondary

Level of Need:

PCI, UR, labor force participation rate, ADM, program costs

Ability to Raise Revenue:

AV /ADM

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Point scores are calculated based on four criteria: low income, ability to pay, employment and program costs. Minnesota is divided into thirteen economic development regions. The low income and employment scores are calculated for each of the regions as a whole. The school districts and institution within a region receive that region's score for these two factors. Ability to pay and cost scores are calculated for each LEA individually.

a) Low Income

Region Per Capia Income (PCI)	Point Score
greater than State PCI	0
75% - 100% of State PCI	1
50% - 75% of State PCI	2
less than 50% of State PCI	3

b) Ability to Pay is based on each district's assessed value per ADM. ADM is calculated in full-time equivalency uints (FTEs) of 1050 class-hours (six hours per day for 175 days per fiscal year). Districts are ranked from highest to lowest according to AV/ADM.

AV/ADM, Highest to Lowest	Point Score
Highest Quartile	0
Second Quartile	1
Third Quartile	2
Lowest Quartile	3

c) Employment, part i).

Region UR	Point Score
less than 1.25 x State UR	0
greater than 1.25 x State UR	1

part ii)

Region Labor Force Participation Rate (LFPR)	Point Score
greater than .75 x State LFPR	0
less than .75 x State LFPR	1

Employment score = part i) score + part ii) score.

d) The Cost factor is based on each district's vocational program costs per ADM. Districts are ranked from lowest to highest by cost/ADM.

Cost/ADM, Lowest to Highest	Point Score
Lowest Third	0
Middle Third	1
Highest Third	2

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

In addition to points awarded on the basis of the above criteria, each district receives ten "base points." Federal funds are allocated proportionally to each district's total points multiplied by its existing program costs in thousands of dollars.

let A_d = (Low Income score + AP score + Employment score + Cost score + 10) x $\frac{\text{Total Program Cost}}{\$1,000}$

all for district d.

$$AL\ d = \frac{A_d}{\sum_{\text{all districts } i} A_i} \times \text{funds available}$$

COMMENTS ON THE MINNESOTA PROCEDURE:

Step 1: It is unclear if "total program costs" are the previous year's costs or an estimate based on this year's applications. If they are based on this year's applications, this is Malleable Data. All other data are non-malleable.

Step 2: Transformation into Point Scores is by the Non-Prodedural Point Scale method, a non-continuous method.

Step 3: Dollar Allocations are by the Weighted Points Method.

i) The formula is used to distribute Secondary and Postsecondary funds from sections 120 and 130. The handicapped and disadvanteged setasides and all funds from sections 140 and 150 are distributed on a non-formula basis.

ii) This funding procedure gives great weight to the costs of exisiting programs. Although this is intended to benefit districts with legitimate high costs, (such as large enrollments of handicapped or disadvantaged students), the formula does not discriminate at all among possible sources of high costs. This may tend to perpetuate existing programs that have proportionately high total costs, because they earn proportionately high allocations of federal dollars.

MISSISSIPPI

1. DATA SELECTED

Level of Need:

- LIF, DOR, YU, MN, Median School Years Completed by Population over age 25, Relative Cost

Ability to Raise Revenue:

AV per student

2. TRANSFORMATION OF DATA INTO POINT SCORES

Mississippi employs five basic factors that are standardized composite scores of several subfactors which are also standardized.

a. Factor A -- Manpower Needs and Job Opportunities

Eight subfactors compose this Factor A: 1) Percent of total population employed, 2) total employment trends, 3) new and expanded jobs, 4) new and expanded manufacturing employment, 5) new and expanded nonmanufacturing employment, 5) total annual wages paid nonagricultural workers (1964-73), 7) total annual wages paid nonagricultural workers 1972-73, 8) unemployment trends.

b. Factor B -- Vocational Needs

Three subfactors compose this factor: 1) Annual drop out rate, 2) median school years completed by population over age 25, and 3) percent of youth unemployed.

c. Factor C -- Ability to Pay

Factor C is assessed value per student.

d. Factor D -- Relative Costs

Factor D is determined by average daily salaries per vocational education instructor.

e. Factor E -- Concentration of Low-Income Families

Three subfactors compose Factor E: 1) population density, 2) percent of families above poverty level, and 3) median family income.

All factors and subfactors are standardized using the following formula:

$$\frac{\text{District Factor Score - State Average Factor Score}}{\text{Variance of Factor}} + 5$$

Note that this is not a standard procedure for normalizing a variable. Standard normalization employs the standard deviation, rather than variance, in the denominator. Using variance significantly narrows the range of scores around the mean.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

The five basic factors are used to determine a reimbursement rate. Factors C and E, relative ability to pay and low-income families are multiplied (weighted) by 3, while the remaining factors are multiplied by 2. The total is divided by 5. Consequently, the state average total of all five scores is 12. The ratio of the district total to the state average, multiplied by 50%, determines the local district's reimbursement rate. Thus, for example, if a local district's total of average weighted factors is 11.56, its reimbursement rate is 48.17% (11.56/12.00 x 50%).

This procedure determines reimbursement rates for Subparts 2 (except postsecondary), 3, 4, and 5 (except portion to non-depressed areas).

COMMENTS ON THE MISSISSIPPI PROCEDURE

Step 1: No malleable data used.

Step 2: A continuous Standardized Value Method is used.

Step 3: The Reimbursement Rate Equation Method is used.

The use of variance in the denominator of the standardization procedure results in a very narrow range of scores around the state mean of 12.0. Hence, reimbursement rates will not vary greatly from the state average of 50 percent. The Annual Plan does not list the rates of districts, but it is unlikely that many, if any, are less than 48 percent or greater than 52 percent. Consequently, Mississippi employs a very elaborate procedure that leads to very little distinction among districts. Moreover, since the reimbursement rate method is used and the range is small, the state is probably allocating more dollars per student to high wealth districts (with higher expenditures to start with) than to low wealth. In effect, the factors have practically no influence, and the result is almost the same as if the state uniformly reimbursed all districts at 50 percent.

MISSOURI

Formula 1

1. DATA SELECTED

Level of Need

E, U, H, LIF, DE, AFDC, MOTIS (Vocational education enrollment)

Ability to Pay

AV, MFI, LEF, U

Quality of Program

MN*

2. TRANSFORMATION OF DATA INTO POINT SCORES

Enrollment Score EN*

$$EN_d^* + 10\left(\frac{X_d - u_x}{s_x}\right) + 50$$

where $X_d = \dfrac{\text{MOTIS Enrollment}_d}{.70\ (\text{Total Grade 9-12 enrollment}_d)}$

$$\times\left[\frac{\text{ADFC}_d}{\text{MOTIS Enrollment}_d} + \frac{\text{MOTIS disadvantaged}_d}{\text{MOTIS Enrollment}_d} + \frac{\text{MOTIS handicapped}_d}{\text{MOTIS Enrollment}_d} + \frac{\text{Handicapped Population}_d}{\text{Total District Enrollment}_d}\right]$$

u_x = mean of all values of X

s_x = standard deviation of the values of X

Ability to Pay and Low Income Score APLI*

$$APLI^* = 10\left(\frac{Y_d - u_y}{s_y}\right) + 50$$

where $Y_d = \left[\frac{\text{Mill Rate of Taxation}_d}{\text{Assessed Valuation}_d} \times \frac{\text{State Average Family Income}}{\text{County Average Family Income}_d}\right]$

$$+ \frac{\text{Count Average Unemployment}_d}{\text{State Average Unemployment}}$$

$$+ \frac{\text{\% of County households with income under \$3,000}}{\text{\% of State households with income under \$3,000}}$$

Manpower Needs Score MN*

The description of the procedure for determining this score is unclear. It seems to be determined on the basis of the ratios between the number of students being trained for each four-digit occupation code and the number of job openings for that four-digit code. The score is standardized.

Total Score TS*

$$TS_d^* = 10\left(\frac{Z_d - u_z}{s_z}\right) + 50$$

where $Z_d = APLI_d^* \times (MN_d^* + EN_d^*)$;

u_z = mean of all values of Z;

s_z = standard deviation of all values of Z.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Formula 1

This formula is used to allocate federal funds (Section 120) for regular vocational programs.

$$\text{Allocation to eligible recipient } d = \text{Total funds available} \times \frac{TS_d \times \text{Approved Vocational Expenditures}_d}{\sum_{\text{all eligible recipients } j} (TS_j^* \times \text{Approved Vocational Expenditures}_j)}$$

where $d \in j$: $j = 1, 2, \ldots, n$

n = number of eligible recipients

COMMENTS ON THE MISSOURI PROCEDURE

Step 1: No malleable data used.

Step 2: A continuous, Standardized Value method is used.

Step 3: A Weighted Points Method is used.

i) Although the process of standardization appears to give equal weight to the various factors, a number of unstandardized variables are used to compute each of the standardized scores. The result is an implicit weighting that depends on the values of the raw data and the ways they are entered into the computations.

MONTANA

1. DATA SELECTED:

AV / E, LIF, district revenue from local taxation (LR_d), approved excess costs in vocational programs.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

An index of Relative Financial Ability, also called (more accurately) an Adjusted Effort Factor, is computed. It is a ratio of ratios, with the numerator being

$$\frac{AV_d}{E_d} \Big/ \frac{\Sigma AV_j}{\Sigma E_j}$$

and the denominator being

$$\frac{\text{Local Revenue d}}{\text{Ed}} \Big/ \frac{\Sigma \text{ Local Revenue j}}{\Sigma E_j}$$

This is converted to a five point scale as follows:

Adjusted Effort Factor Point Conversion

Value of Index	Points
1.50 and above	5
1.11 - 1.49	4
.90 - 1.10	3
.50 - .89	2
.01 - .49	1

A second set of points is derived from a poverty measure, as follows:

Points	Percent of Families by County with Income Below Poverty Level
	5
16.1 % and above	4
13.0 - 16.0 %	
10.6 - 12.9 %	
8.0 - 10.5 %	
.1 - 7.9 %	

Each set of points is weighted by 10, given a maximum point total for each variable of 50. The two weighted scores are then added together.

2. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS OR REIMBURSEMENT RATES:

The following conversion table is used.

Points (Total of Effort and Poverty Measures)	Reimbursement Rates
100	100
90	90
80	80
70	70
60	60
50	50
40	40
30	30
20	20
10	10
0	0

Applicants having a score of less than 5 receive no federal funds.

Local applications must include total program costs. State officials review budgets and approve certain excess costs for reimbursement at the rates described above. Only excess costs qualify for reimbursement. Excess costs are defined as those costs which are over and above the normal operation of an educational program. Specifically these are listed as extended contract salary, vocational student organizations, adviser stipend, instructional supplies, instructional minor equipment, instructional travel expenses, consultants' fees, consultants' travel, instructional equipment main-

enance and repair, and instructional major equipment.

If federal funds are inadequate to meet stated reimbursement for excess costs, then each applicant receives a proportionate reduction in reimbursement rate.

COMMENTS ON THE MONTANA PROCEDURE:

Step 1: No malleable data used.

Step 2: A non-procedural point scale, a non-continuous method is used.

Step 3: A Tabular Method is used to establish a reimbursement rate.

i) The formula as described above is used to distribute Section 150 federal money and the non-setaside portion of Section 120 money. Other funds are paid out on a request-for-proposal basis. The postsecondary setaside is distributed to five training centers that are considered to be "statewide" institutions.

ii) The Adjusted Effort Factor reduces to

$$\frac{\sum \text{Local Revenue}_j}{\sum AV_j} \cdot \frac{\text{Local Revenue}_d}{AV_d}$$

Thus, the measure is a ratio of the average statewide tax rate to the local tax rate, with districts with below average tax rates earning more points than those with above average rates. In most states, local school tax and local wealth are inversely related. Hence, this index, sometimes described as "index of relative ability," is quite possibly the opposite, rewarding high wealth rather that low-wealth districts.

NEBRASKA

1. DATA SELECTED:

Level of Need:

LIF, DIS, HAN, Vocational Enrollment (VEN), Sex equity (SE), New and emerging occupations (NEO), Economic Depression (ED), New Programs (NP)

Ability to Raise Revenue:

AV per capita

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary

Low Income Family Score LIF*

% of families with low income	LIF_d^*
25 or more	20
20.0-24.9	16
15.0-19.9	12
10.0-14.9	8
5.0-9.9	4
0-4.9	0

Disadvantaged Score DIS*

$$DIS_d^* = 10 \times \frac{\text{No. of disadvantaged students enrolled in d's voc/ed. programs}}{\text{Total no. of disadvantaged students enrolled in all programs at d}}$$

Handicapped Score HAN*

$$HAN_d^* = 10 \times \frac{\text{No. of handicapped students enrolled in d's voc. ed. programs}}{\text{Total no. of handicapped students in all types of programs at d.}}$$

Vocational Enrollment Score VEN*

$$VEN_d^* = 16 \times \frac{\text{Vocational Enrollment at d}}{\text{Total Enrollment at d}}$$

Sex Equity Score SE*

For each of six disciplines (agriculture, business, distributive, health occupations, occupational home economics, trade and industry) each eligible recipient will receive 1 point for each discipline in which the female enrollment is greater than or equal to 10% and the male enrollment is also greater than or equal to 10%.

New and Emerging Occupations Score NEO*

NEO_d^* = 2 x (d's no. of programs serving emerging needs)

NEO* has a maximum value of 6.

Economic Depression Score ED*

Percent of d's geographic area that contains a high unemployment of economically depressed area.	ED_d^*
51 or more	11
26-50	6
1-25	3

New Program Score NP*

NP_d^* = 2 x (d's no. of new programs)

NP* has a maximum value of 10.

Total Score TS*

$$TS_d^* = AP_d^* + LIF_d^* + DIS_d^* + HAN_d^* + VEN_d^* + SE_d^* + NEO_d^* + ED_d^* + NP_d^*$$

Postsecondary

Low Income Score LI*

% of c's population that is "low income"	LI_c^*
25 or more	23
20-24.9	16
15-19.9	12
10-14.9	8
5.0-9.9	4
0-4.9	0

Disadvantaged Score DIS*

Same procedure as secondary disadvantaged score.

Handicapped Score HAN*

Same procedure as secondary handicapped score.

Vocational Enrollment Score VEN*

Same procedure as secondary vocational enrollment score.

Sex Equity Score SE*

A sub-score is assigned to each institution for each of six types of programs. The Sex Equity Score is equal to the sum of these sub-scores.

For traditionally male-dominated programs:

% of program enrollment that is female	sub-score
0-9	0
10-25	1
26 or higher	2

For traditionally female dominated programs:

% of program enrollment that is male	sub-score
0-9	0
10-25	1
26 or higher	2

New and Emerging Occupations Score NEO*

NEO^*_c = c's no. of programs serving emerging occupations

NEO* has a maximum value of 6

where H = highest value of TS* (for technical colleges)

L = lowest value of TS* (for technical colleges)

The Economic Depression Score (ED*) and the New Program Score (NP*) are the same as the secondary equivalents.

Total Score TS*

$$TS^*_c = AP^*_c + LI^*_c + DIS^*_c + HAN^*_c + VEN^*_c + SE^*_c + NEO^*_c + ED^*_c + NP^*_c$$

Ability to Pay Score AP*

In both secondary and postsecondary institutions, the eligible recipients are ranked in descending order of their values of wealth per capita. Each eligible recipient's percentile rank based on wealth per capita is then determined.

$$AP^*_d = 20 \times \frac{\text{Percentile Rank}}{100}$$

(AP* will be a number between 0 and 20.)

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary

$$\text{Reimbursement Rate for eligible recipient}_{d} = \frac{\text{Federal Funds Available for secondaries}}{\text{Total Funds requested by all secondaries}} \times \left[.75 + \left(\frac{.50}{H-L} \times (TS^{*}_{d} - L) \right) \right]$$

Where H= highest value of TS*
L= lowest value of TS*

Postsecondary

$$\text{Reimbursement Rate for elibible recipient}_{c} = \frac{\text{Federal Funds Available for technical colleges}}{\text{Total Funds requested by all technical colleges}} \times \left[.75 + \left(\frac{.50}{H-L} \times (TS^{*}_{c} - L) \right) \right]$$

COMMENTS ON THE NEBRASKA PROCEDURE:

Step 1: No malleable data used.

Step 2: Both procedural and non-procedural point scales, both non-continuous methods, are employed. Proportion of Total methods, which are continuous, are used to compute enrollment scores.

Step 3: Reimbursement Rate Method employed.

i) The computation of TS* fails to standardize variables. Consequently, variables assume different weights in the equation, and these weights have no rational basis.

NEVADA

1. DATA SELECTED:

AV (per capita) POP (county and state), Number of individuals in Poverty, Number of Vocational Education Courses Taught.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

An index of relative wealth is computed. This is the following:

$$Wd = \frac{\frac{\text{State AV}}{\text{State Population}}}{\frac{\text{County AV}}{\text{County Population}}}$$

Next, a measure of county weighted vocational program units is developed. It is equal to the following:

$$WPU_d = 2 \times \text{County Relative Wealth Index} \times \text{County Vocational Program Units}$$

This is the measure used to allocate approximately half of federal vocational funds.

The other half is distributed on the basis of poverty. The point scale is simply.

$$\frac{\text{County Individuals in Poverty}}{\text{Statewide Individuals in Poverty}} = \text{County Percentage in Poverty}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

The only federal funds not distributed by these formulas are Section 130 funds, which go out on a request-for-proposal basis, a block of Section 120 money for Displaced Homemakers (for which

only one LEA applies), and the Section 120 setaside for limited English speaking students (for which only one LEA applies).

The remainder of the federal vocational money is divided into two equal parts. Half is distributed by the formulas:

$$\frac{\text{Amount of Available Funds}}{WPU_j} = \text{Amount of Allocation Per Weighted Unit}$$

and

$S_d = WPU_d \times$ Amount of Allocation Per Weighted Unit

The other half is distributed by the formula:

$S_d =$ County Percentage in Poverty x Amount of Available Funds

COMMENTS ON THE NEVADA PROCEDURE:

Step 1: No malleable data used.

Step 2: Proportion to Total and Ratio to Average Value, both continuous methods, are employed.

Step 3: Weighted Points Method is used.

i) This is one of the few formulas in which funds are distributed on the basis of a count of vocational education courses. The count is described as "The number of secondary certified vocational program units which is the sum of all previous year district vocational education courses receiving one Carnegie unit or its equivalent."

NEW HAMPSHIRE

1. DATA SELECTED

Secondary

Level of Need:

LIF, E

Ability to Raise Revenue:

AV per pupil

Program Quality:

Number of programs offered, quality of plans to eliminate sex bias, quality of programs

Postsecondary

Level of Need:

Number of students eligible for financial aid, number receiving financial aid, amount of financial aid, HE, UR, E

Ability to Raise Revenue:

Amount of general education State support, tuition, other financial support

Program Quality:

Faculty/industry coordination, male/female ratio, overlaps with other postsecondary institutions, sex bias, faculty evaluations, program evaluations, new programs

2. TRANSFORMATION OF DATA INTO POINT SCORES

Secondary

Points are assigned for various criteria.

Assessed valuation per pupil by school district -- 25 points

25,001 - 50,000 = 25
50,001 - 75,000 = 22
75,001 - 100,000 = 19
100,001 - 125,000 = 16
125,001 - 150,000 = 13
150,001 - 175,000 = 10

Demographic Factor -- Concentration of Low Income Families: Percent of Families with income under $4,000 by school district -- 20 points.

20 or higher = 20
15 - 19.9 = 17
10 - 14.9 = 14
5 - 9.9 = 11
4.9 or lower = 8

Program Characteristic Factors -- Number of Programs Offered by School District -- 15 points: .44 point per funded program. Total rounded to nearest whole number.

Two quality measures are done according to the number of years for which a program is approved.

Quality of Plans to Eliminate Sex Bias and Progress Toward Implementation of the Plans by School District. (Consultant Subjective Evaluations) -- up to 10 points.

4 years = 10
3 years = 8
2 years = 6
1 year = 4

Quality of Vocational Program Offerings -- Overall Evaluation of Local Plan by Consultant Staff

4 years = 15
3 years = 12
2 years = 9
1 year = 6

For each of 20 vocational education districts, one school is designated as that district's vocational training center. These 20 schools receive additional points on the basis of enrollment.

Number of Regional (area) students in Project Enrollment -- 15 points

200 or more	= 15
100 - 199	= 13
50 - 99	= 11
25 - 49	= 7
0 - 24	= 5

Postsecondary

I. Institution's Ability to Pay (28 points) -- sum of three factors:

1. State Support for Student for Day School. Divide the net state appropriation by the number of full-time students enrolled in September. Points are awarded as follows:

Under $2,000	10 points
2,000 - 2,199	8 "
2,200 - 2,399	6 "
2,400 - 2,599	4 "
2,600 and over	2 "

2. A Tuition Factor. Points are assigned based on the ratio of tuition to state aid, as follows:

Over 30%	9 points
25% - 30%	7 "
21% - 25%	5 "
16% - 20%	3 "
15% or less	1 "

3. Other Financial Resources. Points are assigned based on amount of financial support for Day School programs in existence for two or more years from other than state funds, tuition or financial aid:

$ 0 -	$ 9,999	9 points
10,000 -	19,999	7 "
20,000 -	29,999	5 "
30,000 -	39,999	3 "
40,000 -	49,999	1 "
Over	50,000	0 "

II. Students' Financial Status (28 points) -- sum of four factors:

1. Percentage of Students Eligible for Financial Aid. Points are assigned as follows:

- 50% and over	9 points
35 - 49%	6 "
20 - 34%	3 "
5 - 19%	1 "

2. Percent of Students Determined To Be Eligible Actually Awarded Financial Aid. Points are assigned as follows:

- 50% and over	9 points
35 - 49%	6 "
20 - 34%	3 "
5 - 19%	1 "

3. Percent of Students Receiving Aid Amounting To 50% or More of the Cost of Attending the Institution for the Academic Year. Points are assigned as follows:

- 40% or over	5 points
31 - 40%	4 "
21 - 30%	3 "
11 - 20%	2 "
0 - 10%	1 "

4. Number of Handicapped Students Imposing Excess Costs. Points are assigned as follows:

12 and over	5 points
8 - 11	4 "
4 - 7	3 "
1 - 3	2 "

III. Meeting with Needs of Business and Industry (15 points) -- sum of three factors:

1. The percent of Day School programs with craft committees which meet with faculty a minimum of twice a year. Points are assigned as follows:

90 - 100%	4 points
80 - 89%	3 "
70 - 79%	2 "
60 - 69%	1 "
Under 60%	0

2. Unemployment Rate. An institution which draws students from the entire state uses the state unemployment rate. All others use unemployment rates in their local areas.

3. Freshman Enrollment Compared to Total Day School Capacity as of September Enrollment. Points are assigned as follows:

95% capacity	5 points
90 - 94% "	4 "
85 - 89% "	3 "
80 - 84% "	2 "
75 - 79% "	1 "

IV. Meeting Students Needs (22 points) -- sum of five factors:

1. Day School Male/Female Institution Ratio. Points are assigned as follows:

Over 45% each	5 points
33 - 44% "	3 "
20 - 32% "	1 "

2. A Program Duplication Factor: Points are assigned based on the percent of institution Day School porgrams which would be available to students at other postsecondary institutions within a 45 minute commuting distance of the institution in which the student is enrolled.

Less than 20% duplication		5 points
21% - 40%	"	3 "
41% - 60%	"	1 "
Over 60%	"	0

3. A Sex Equity Factor. Points are assigned based on the total number of male or female students enrolled in courses normally dominated by the opposite sex.

10 or more non-traditional students		6 points
6 - 9	" "	4 "
2 - 5	" "	1 "

4. Existence of Faculty Evaluation Method.

Formal Plan	3 points
No Formal Plan	0 "

5. Frequency of Faculty Evaluation.

Once a year	3 points
Once every two years	1 point

V. Evidence of Special Needs for Program Improvement - 2 points.

VI. New Programs to be Inaugurated this Fiscal Year

2 or more	10 points
1	5 "
none	0 "

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary and Postsecondary

Allocations are proportional to each district's total points.

$$\text{district allocation} = \frac{\text{sum of all scores for district}}{\text{sum of all scores for all districts in State}} \times \text{Funds Available}$$

COMMENTS ON THE NEW HAMPSHIRE PROCEDURE

Steo 1: i) The following are Malleable Data: quality of plans to eliminate sex bias, quality of vocational program offerings. ii) Several of the postsecondary criteria are vague and may therefore be malleable. These are: III.1, "craft committee"; III.3, "freshman capacity"; IV.3, "normally dominated by the opposite sex"; and LV.4, "formal method for evaluating faculty."

Step 2: Point Scores are assigned by the Procedural and the Non-Procedural Point Scale methods, both non-continuous.

Step 3. The Weighted Points Method is used.

i) Generally, there is no explanation for the different weights with which the various factors earn points.

ii) In the handicapped enrollment and sex bias criteria for post-secondary, the use of raw figures, rather than percents, favors large institutions.

iii) The reason for postsecondary criterion I.2 which encourages high tuition is not explained.

iv) The number of points given postsecondary institutions for new programs (VI) seems excessive and may discriminate against institutions which already offer a broad range of programs. It may also encourage unnecessary turn-over or adjustment of programs.

NEW JERSEY

1. DATA SELECTED:

Vocational Education Need (VEN), Per Capita Income (PCI), UR DR, E, HE, POP, CAFDC, State Aide for local schools, Dollars of school tax dollars of total local tax in municipalities, New programs

2. TRANSFORMATION OF DATA INTO POINT SCORES:

For distribution of federal funds to secondary programs, VEN, PCI, UR, and DR, as computed for counties, are transformed into point scores by unspecified, non-continuous methods. There are 21 counties. The unemployment rates, for example, are scored as follows:

Unemployment Rate = UR*	Point Scores
7.8	1
none listed	2
9.1	3
9.3	4
9.5	↓
10.0	5
10.7	6
10.7	↓
10.8	
10.9	
11.1	7
11.2	↓
11.4	
11.4	
11.8	8
12.6	9
none listed	10
none listed	11
14.2	12
14.7	13
14.3	↓
15.3	14
none listed	15
16.6	16
17.0	17
21 counties	

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

New Jersey employs one set of procedures to distribute federal funds to secondary programs and another set to distribute federal money to postsecondary programs.

Secondary

There is one set of procedures to direct the money to counties and another process to govern intra-county allocations. The state-to-county procedures are as follows:

For Sections 120, 110(b) and 140 money, an index is computed as

(i) .60 VEN + .25 PCI + .10 DR, where VEN, PCI, and DR are point scores computed as noted above.

For Section 150 money, an index is computed as

(ii) .75 CHE + .25 PCI

For Section 122 money, the index is

(iii) .65 VEN + .25 PCI + .10 DR

For Section 110(a), the index is

(iv) .75 (HE) + .25 PCI

The weighted point scores from (i), (ii), (iii), and (iv) are summed to form a County Need Index. A county allocation is

$$\text{Total Vocational Education Funds Available} \times \frac{\text{County Need Index}}{\text{Statewide Sum of County Need Index.}}$$

The procedure used by county officers to distribute funds to LEA's for secondary programs are not clearly described, but the "criteria used to rank fiscal year 1979 applications" are stated to be 1) children from low-income families, 2) state aid for schools, 3) school tax as a percent of total tax, and 4) new programs and modified programs as a percent of the total program. How these separate elements are weighted and whether all LEA's are entitled to federal funds are points not disclosed.

Postsecondary

Federal funds for postsecondary programs are distributed under the following formula:

$$\text{Allocation to County c} = \text{Funds Available for Postsecondary Programs} \times \left[.20 \frac{\text{Unemployment rate for county c}}{\text{Sum of Unemployment rates of all counties}} + .30 \frac{\frac{1}{\text{per capita income of county c}}}{\text{Sum of the value of } \frac{1}{\text{per capita income of county}} \text{ for all counties}} + .50 \frac{\text{population of county c}}{\text{population of state}} \right]$$

COMMENTS ON THE NEW JERSEY PROCEDURE:

Step 1: Distribution is based on "Vocational Education Need" and "New Programs" in addition to other criteria. The Plan offers no explanation as to how these are computed and they may contain malleable data.

Step 2. Unspecified, non-continuous methods are employed.

Step 3. A Weighted Points Method is used.

i) Formula distributes funds to counties. While intracounty distributions are said to take into account such factors as local tax effort and new programs, no explanation is offered as to how this is done. Relative financial ability plays no part in distributions to counties.

ii) Actual enrollment has no effect on distribution of postsecondary funds. Allocations are based on county population which may have no strong relation to the number of postsecondary vocational education students.

NEW MEXICO

1. DATA SELECTED

Level of Need:

LIF, U, FTE

Ability to Raise Revenue:

AV per capita

2. TRANSFORMATION OF DATA INTO POINT SCORES

New Mexico employs four factors in its distribution procedures: 1.) Relative Ability to Pay (Assessed value per capita), 2.) Percentage of Low-Income Families, 3.) Unemployment Rate, and 4.) Student FTE. Each of these factors is converted into weights, which for the four factors total 100 points, statewide. Thus, the total number of points earned by an eligible recipient represents the percentage of federal funds for which it is eligible. The plan offers no explanation for the relative weights assigned to the four factors, although ability to pay and percentage of low-income families are weighted more heavily. Similarly, there is no rationale given for how raw scores of LEAs are converted to weights.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

New Mexico distributes all federal VEA to eight postsecondary institutions; secondary vocational education is funded wholly by state and local dollars. Each of the eight postsecondary institutions earns points on four separate factors. By design, points for all eight institutions total 100; therefore, an institutions' point score represents its share of federal funds. Albuquerque TVI, for example, had a total score of 37 in 1979-80 and received 37 percent of federal funds.

COMMENTS ON NEW MEXICO'S PROCEDURE

Step 1: No malleable data used.

Step 2: A non-continuous, non-procedural Point Scale Method is used.

Step 3: WPM is used. New Mexico provides a good illustration of the need to adjust each factor in the formula by FTE, rather than simply including FTE as one of several factors in a formula. In this instance, Albuquerque TVI, with over 60 percent of the state's FTE, receives only 37 percent of the funds. This happens despite the fact that the LEA has about average ability to pay, average unemployment, and the highest concentration of low-income families of all eight LEAs.

NEW YORK

1. DATA SELECTED:

Planning Region (New York's formulas distribute funds to thirteen planning regions, each of which contains many LEAs).

Level of Need:

LIF, POP, no. of ESEA Title I participants, U, LESA, HE, RYU, DR

Ability to Raise Revenue:

AV per capita

2. TRANSFORMATION OF DATA INTO POINT SCORES:

a) Regular programs under section 120 and programs under sections 134 and 150.

These funds are distributed according to regional assessed value per capita, population, and the number of low income families.

$$A_r^* = \left(2 - \frac{\text{region r's assessed value per capita}}{\text{state assessed value per capita}}\right) \times \frac{\text{population of region r}}{\text{population of state}}$$

$$LIF^* = \frac{\text{region LIF}}{\text{state LIF}}$$

b) Secondary Disadvantaged funds from section 120.

$$ESEA^* = \frac{\text{ESEA Title I participants in region}}{\text{ESEA Title I participants in state}}$$

c) Postsecondary and Adult Disadvantaged funds from section 120.

$$U^* = \frac{\text{no. of unemployed in region}}{\text{no. of unemployed in state}}$$

23.578% of the Postsecondary and Adult Disadvantaged funds are earmarked for postsecondary programs. The balance is used for adult programs.

d) Limited English-Speaking Ability funds from section 120.

LESA funds are distributed to only five regions with high concentrations of persons with limited English-speaking ability.

$$LESA^* = \frac{\text{LESA in region}}{\text{LESA in all five high LESA concentration regions}}$$

61.468% of each region's LESA allocation is earmarked for secondary programs, 8.257% is for postsecondary programs, and 30.276% is for adult programs.

e) Handicapped funds from section 120.

$$HE^* = \frac{\text{No. of handicapped students receiving special ed. in region}}{\text{No. of handicapped students receiving special ed. in state}}$$

f) Special Disadvantaged funds from section 140.

These funds are distributed according to the rate of youth unemployment (RYU) and the drop-out rate (DR) weighted by population (POP).

$$B_r^* = \frac{\text{region r POP}}{\text{state POP}} \times \frac{\text{region r RYU}}{\text{state RYU}} \times \frac{\text{region r DR}}{\text{state DR}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Part a) funds

$$\text{region r allocation} = \left[.87\ (.75\ \frac{Ar}{\sum_{\text{all regions}} A_i} + .25\ LIF^*) + .01\right]$$

Parts b), c), d), and e) funds

Each region's allocation is simply the region's score multiplied by the funds available (i.e. handicapped funds allocation = HE* x funds available.)

Part f) funds

$$\text{region r allocation} = \frac{B_r}{\sum_{\substack{\text{all} \\ \text{regions}}} B_i} \times \text{funds available}$$

COMMENTS ON THE NEW YORK PROCEDURE:

Step 1: No Malleable Data used.

Step 2: Point Scores are by Proportion of Total and Ratio to Average Value methods, both continuous.

Step 3: Dollar Allocations are by Weighted Points Method.

1) No formulas are used by regions to distribute funds to LEAs.

2) The distribution of funds for limited English-speaking ability may be inequitable because only five of the thirteen regions receive such funds.

3) The reasons for the total amounts allocated to each of the various uses (e.g., Adult Disadvantaged) are not explained.

NORTH CAROLINA

1. DATA SELECTED

All Secondary Except Subpart 4 and Workstudy

Level of Need:

LIF, ADM, U

Ability to Raise Revenue:

Total Personal Income, AV/ADM

Secondary Subpart 4 and Workstudy (Subpart 2)

Level of Need:

DR, RYU

Postsecondary

Level of Need:

U, economic depressed area, new and emerging occupations, ECS

Ability to Raise Revenue:

Equalized tax valuation, POP by county

2. TRANSFORMATION OF DATA INTO POINT SCORES

All Secondary Except Subpart 4 and Workstudy

The funding factor for each LEA d is calculated as follows:

$$\text{Funding Factor} = FF_d = \frac{LIF_d + ADM_d + U_d}{LIF_{state} + ADM_{state} + U_{state}}$$

Secondary Subpart 4

Each LEA d is ranked from highest to lowest according to

drop out and youth unemployment rate by percentage points.

$$\text{Special Disadvantaged Needs Rank}_d = (DR_d - DR_{state}) + (RYU_d - RYU_{state})$$

Secondary Workstudy

Each LEA d is awarded workstudy points (WS*) as follows:

$$WS^* = \frac{DR_d + RYU_d}{DR_{state} + RYU_{state}}$$

Postsecondary

Each district which submits an application will be ranked according to the following criteria:

a) The highest rate of unemployment of an administrative area (county(ies) providing local support).

b) The county (ies) (administrative area) which has been designated as an economically depressed area by the U.S. Dept. of Commerce.

c) New and emerging occupations as identified by the N.C. Employment Security Commission or the N.C. Dept. of Commerce.

Each will then receive a funding factor based on their concentration of higher than average cost students (ECS).

$$\text{funding factor}_d = \frac{ECS_d}{\sum_{\text{all } i} ECS_i}$$

This transformation applies to all Subpart 2 and 3 funds, except

construction (Subpart 2) and research, exemplary and curriculum development (Subpart 3) which are funded on an application by application basis.

This transformation applies to Subpart 4 funds only if the district is in a county having both RYU and DR higher than the state average.

3. TRANSFORMATION OF POINT SCORES INTO REIMBURSEMENTS

All Secondary Except Subpart 4 and Workstudy

The funding factor is simply multiplied by the Funds Available to determine the allocation to each LEA.

Allocation to LEA = (Funding factor) (Funds Available)

Secondary Subpart 4

Only those LEAs with a positive needs rank are eligible for reimbursement. Starting with the LEAs at the top of the needs rank, LEAs are reimbursed 100% until all the federal funds allocated under this subpart are exhausted.

Secondary Workstudy

The workstudy points for each LEA are simply multiplied by the workstudy funds available to determine the workstudy reimbursements.

Workstudy Reimbursement = (WS*) (workstudy funds available)

Postsecondary

The mechanism for transforming the district rank and funding factors into dollar allocations is incomprehensible.

COMMENTS ON THE NORTH CAROLINA PROCEDURE:

Step 1: All secondary but Subpart 4 and Workstudy i) No malleable data used. ii) The definitions and sources of data to be used are found in the five year plan.

Postsecondary i) ECS includes handicapped persons, persons from low income families and persons from families in which English is not the dominant language.

Step 2: Strictly speaking, North Carolina does not transform its data into points. For the purposes of this study, the State's method of aggregating data into factors for reimbursement was discussed in the "Step 2" section.

Step 3: The actual method of transforming factors for reimbursement into dollar allocations is difficult to determine. The description of the funding mechanism in the Five year plan is very unclear. The analysis presented herein reflects an attempt to make sense of the plan, but it should not be considered a definitive analysis of the State's procedure.

i) It is not clear how relative financial ability enters into the distribution process. The state appears to have adopted the following practices for secondary and postsecondary distributions.

Postsecondary No federal funds are used to support Subpart 5 programs.

Step 3: The actual method of transforming factors for reimbursement into dollar allocations is unclear.

All Secondary but Subpart 4 and Workstudy i) This transformation is applied to each district for each allotment of Federal Funds (Basic Grant, Disadvantaged, Handicapped, Vocational Guidance, and Consumer and Homemaking.) ii) Each LEA d is ranked according to Ability to Pay..

$$\text{Ability to Pay Rank for Eligible Recipient d} = \left(3 \times \frac{\text{Total Personal Income in d}}{ADM_d}\right) + \frac{\text{Assessed Value of d}}{ADM_d}$$

The relative ability to pay is used to determine the percent of Federal Funds that must be matched by the LEA. The Five Year Plan does not specify how this determination is accomplished.

Postsecondary The relative ability to pay for each postsecondary district which applied for reimbursement is determined as follows:

$$\text{Ability to Pay d} = \frac{\text{Assessed valuation of county containing d}}{\text{Latest official population count of county containing d}}$$

The Five Year Plan states that the ratio of Federal to State matching funds will be determined by this index. The Five Year Plan does not specify how this determination is accomplished.

NORTH DAKOTA

1. DATA SELECTED:

Secondary

AV / E, CAFDC, New Programs (NP), Out-of-district enrollment

Postsecondary

AV / E, CAFDC, NP, HE, DVE, LESA, legislative appropriations to postsecondary institutions, total vocational instructional costs in postsecondary institutions.

2., 3. TRANSFORMATION OF DATA INTO POINT SCORES AND TRANSFORMATION OF POINT SCORES INTO REIMBURSEMENT RATES:

In North Dakota, the transformation of data into point scores is more or less integrated with the computation of reimbursement rates, so we deal with these two topics simultaneously. However, procedures for distributing federal funds to secondary institutions are quite distinct from those used for postsecondary institutions.

Secondary

The ratio of

$$\frac{AV_i}{E_i} \Big/ \frac{AV_d}{E_d}$$

is computed for all LEA's. These ratios are translated into partial reimbursement rates under the follow table.

Table I

WEIGHTED FACTORS PER PUPIL TAXABLE VALUATION	RATE OF REIMBURSEMENT Sections: 120	120,134	140	150
1.25 and above	60%	40%	65%	15%
1.20 - 1.24	59%	39%	64%	14%
1.15 - 1.19	58%	38%	62%	13%
1.10 - 1.14	57%	37%	58%	12%
1.05 - 1.09	56%	36%	54%	11%

WEIGHTED FACTORS PER PUPIL TAXABLE VALUATION	RATE OF REIMBURSEMENT Sections: 120	120,134	140	150
1.00 - 1.04 State Average	55%	35%	50%	10%
.95 - .99	54%	34%	46%	9%
.90 - .94	53%	33%	42%	8%
.85 - .89	52%	32%	39%	7%
.80 - .84	51%	31%	34%	6%
.79 - below	50%	30%	30%	5%

Secondly, the ratio $\frac{CAFDC_d}{\text{child pop}}$ is computed for all LEA's and translated into partial reimbursement rates under the following table:

PERCENT OF LOW INCOME CHILDREN	RATE OF REIMBURSEMENT Sections: 120	120,134	140	150
20% and Above	20%	20%	35%	15%
19%	19%	19%	34%	14%
18%	18%	18%	33%	13%
17%	17%	17%	31%	12%
16%	16%	16%	28%	11%
15% State Average	15%	15%	25%	10%
14%	14%	14%	22%	9%
13%	13%	13%	19%	8%
12%	12%	12%	16%	7%
11%	11%	11%	13%	6%
10% and Below	10%	10%	10%	5%

These two partial reimbursement rates are simply added together to yeild a total reimbursement rate at the secondary level. For example, a local educational agency with a Weighted Factor Per Pupil Taxable Valuation of .92 and a Percent of (Low Income Children) of 18 would receive 33% + 18% or a 51% rate of reimbursement for a section 120 program.

In addition, at the secondary level, the state may make discretionary grants on two bases. For initiating new programs or for operating high cost programs, the reimbursement rate may be increased by up to 10%. Secondly, for each school served in a region outside the school district, an additional 2% may be granted on the reimbursement rate for instructional

costs up to a maximum of an additional 10%. A maximum of 50% of the costs of initial equipment may also be allowed.

Postsecondary

For each postsecondary institution that lacks local taxing powers (the general case), the following ratio is computed:

$$\text{Relative Ability to Pay} = \frac{\text{Legislative Appropriations to Institution d}}{\text{Total Instructional Costs of Vocational Programs}_d}$$

This ratio is transformed into a weighted factor under the following table.

Table III

Relative Ability to Pay	Weighted Factor
0-10	90-100
11-20	80-90
21-30	70-80
31-40	60-70
41-50	50-60
51-60	40-50
61-70	30-40
71 & Up	30 or Less

Next, for each eligible recipient, a second ratio is computed, namely,

$$\frac{HE_d + DVE_d + LESAE_d}{E_d}$$

These ratios are converted into a weighted factor by the following table:

Table IV

% of High Concentration of Low Income, Handicapped & LESA	Weighted Factor
90-100	18-20
80-89	16-18

70-79	14-16
60-69	12-14
50-59	10-12
40-49	8-10
30-39	6-8
30 or Less	6 or Less

Finally, the two weighted factors are added together and are translated into a postsecondary reimbursement rate by the following table:

Table V

Sum of Weighted Factors	Reimbursement Range
108-120	90 - 100%
96-108	80 - 89%
84-96	70 - 79%
72-84	60 - 69%
60-72	50 - 59%
48-60	40 - 49%
36-48	30 - 39%
Less Than 36	Less Than 29%

COMMENTS ON THE NORTH DAKOTA PROCEDURE:

Step 1: No malleable data used.

Step 2: Generally, a continuous Ratio to Average Value is employed.

Step 3: A Tabular Method is used to determine reimbursement rates.

i) At the secondary level, the reimbursement rate is applied to a local educational agency's costs for vocational instruction, defined to consist of approved salaries, equipment and durable aids, travel and "other instructional costs" (Ibid.).

ii) In the case of the postsecondary formula, note that Relative Ability to Pay is defined as the percentage of the institution's costs that are covered by Legislative Appropriation. The possibility that the institution's costs are higher than necessary for the population it serves is ignored by this procedure. An institution which proposes an expensive

program and receives a small appropriation from the legislature will, by this definition, have a low ability to pay and therefore receive a large amount of federal funds, even though it may not need such an expensive program.

OHIO

1. DATA SELECTED:

ADA, LEE, RYU, Manpower Needs by County, UR, New Programs, AV/E, CAFDC, LIF

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Data are accumulated for each eligible recipient under the seven headings noted below. Each eligible recipient is assigned a rank score, from low to high or high to low, as the case may be. If there are 600 eligible recipients and we are considering, say, youth unemployment (high to low ranking), the district with the highest unemployment rate will receive a point score of six hundred and the district with the lowest will receive a point score of one.

The seven criteria are

Unemployment Rate	High to Low
Youth Unemployment Rate	High to Low
LEA's per Student Cost for Education	High to Low
Manpower Needs -- est. no. of job opportunities	High to Low
Number of Low Income Families	High to Low
Relative Proportions of Children in Low Income Children (to 10,000 Total Population)	High to Low
Taxable Property Per Student	Low to High

LEA Totals of these seven point scores are added up. All have equal weight except Taxable Property Per Student, which has a weight of 2. Each LEA total is then divided by 7, and the resulting number is called the composite score.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

The eligible recipients are listed in descending order of their

composite scores. Eligible recipients in the top third are given an "A" classification, those in the middle third are classified as "B" and the bottom third are given a "C" classification. The classification establishes either a dollar sum for distribution or a reimbursement rate, depending on the item of expenditure, as under the following classification:

Local Directors of Vocational Education	A $8,500 B 8,250 C 8,000
Superintendents of Joint Vocational School Districts	A 9,500 B 9,250 C 9,000
Local Supervisors of Vocational Programs	A 7,500 B 7,250 C 7,000
Local Coordinators	A 6,500 B 6,250 C 6,000
Local Vocational Guidance Counselors	A 5,500 B 5,250 C 5,000
Equipment for Approved Programs	A 60% B 55% C 50%
Travel Support	A 77% B 76% C 75%
Adult and Postsecondary Programs	
A. Public Institutions	A 11,500* B 11,250* C 11,000*
	A 10,000** B 9,750** C 9,500**

B. Private Institutions	50% of Above Rate
Hourly Reimbursement Rates -- Part Time	A 5.00 B 4.75 C 4.50
Apprenticeship	Up to 50¢ per hour guaranteed, based upon expenditures of local board funds
Postsecondary Director	A 6,750 B 6,500 C 6,250
Supervisors	A 5,250 B 5,000 C 4,750

* This is reimbursement rate for 36-week program if the entire curriculum is approvable as vocational or technical.

** This is reimbursement rate for 36-week program if elective courses are non-vocational.

COMMENTS ON THE OHIO PROCEDURE:

Step 1: If funds are insufficient to meet the financial requirements of the distribution plan, then the state funds applicants in an order of priority determined by a) unemployment rate, and b) program innovation. This latter variable appears to be malleable.

Step 2: Ohio employs a non-continuous Ranking Method.

Step 3: A Tabular Method is used.

i) The differences in dollars and in reimbursement rates by A, B, and C classifications appear to be small. For all whole dollar categories of aid, e.g., local directors, superintendents, coordinators, etc., the dollar differences between the A and B classification of LEAs are $250 and between B and C are likewise $250. Obviously, the percentage differences between the classification of dollar aid decline as the base amount (the C

amount, say) of aid is higher. As for reimbursement rates, the difference in rate of aid for travel between the most needy LEA and the least needy is only 2 percentage points. Thus, the state employs substantial data collection and a rather cumbersome ranking process to make distinctions that result in minor differences in allocations of funds.

ii) Approved construction is reimbursed at a rate of 65 percent in areas characterized by a high concentration of low income families and at a rate of 50 percent elsewhere.

OKLAHOMA

1. DATA SELECTED

Secondary

Level of Need:

LIF, UR, HE, DE, DR

Ability to Raise Revenue:

AV/ADA, property tax rate

Postsecondary

Level of Need:

HE, DE

Ability to Raise Revenue:

funds requested, state and local funds allocated

Area Vocational and Technical Schools

Level of Need:

LIF, HE, DE, UR, DR

Ability to Raise Revenue:

AV/FTE

2. TRANSFORMATION OF DATA INTO POINT SCORES

Secondary

a) Points are attached to various indicators of need.

$$\frac{\text{no. of families below poverty income}}{\text{district total number of families}} \times 100$$

Index Range

8 - 11.5 = 1
11.6 - 15.0 = 2
15.1 - 18.5 = 3
18.6 - 22.0 = 4
22.1 - 25.5 = 5

25.6 - 29.0 = 6
29.1 - 32.5 = 7
32.6 - 36.0 = 8
36.1 - 39.5 = 9
39.6 - 43.0 = 10

$$\frac{\text{No. of handicapped voc. students}}{\text{District total voc. enrollment}} \times 100$$

Percent Handicapped

0 - 3 = 1
4 - 7 = 2
8 - 11 = 3
12 - 15 = 4
16 - 100 = 5

$$\frac{\text{No. of disadvantaged voc. students}}{\text{District total voc. enrollment}} \times 100$$

Percent Disadvantaged

0 - 6% = 1
7 - 13% = 2
14 - 20% = 3
21 - 27% = 4
28 - 100% = 5

County Unemployment Rate

0 - 2 = 1 point
3 - 4 = 2 points
5 - 6 = 3 points
7 - 8 = 4 points
9 - 10 = 5 points

b) Ability to Pay (AP*)

Assessed value per ADA

0 - 1,000 = 10
1,000 - 2,000 = 9
2,001 - 3,000 = 8
3,001 - 4,000 = 7
4,001 - 5,000 = 6
5,001 - 6,000 = 5
6,001 - 7,000 = 4
7,001 - 8,000 = 3
8,001 - 9,000 = 2
9,001 - 10,000 = 1
10,001 - greater = 0

Property tax rate (in mills)

20 - 22 = 1
23 - 24 = 2
25 - 26 = 3
27 - 28 = 4
29 - 30 = 5
31 - 32 = 6
33 - 34 = 7
35 - 36 = 8
37 - 38 = 9
39 - 40 = 10

$$AP^* = \frac{\text{AV/ADA score + property tax score}}{2}$$

Postsecondary

a) Ability to pay is determined according to the amount applied for which is not supplied by state or local funds.

AP* = Amount requested - state and local funds allocated

b) A cost score is given based on handicapped and disadvantaged student enrollments.

COST* = handicapped enrollment + disadvantaged enrollment

Area Vocational and Technical Schools (AVTS

a) Level of Need

$$\frac{\text{no. of families below poverty income}}{\text{total families in AVTS service area}} \times 100$$

Percent below poverty level

8.0 - 11.5 = 1
11.6 - 15.0 = 2
15.1 - 18.5 = 3
18.6 - 22.0 = 4
22.1 - 25.5 = 5
25.6 - 29.0 = 6
29.1 - 32.5 = 7
32.6 - 36.0 = 8
36.1 - 39.5 = 9
39.6 - 43.0 = 10

$$\frac{\text{Handicapped enrollment}}{\text{Total AVTS enrollment}} \times 100$$

$$\frac{\text{Disadvantaged enrollment}}{\text{Total AVTS enrollment}} \times 100$$

Percent handicapped

0 - 7 = 1
8 - 15 = 2
16 - 23 = 3
24 - 30 = 4
31 - 100 = 5

Percent Disadvantaged

0 - 20 = 1
21 - 30 = 2
31 - 40 = 3
41 - 50 = 4
51 - 100 = 5

AVTS service area unemployment rate

0 - 2 = 1
3 - 4 = 2
5 - 6 = 3
7 - 8 = 4
9 - 10 = 5

a) Ability to pay is the total area assessed value per full-time student.

Assessed value per FTE.

94,903 - 117,210 = 10
117,211 - 139,517 = 9
139,518 - 161,824 = 8
161,825 - 184,131 = 7
184,132 - 206,438 = 6
206,439 - 228,745 = 5
228,746 - 251,052 = 4
251,053 - 273,359 = 3
273,360 - 295,666 = 2
295,667 - 317,973 = 1
317,974 - greater = 0

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary and AVTS

Each eligible recipient is assigned to a group according to the sum total of points awarded the recipient on the above criteria.

Applicant's no. of Points	Applicant's Group Assignment
28 - 32	Group 1
24 - 27.5	Group 2
20 - 23.5	Group 3
16 - 19.5	Group 4
12.5 - 15.5	Group 5
9 - 12	Group 6

The members of each group will be reimbursed with federal funds at the following rates:

TABLE A -- Secondary

Applicant's Group Assignment	Rate of Reimbursement With Federal Funds
Group 1	65.0%
Group 2	49.6%
Group 3	37.6%
Group 4	31.2%
Group 5	27.9%
Group 6	23.0%

TABLE B

Rates of Reimbursement for AVTSs

Applicant's Group Assignment	Rate of Reimbursement With Federal Funds
Group 1	15.0%
Group 2	9.0%
Group 3	8.0%
Group 4	7.4%
Group 5	6.8%
Group 6	6.3%

The above reimbursement rates are used to distribute Subpart 2 funds for regular programs.

The same reimbursement rates are applied to subpart 4 funds but not all eligible recipients necessarily receive such funds. Districts are ranked according to their unemployment and drop out rates. Subpart 4 money is distributed in order of rank until it is all distributed. Ranking is done as follows:

a) Unemployment rate. The range of unemployment rates (maximum rate minus minimum rate) is divided into five equal parts. These five parts are associated with point scores of one to five from lowest to highest. Each district is assigned the point score corresponding to the part of the range in which its unemployment rate falls.

b) Drop out rate. Points are assigned to each district according to its drop out rate by exactly the same process.

The sum of each district's drop out and unemployment points is its total disadvantaged points (10 possible). Districts are ranked from highest to lowest according to their numbers of disadvantaged points. Districts are given money in order from the top down until the subpart 4 funds are exhausted. The amount each is given is found by multiplying the amount it applied for to spend on a Special Disadvantaged program by its reimbursement rate (as above).

Subpart 5 funds are distributed using different reimbursement rates. Each eligible recipient's group number is the same as that determined for subpart 2 funds.

Group number	Reimbursement Rate
1	90.0%
2	82.9
3	72.3
4	66.6
5	62.9
6	49.1

Postsecondary

The postsecondary allocation is divided into two funds. One (10/19 of the total) is distributed on the basis of AP and the other (9/19 of the total) is distributed on the basis of extra costs.

$$\text{institution d's allocation for need} = \frac{\text{AP* for d}}{\sum_{\text{all i}} (\text{AP* for i})} \times \frac{10}{19} \text{ funds available}$$

$$\text{institution d's allocation for cost} = \frac{\text{COST* for d}}{\sum_{\text{all i}} (\text{COST* for d})} \times \frac{9}{19} \text{ funds available}$$

COMMENTS ON THE OKLAHOMA PROCEDURE

Step 1. The criteria used to distribute postsecondary funds on the basis of ability to pay have little to do with relative abilities to pay. Allocations are simply on the basis of the amounts requested without determining how much each institution should be requesting. Furthermore, it may actually favor institutions with the greatest ability to pay since it gives an incentive to request the largest possible budget for which an institution can provide matching. This criterion is therefore malleable. No other malleable data are used.

Step 2. Postsecondary point scores are determined by the Proportion of Total method, a continuous method. Secondary and AVTS point scores are both by the Procedural and Non-procedural Point Scale methods, both non-continuous.

Step 3. Reimbursement rates for all levels are determined by the Tabular method.

i) The various funds are distributed as follows: subpart 2 funds for regular programs are by the secondary and AVTS formulas above; subpart 2 funds for postsecondary are by the formula above; subpart 2 setasides for handicapped and disadvantaged students are by a committee on a non-formula basis; subpart 3 funds are used for state level projects and are not distributed to LEAs; subpart 4 funds are by the formula above; and subpart 5 funds are by the formula above.

ii) The secondary and AVTS scores for poverty, handicapped and disadvantaged are done according to proportions of district totals. This follows BOAE guidelines but, as discussed earlier in this report, may

produce outcomes that favor small districts.

iii) Points are given at all levels for handicapped or disadvantaged students on the basis simply of enrollment rather than additional costs actually incurred for those students.

iv) The reasons for the particular point scales and the particular reimbursement rates are bot explained.

OREGON

1. DATA SELECTED:

Secondary

Level of Need:

ADM (grades 7-12), AV, UR, low income students, 11-12th grade enrollment in vocational education, 11th and 12th grade enrollment, FTE community college, per capita income, DE, minority enrollment, HE, HE in vocational education.

2. TRANSFORMATION OF DATA INTO POINT SCORE:

Secondary

The data mentioned above are entered directly and continuously into the distribution formulas, of which there are four. The formulas are described below, along with an extended analysis of the formula for regular vocational programs in secondary schools.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

The four formulas apply to regular secondary programs, programs in community colleges, programs for disadvantaged students, and programs for handicapped students. These formulas distribute the following shares of Section 120 federal vocational money:

Regular Secondary	35%
Regular Community College	35%
Disadvantaged	20%
Handicapped	10%

Monies available under Sections 130, 140, and 150 of the federal vocational act are awarded on a competitive basis, project by project.

Regular Secondary Programs

$$\text{District Allocation} = \text{District's ADM} \times \frac{\text{Funds Available}}{\text{State ADM}}$$

$$\times \tfrac{1}{4} \left[\frac{\text{State Average AV/ADM}}{\text{District's AV/ADM}} + \frac{\text{County's \% Unemployed}}{\text{State's \% Unemployed}} + \frac{\text{\% of District's students who are "low income"}}{\text{\% of State's students who are "low income"}} + \frac{\text{District's \% of 11th and 12th grade enrollment that is in voc/ed}}{\text{State's \% of 11th and 12th grade enrollment that is in voc/ed}} \right]$$

Regular Community College Programs

$$\text{District Allocation} = \text{College's FTE} \times \frac{\text{Funds Available}}{\text{Total State Community College FTE}}$$

$$\times \tfrac{1}{3} \left[\frac{\text{State Average AV/FTE}}{\text{College's AV/FTE}} + \frac{\text{unemployment rate of County(ies) in College District}}{\text{State average unemployment rate}} + \frac{\text{per capita income of State}}{\text{per capita income of College District}} \right]$$

Programs for Disadvantaged Students

$$\text{Allocation} = \left[\text{ADM (if secondary) or FTE (if community college)}\right] \times \frac{\text{Funds Available}}{\text{State Secondary ADM + State Community College FTE}} \times \tfrac{1}{4} \left[\begin{array}{l} \text{for secondary} -- \dfrac{\text{\% of District's students who are low income}}{\text{\% of State's students who are low income}} \\ \text{for community college} -- \dfrac{\text{State average per capita income}}{\text{College District per capita income}} \end{array} \right]$$

$$+ \frac{\text{\% of recipient's students who are "minority"}}{\text{\% of State's students who are "minority"}}$$

$$+ \frac{\text{\% of recipient's students who are disadvantaged}}{\text{\% of State's students who are disadvantaged}}$$

$$+ \frac{\text{County \% unemployed}}{\text{State \% unemployed}} \Bigg]$$

Programs for Handicapped Students

$$\text{Allocation} = \Big[\text{ADM (if secondary) or FTE (if community college)}\Big]$$

$$\times \frac{\text{Funds Available}}{\text{State Secondary ADM + State Community College FTE}}$$

$$\times 1/2 \left[\frac{\text{Recipient's handicapped student rate}}{\text{State average handicapped student rate}}\right.$$

$$+ \frac{\dfrac{\text{District's No. of handicapped voc/ed students}}{\text{District's ADM}}}{\dfrac{\text{State's No. of handicapped voc/ed students}}{\text{State's ADM}}} \Bigg]$$

Discussion of the Formula for Regular Secondary Programs

The formula shown above for regular secondary programs can be converted to the following equivalent form:

$$\text{District Allocation} = \text{Funds Available} \times \frac{\text{District ADM}}{\text{State ADM}}$$

$$\times 1/4 = \left[\frac{\dfrac{\text{State AV}}{\text{State ADM}}}{\dfrac{\text{District AV}}{\text{District ADM}}} + \frac{\dfrac{\text{County's No. unemployed}}{\text{County's No. in work force}}}{\dfrac{\text{State's No. unemployed}}{\text{State's No. in work force}}} + \right.$$

$$\frac{\dfrac{\text{District No. of Low Income Students}}{\text{District ADM}}}{\dfrac{\text{State's No. of Low Income Students}}{\text{State ADM}}} +$$

$$\left.\frac{\dfrac{\text{District's No. 11th \& 12th graders in voc/ed}}{\text{District 11th \& 12th grade ADM}}}{\dfrac{\text{State's No. of 11th \& 12th graders in voc/ed}}{\text{State's 11th \& 12th grade ADM}}}\right]$$

$$= \text{Funds Available} \times 1/4$$

$$\left[\frac{\text{State AV}}{\text{State ADX}} \times \frac{\text{District ADM}}{\text{District AV}} \times \frac{\text{District ADM}}{\text{State ADM}} \right.$$

$$+ \frac{\text{County's No. unemployed}}{\text{State's No. unemployed}} \times \frac{\text{State's No. in work force}}{\text{County's No. in work force}} \times \frac{\text{District ADM}}{\text{State ADM}}$$

$$+ \frac{\text{District No. of Low Income Students}}{\text{State's No. of Low Income Students}}$$

$$+ \frac{\text{District No. of 11th \& 12th graders in voc/ed}}{\text{State's No. of 11th \& 12th graders in voc/ed}} \times \frac{\text{State's 11th \& 12th grade ADM}}{\text{District 11th \& 12th grade ADM}} \times \left. \frac{\text{District ADM}}{\text{State ADM}} \right]$$

When the formula is rewritten this way we can see that what it actually does is to divide the funds up into four quarters and distributes each quarter on the basis of a unique criterion. One quarter is distributed on the basis of districts' Assessed Value per ADM, another quarter is distributed on the basis of the distribution of the unemployed population among the districts, and so on.

Observe that $1/4$ of the "Funds Available" is distributed to districts in direct proportion to their value of

$$\frac{\text{District No. of Low Income Students}}{\text{State's No. of Low Income Students}}$$

an expression of the proportion of the state's total number of low income students who are in a particular district. If we summed the values of this expression for all districts the result would be unity. Given this fact, we can be certain that the allocations that one determined by using this factor will just add up to the $1/4$ of Funds Available which have apparently been designated for this purpose.

However, this is not the case for the three factors that are used to distribute the other three quarters of the Funds Available. It can be seen that the sum of the values for all districts of any one of these factors will not necessarily be unity and that therefore the sum of the allocations determined by the formula for a particular quarter of the Funds Available may be greater or less than what is actually available for distribution.

For example, the sum of the value of

$$+ \frac{\text{District No. of 11th \& 12th graders in voc/ed}}{\text{State's No. of 11th \& 12th graders in voc/ed}} \times \frac{\text{State's 11th \& 12th grade ADM}}{\text{District 11th \& 12th grade ADM}} \times \frac{\text{District ADM}}{\text{State ADM}}$$

for all districts will be unity only if the last two factors in the expression cancel each other out. Now it is true that they are likely to come very close to cancelling each other (since a district's proportion of the state's 11th & 12th grade ADM is probably about the same as its proportion of the state's grade 7-12 ADM) and that the difference between the sum of the allocations and the funds actually available will be small, but it would also be fairly easy to remove those last two factors from the expression so that the allocations would exactly equal the funds available.

The problem is more pronounced in the case of the factor involving TCV/ADM. There is no reason to believe that the expression

$$\sum_{\text{all districts}} \frac{\frac{\text{State AV}}{\text{State ADM}}}{\frac{\text{District AV}}{\text{District ADM}}} \times \frac{\text{District ADM}}{\text{State ADM}}$$

will even be close to unity in value.

Now it is apparent that the goal here is to distribute funds to districts in direct proportion to their respective values of the expression

$$\frac{\text{State Average AV/ADM}}{\text{District AV/ADM}} = \left(\frac{\frac{\text{State AV}}{\text{State ADM}}}{\frac{\text{District AV}}{\text{District ADM}}} \right)$$

In order to do this, we must have a factor P_d for each district d such that:

1. P_d is directly proportional to that district's value of $\frac{\text{State Average AV/ADM}}{\text{District AV/ADM}}$ and

2. $\sum_{\text{all districts}} P_d = 1$

so that when the values of P_d are multiplied by the value ($1/4$ x Funds Available), the resulting allotments will, when totalled, equal ($1/4$ x Funds Available). This will occur if:

$$P_d = \frac{\text{State Average AV/ADM}}{\text{District's d's AV/ADM}} \times \frac{1}{\sum_{\text{all districts}} \frac{\text{State Average AV/ADM}}{\text{District AV/ADM}}}$$

In other words, instead of multiplying

$$\frac{\frac{\text{State AV}}{\text{State ADM}}}{\frac{\text{Dist. AV}}{\text{Dist. ADM}}} \text{ by } \frac{\text{Dist. ADM}}{\text{State ADM}}, \text{ it should}$$

be multiplied by

$$\frac{1}{\sum_{\text{all districts}} \frac{\frac{\text{State AV}}{\text{State ADM}}}{\frac{\text{Dist. AV}}{\text{Dist. ADM}}}}$$

The unemployment factor is a more complicated problem since unemployment data is available by county but not by school district. Since

it is not certain that the expression

$$\sum_{\text{all districts}} \frac{\text{County's No. of unemployed}}{\text{State's No. of unemployed}} \times \frac{\text{State's No. in work force}}{\text{County's No. in work force}} \times \frac{\text{Dist. ADM}}{\text{State ADM}}$$

will equal unity, it would probably be better to use one that does such as

$$\frac{\text{County's No. unemployed}}{\text{State's No. unemployed}} \times \frac{\text{District population}}{\text{State population}}$$

If the above changes are made, the sum of the allocations made by the formula will just equal the Funds Available figure. As it is now the sum is different from the Funds Available figure and Oregon is forced to scale allocations up or down in order to fit the budget.

The new formula with all the changes made would be:

$$\text{District Allocation} = \frac{\text{Funds Available}}{4} \times \left[\frac{\text{State Average AV/ADM}}{\text{District AV/ADM}} \times \frac{1}{\sum_{\text{all districts}} \frac{\text{State Av. AV/ADM}}{\text{District AV/ADM}}} + \frac{\text{No. unemployed in County}}{\text{No. unemployed in State}} \times \frac{\text{District population}}{\text{County population}} + \frac{\text{District No. of low income students}}{\text{State's No. of low income students}} + \frac{\text{District 11th \& 12th grade voc/ed ADM}}{\text{State 11th \& 12th grade voc/ed ADM}} \right]$$

A similar commentary applies to the other three formulas used in Oregon, i.e. the formulas for community college programs, disadvantaged students, and handicapped students.

COMMENTS ON OREGON'S PROCEDURE:

1) No malleable data are used.

2) Continuous methods are used.

PENNSYLVANIA

1. DATA SELECTED:

Secondary

Level of Need:

PCI, DR, UR, economic depression, E, training needs, expenditures, HE, DE, POP

Ability to Raise Revenue:

Property market value per pupil

Postsecondary

Level of Need:

MFI, LIF, HE, DE, Black enrollment, Hispanic enrollment

Ability to Raise Revenue:

state funding, tuition increase

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Secondary

All variables are transformed into point scores by the following method: a) The mean (M) and standard deviation (SD) are computed from all the district values for a particular variable. b) It is determined for the variable whether a higher value is reason for greater funding (e.g., LIF) or for less funding (e.g., AV). c) Point scores are assigned using the following table. If higher values receive greater funding, scale A is used. If higher values receive less funding, scale B is used.

District value for variable	Scale A	Scale B
(M + 4SD) to (M + 5SD)	10	1
(M + 3SD) to (M + 4SD)	9	2
(M + 2SD) to (M + 3SD)	8	3
(M + SD) to (M + 2SD)	7	4

District Value for variable	Scale A	Scale B
(M) to (M + SD)	6	5
(M - SD) to (M)	5	6
(M - 2SD) to (M - SD)	4	7
(M - 3SD) to (M - 2SD)	3	8
(M - 4SD) to (M - 3SD)	2	9
(M - 5SD) to (M - 4SD)	1	10

Each secondary district is assigned point scores by this process for the following variables: property market value per pupil enrolled (MV/E), total taxable income per pupil enrolled (PCI), drop-out rate (DR), unemployment rate (UR), total expenditure per pupil (TEP), training needs (TN), economic depression (ED). The enrollment used in all cases is general education secondary enrollment. The drop-out rate is the average over the previous three years. The unemployment and training needs figures are for the county in which the district is located.

Since several of the scores are used in all secondary funding formulas, they can be considered to comprise a general funding factor as follows (a "*" indicates a point score for the variable before it):

funding factor = DR* + UR* + TEP* + TN* + ED*

Postsecondary

Postsecondary funds are distributed by the "project method." That is, each postsecondary program is judged individually to determine whether or not to fund it. This determination is not done by formula. However, institutions are scored and ranked to determine how much funding their programs will receive if their programs are

funded at all. The criteria and the point scores are as follows:

RELATIVE ABILITY OF INSTITUTIONS TO INITIATE OR MAINTAIN PROGRAMS

A. State Appropriation Received per FTE 1977

0 - 130	5
130+ - 166	4
166+ - 586	3
586+ - 632	2
632+ - 1228	1
1228+ - 2700	0

B. Percent of Tuition Incerase 1976-77

37 - 55	0
55+ - 72	1
72+ - 91	2
91+ - 131	3
131+ - 188	4
188+ - 466	5

RELATIVE FINANCIAL ABILITY OF STUDENTS - SOCIO - ECONOMIC FACTORS

C. Mean Family Income of State Financial Grant Recipients 1975 1975

4500 - 9152	5
9152+ - 9969	4
9969+ - 10777	3
10777+ - 12868	2
12868+ - 13500	1
13500+ - 14569	0

D. Percent of Families of State Financial Grant Recipients with $6,000 or Less Income (%)

6.5+ - 7.5	0
7.5+ - 9.6	1 (7.5--1.25)
9.6+ - 13.0	2
13.0+ - 17.1	3
17.1+ - 34.5	4
34.5+ - 62.9	5

E. Percent of Handicapped and Disadvantaged Enrollees (%)

0 - 1.4	0
1.4+ - 5.7	1 (5.7--1.5)
5.7+ - 5.7	2
55.7+ - 36.2	3
36.2+ - 65.2	4
65.2+ - 100	5

F. Percent of Black Enrollees (%)

0 - 0.6	0
0.6+ - 0.8	1
0.8+ - 2.7	2
2.7+ - 6.4	3
6.4+ - 11.4	4
11.4+ - 93.6	5

G. Percent of Hispanic Enrollees

0 - 0	0
0+ - 0	1 (0--0)
0+ - 0.2	2
0.2+ - 0.6	3
0.6+ - 1.4	4
1.4+ - 5.9	5

(Continued next page)

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Secondary

Funds for secondary programs are allocated to large planning units which then distribute money to individual districts on a non-formula basis. Since points are scored at the district level and funds are allocated according to planning unit scores, we assume that a planning unit's score is simply the sum of the total points (TP) scored by each district in the planning unit. (The state plan does not make this clear).

All categories of funds are distributed using similar formulas, but with differing enrollment weightings.

a) The Subpart 2 formula for regular programs uses total secondary enrollment (E).

$$TP_r = E \times 2\left(\frac{MV}{E}* + PCI*\right) + \text{funding factor}$$

$$\text{Planning unit Allocation} = \frac{TP_r \text{ for all districts in planning unit}}{TP_r \text{ for all districts in state}} \times \text{funds available}$$

b) The Subpart 2 formula for the handicapped setaside uses handicapped enrollment (HE).

$$TP_h = HE \times 2\left(\frac{MV}{E}* + PCI*\right) + \text{funding factor}$$

$$\text{Planning unit Allocation} = \frac{TP_h \text{ for all districts in planning unit}}{TP_h \text{ for all districts in state}} \times \text{funds available}$$

c) The Subpart 2 formula for the disadvantaged setaside uses disadvantaged enrollment (DE).

$$TP_d = DE \times 2\left(\frac{MV}{E}^* + PCI^*\right) + \text{funding factor}$$

$$\text{Planning unit Allocation} = \frac{TP_d \text{ for all districts in planning unit}}{TP_d \text{ for all districts in state}} \times \text{funds available}$$

d) Subpart 3 funds are all distributed by the project method, on an individual program basis.

e) Subpart 4 funds are all distributed by the project method. Any school district with a three-year average of 150 or more dropouts and any Area Vocational-Technical School with a youth unemployment rate (in its service area) above the state average and at least 2,000 youths unemployed is eligible for subpart 4 funds.

f) Subpart 5 funds use total district population (POP).

$$TP_c = POP \times 2\left(\frac{MV}{E}^* + PCI^*\right) + DR^* + TEP^* + ED^*$$

$$\text{Planning unit Allocation} = \frac{TP_c \text{ for all districts in planning unit}}{TP_c \text{ for all districts in state}} \times \text{funds available}$$

Postsecondary

Postsecondary institutions are ranked according to the sum of their scores on the criteria presented above. If it is determined that a particular program will be funded, some percentage of its costs will be covered by federal funds. What percentage is covered will depend on both the type of program and the ranking of the institution, as described in the state plan.

COMMENTS ON THE PENNSYLVANIA PROCEDURE:

Step 1: Secondary The state plan does not specify how training

needs (TN) are determined. Thus, training needs may be malleable. No other malleable data are used in determining allocations to planning units. However, since no formula is used for distribution of funds from planning units to LEAs, this whole process is considered malleable.

Postsecondary It is unclear how the amount of state funding is determined. No explanation is given for selecting tuition increases as a criterion. No malleable data are used in determining the rankings of postsecondary institutions; however, the whole process is malleable because the decision to fund a program is decided by committee.

Step 2: Secondary The non-continuous standard deviation method, is used. As discussed earlier in this report, this method may fail to discriminate adequately among recipients. A normal distribution, for instance, will give scores of 5 or 6 to approximately two-thirds of the recipients. Very few, will have scores well above or well below the middle of the scale.

Since economic depression is generally a "yes or no" criterion, it's difficult to see how it could be assigned a point score by this method. No alternative method is given.

Postsecondary The non-procedural point scale method (non-continuous) is used.

Step 3: Secondary The weighted points method is used.

Postsecondary Dollar allocation decisions are by committee.

i) The use of total expenditures per pupil may favor districts which can afford a large local funding share.

RHODE ISLAND

1. DATA SELECTED

LIF, AV, UR, HE, LESA, P(undefined), DE, PC, Quality of Programs, Consistency of Programs with Statewide Criteria, Cost-Effectiveness of Programs

2. TRANSFORMATION OF DATA INTO POINT SCORES

No information is provided on the matter of how data are translated into point scores.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Rhode Island indicates that it uses a formula of the type

$$S_d = \text{Total Federal funds available} \times \frac{P_d}{\sum_{\text{all eligible recipients } j} P_j}$$

For administration, instruction of secondary and postsecondary students, adults, work study, cooperative education, apprenticeship, sex equity personnel, industrial arts, and "other purposes," weights are assigned to point scores as follows:

1)	Number of Low Income Families	30%
2)	Ability to Pay	30
3)	Unemployment Rate	13.34
4)	Number of Handicapped, Bi-Lingual and Disadvantaged Students	13.33
5)	Per Student Vocational Expenditures	13.33

In addition, for proposals submitted by LEA's under a distribution to satisfy statewide priorities, the following weights are applied:

1)	Number of Low Income Families	25%
2)	Ability to Pay or Concentration of High Cost Students	25
3)	Quality of Program in Proposal	20
4)	Consistency of Proposal with Statewide Priorities	20
5)	Cost-Effectiveness of Program	10

COMMENTS ON THE RHODE ISLAND PROCEDURE:

Step 1: Many of the variables are not defined and appear malleable -- program quality, consistency of proposal with statewide priorities, and cost effectiveness.

Step 2: The plan provides no explanation as to how data are transformed.

Step 3: Rhode Island appears to use a Weighted Points Method. However, the description of the distribution formula is vague and uninformative.

SOUTH CAROLINA

1. DATA SELECTED:

All levels and funds except Subpart 4

Level of Need:

LIF, Orshansky Index

Ability to Raise Revenue:

AV /E, tax effort ratio

Enrollment:

Voc Ed. Enrollment

Subpart 4

Level of Need:

LIF, RYU, DR

Ability to Raise Revenue:

AV / E, tax effort ratio

2. TRANSFORMATION OF DATA INTO POINT SCORES:

All funds except Subpart 4

a) The Ability to Raise Revenue (AP*) component is based on the relative ability to pay of each district d according to the following formula:

$$AP^*_d = \frac{\text{Grade 9 - 12 enrollment}_d}{\sum_{\text{all } i} \text{Grade 9 - 12 enrollment}_i} \times \text{tax effort ratio} \times \text{forced total correction factor}$$

The forced total correction factor scales the AP* slightly down to adjust for discrepancies resulting from calculations and weigting done at the district level. This was determined to be .9884687 in FY 1979.

The tax effort ratio is the ratio of the "actual local tax yield" in district d to the "equalized local tax yield" in district d. The "actual local tax yield" is the actual tax yield collected in district d in 1976. The "equalized tax yield" is the product of the local tax yield in all districts and a tax equalization index called the Callahan index. The Callahan index combines the assessed residential and industrial property values for district d, and expresses this equalized evaluation in proportion to the state total equalized valuation.

For district d,

$$\text{tax effort ratio}_d = \frac{\text{actual tax yield}_d}{\text{equalized tax yield}_d}$$

$$= \frac{\text{Actual tax yield}}{\text{local tax yield for all districts} \times \frac{\text{Equalized Assessed Valuation}_d}{\text{State Total Equalized Assessed Valuation}}}$$

b) Level of Need (LON*) component is determined by the percent of low income families in a district as defined by the Orshansky Poverty Index.

$$LON^*_d = \frac{\text{LIF in district}}{\sum_{\text{all } i} (\text{LIF in } i)}$$

The Orshansky Index is based on 1970 census data.

c) Enrollment (E). The relative unduplicated vocational education enrollment in grades 9 - 12 in a given district is used to compute the enrollment component (E*).

$$E^*_d = \frac{\text{voc ed enrollment in district}}{\sum_{\text{all } i} (\text{voc ed enrollment in } i)}$$

Subpart 4

a) The Ability to Raise Revenue (AP). Districts are ranked by the tax effort ratio, as defined above, from smallest to largest. Points are assigned as follows:

Districts ranked by the effort ratio	Points
Thirty-one smallest districts	3
Middle Thirty-one districts	2
Thirty largest districts	1

b) Level of Need

i) low income families (LIF). Using the Orshansky index, districts are ranked by number of families below the poverty income level, from highest to lowest. Points are assigned as follows:

Districts ranked by LIF	Points
Highest Thirty-one Districts	3
Middle Thirty-one Districts	2
Lowest Thirty Districts	1

ii) youth unemployment (RYU). A composit unemployment figure is calculated for each LEA.

$$RYU = UR_{voc\text{-}ed} + UR_{county} + RYU_{age\ 16 - 21}$$

Local agencies having a RYU equal to or exceeding the state average are assigned two points. All others are assigned one point.

iii) drop outs (DR). The district's number of drop outs as a percent of the district's enrollment is computed. All districts

having a drop out rate exceeding or equaling the state average receive two points. All others receive one point.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

All levels except Subpart 4

The assigned point values are weighted, summed and multiplied by the total federal funds available.

$$\text{Reimbursement for district } d = (.35)(AP_d^*) + (.35)(LON_d^*) + (.30)(E_d^*) \times \text{total federal funds available}$$

Subpart 4

The points for each district d are then computed.

$$\text{total points}_d = \text{Tax effort ratio}_d^* + LIF_d^* + RYU_d^* + DR_d^*$$

Districts are clustered by point total and ranked within each point total on the basis of vocational secondary enrollment.

COMMENTS ON THE SOUTH CAROLINA PROCEDURE:

Step 1: No malleable data used.

Step 2: South Carolina uses the Proportion of Total Method for transforming data, which is continuous.

All funds except Subpart 4: i) The reasons for the specific weights are not explained. ii) This process is applied directly to all Subpart 2,3, and 5 funds except the postsecondary setaside. The state distributes this setaside money to the statewide boards administering the postsecondary and adult programs. These boards in turn administer

the money to local programs using this formula. iii) The Subpart 2,3, and 5 moneys (including each setaside category of Subpart 2) are run through the formula separately. The recipient is required to spend the award from each category for its designated purpose.

Subpart 4 i) The justification for the group rankings and general point scheme is not explained. ii) The vocational education unemployment statistic ($UR_{voc\ ed}$) used in computing RYU is based on the number of completers available for placement.

Step 3: For all levels except Subpart 4: South Dakota uses the Weighted Points Method of funds distribution.

Subpart 4: The actual mechanism for the distribution of Subpart 4 funds, once the districts have been ranked, is not explained.

SOUTH DAKOTA

1. DATA SELECTED

All levels

Level of Need:

LIF, transportation

Ability to Raise Revenue:

AV per child age 5 - 18

Local Effort:

AV x highest allowable tax levy

Other:

Approved Budget Request

2. TRANSFORMATION OF DATA INTO POINT SCORES

All levels

Level of Need

a. i. Low income families

The relative percent of students from low income families in each district d is calculated as follows:

$$\frac{LIF_d}{\text{State Total LIF}} \times 100$$

This percent is then assigned the following point score:

% of Students From Low Income Families	Points
Up to 10%	11
11 - 13%	12
14 - 16%	13

% of Students From Low Income Families	Points
17 - 19%	14
20 - 22%	15
23 - 25%	16
26 - 28%	17
29 - 31%	18
32 - 34%	19
35 - 37%	20
38 - 40%	21
41 - 43%	22
44 - 46%	23
47 - 49%	24
50% and up	25

ii. Transportation costs

In order to compensate for the extra transportation costs that districts incur when participating in multi-district programs, one quarter point is allowed per mile distance between a participating district and the multi district center.

b. Ability to Raise Revenue

The assessed valuation per school child ages 5 - 18 is calulated for each secondary school district. This valuation is then assigned points according to the following table:

Assessed Valuation Per Child 5 - 18	Points
49,000 & up	11
46,001 - 49,000	12
43,001 - 46,000	13
40,001 - 43,000	14
37,001 - 40,000	15
34,001 - 37,000	16
31,001 - 34,000	17
28,001 - 31,000	18
25,001 - 28,000	19
22,001 - 25,000	20
19,001 - 22,000	21
16,001 - 19,000	22
13,001 - 16,000	23
10,001 - 13,000	24
Up to 10,000	25

c. Local Effort

The local effort for each district is the percent of the maximum potential tax revenue which is actually collected. This is calculated as follows:

i) The assessed valuation is determined by multiplying the market assessed value for property by the highest allowable assessed valuation factor permitted in the state (60%). The maximum potential tax revenue is determined by applying the highest allowable tax levy to the assessed valuation. This tax levy is .0024 for agricultural property and .004 for non-agricultural property.

$$\text{Assessed value}_{ag} = (.6)(\text{market assessed value})_{ag}$$

$$\text{Assessed value}_{non\text{-}ag} = (.6)(\text{market assessed value})_{non\text{-}ag}$$

$$\text{Maximum potential tax revenue} = (.0024)(\text{assessed value})_{ag} + (.004)(\text{assessed value})_{non\text{-}ag}$$

ii) The local effort is the ratio of the actual tax revenue collected to the maximum potential tax revenue, expressed as a percent.

iii) Each district is then assigned two points for every 10% of effort realized. Thus, a district which collects 40% of its maximum potential tax revenue would be alloted eight points.

Special factor for Postsecondary Institutions Only

Additional points are added to postsecondary institution point totals to equalize the reimbursement rates between institutions.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

The points alloted to each district are summed. This total is converted to a proportional amount depending on the availability of funds.

$$\text{reimbursement to district} = \frac{(\text{district point total})\,(\text{district approved budget request})}{\sum_{\text{all districts } i} (\text{point total})_i\,(\text{approved budget request})_i} \times \text{total federal and state vocational ed. money for the state}$$

The reimbursement calculations are computed separately for secondary and postsecondary districts.

COMMENTS ON SOUTH DAKOTA'S PROCEDURE:

Step 1: The variable "approved budget request" is not defined and is thus considered malleable.

Step 2: i) The reasons for the specific scales and weights of the various factors are not explained.

ii) The extra points given to postsecondary institutions are included because most of the criteria used to transform the data into points as discussed above have little meaning when applied to the postsecondary institutions. Nevertheless, since the reimbursement rate is predetermined, the extra points factor is malleable.

iii) South Dakota transforms its data using the non-procedural point scale method, which is non-continuous.

Step 3: South Dakota transforms its points into dollar allocations using the weighted points method.

The above formula applies to the various parts of the Vocational

Education Act as follows:

a) Subpart 2 -- The above formula applies to all non-setaside funds in the secondary and postsecondary levels, and to the "instructors" portions of part-time adult programs. No formula is used for the distribution of funds for statewide programs or full-time adult programs.

b) Subpart 3 -- Part of the funds set aside for guidance and counseling is distributed by ~~the~~ above described formula. Other funds are not distributed by formula.

c) Subpart 4 -- No formula is used for funds distributed under this subpart.

d) Subpart 5 -- All money under this subpart is distributed by the above formula except for a portion taken off the top for teacher education.

TENNESSEE

1. DATA SELECTED:

Classification of Economically Depressed Area (U.S. Department of Commerce), UR, AV/E, LIF, County Labor Force, POP aged 12-17, POP aged 18-64, H, LESA, Legislative Appropriations to state-operated vocational-technical schools, technical institutes, and community colleges.

2. TRANSFORMATION OF DATA INTO POINT SCORES:

A. LEA's

Counties are ranked according to the criteria of relative ability to pay, concentration of low income families, vocational education need, and manpower needs. The relative ability variable consists of three components: status as an economically depressed area, UR, and AV/E. AV/E carries a weight of 2 to weights of 1 for economically depressed area and UR. Concentration of low income families is derived from data supplied by a private company, Sales and Marketing Management. Counties are ranked from high to low in percent of low income families. Vocational education need is measured by a count of population aged 12-17, and counties are ranked from high to low by that number. Manpower need is apparently an estimate of the size of the labor force by county, with data supplied by the Tennessee Department of Employment Security. Counties are ranked from high to low in terms of absolute size of labor force.

Each ranking of counties is divided into 5 groups, A, B, C, D, E, with an A ranking indicating greatest entitlement for federal funds and E indicating the least. The same grouping procedure is used in virtually all instances; it can be illustrated by the data in low-income families. The highest percentage, rank #1, was Hancock, with 71.6%; the lowest percentage, rank #95, was Davidson, with 25.9%. Subtract 25.9 from 71.6 = 45.7.

Divide 45.7 by 5 = 9.1. Form categories as in Table I.

Table I

A	71.6 to 62.5 (71.6 - 9.1 = 62.5) etc.
B	62.4 to 53.3
C	53.2 to 44.1
D	44.0 to 34.9
E	34.8 to 25.7

A composite weight is then established by multiplying the county weight under each of the four criteria by a factor weight. A county weight is obtained by translating the letter scores into numbers, e.g., A = 5, B = 4, etc. The factor weights are the following: Relative Ability to Pay, 35; Concentration of Low Income Families, 25; Vocational Education Needs 20; Manpower Needs, 20. The process is illustrated by Table II.

Table II

Criteria	Weight Factor Assigned		County Weight	County Group	Relative Weight of Application
A Relative Ability to Pay	35	X	5	A	175
			4	B	140
			3	C	105
			2	D	70
			1	E	35
B Concentration of Low Income Families	25	X	5	A	125
			4	B	100
			3	C	75
			2	D	50
			1	E	25
C Vocational Education Needs	20	X	5	A	100
			4	B	80
			3	C	60
			2	D	40
			1	E	20
D Manpower Needs	20	X	5	A	100
			4	B	80
			3	C	60
			2	D	40
			1	E	20

The counties are then put in five groups, A,B,C,D,E on the basis of their ranking in the composite weight and by the means described above with regard to the grouping procedure used for concentration of low income families.

B. Other Eligible Recipients

Other eligible recipients are state-operated systems of area vocational-technical schools, technical institutes, and community colleges. They lack a local tax base. Each institution serves students in several counties. There are nine planning districts that receive federal vocational funds from the state. Available funds are distributed on the basis of a weighted formula of four main components.

i) Concentration of Students which Impose Higher than Average Instructional Costs.

The following statement appears in the Tennessee State Plan for the Administration of Vocational Education, 1978-82, Part II, p. 5:

> Factors considered in determining the concentration of students which imposes higher than average instructional costs are: concentration of low-income families, handicapped, and non-English speaking population. Each of the factors is weighted and combined to account for the highest weighted individual criterion considered in the allocation of funds.

We have been unable to discover the meaning of these sentences or to obtain clarification of them.

ii) Manpower Needs and Job Opportunities

Each of the nine planning districts is given a number equal to the size of the labor force in its area.

iii) Vocational Education Needs

Each of the nine planning districts is assigned a number equal to its population aged 18 - 64.

iv) Relative Financial Ability

Each of the nine planning districts is given a number equal to the amount of funds appropriated to its constituent institutions by the legislatures.

The numbers assigned to the nine planning districts are weighted by the following values:

Table III

High Cost Students	.33
Manpower Needs	.21
Vocational Needs	.21
Relative Ability	.25

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

A. LEA's

The following arbitrary scale is used to translate the five-fold letter ranking of LEA's into "county group reimbursement percentages:

Table IV

A	110%
B	105%
C	100%
D	95%
E	90%

The amount of federal vocational funds is divided by the number of authorized programs (see "Comments") to obtain an approximate average reimbursement sum. In 1979, this amount was $1,000. The five-fold set of county group reimbursement percentages is applied to the average figure of $1,000 and the following sums are available to LEA's in the five-fold classification for each of their approved programs:

Table V

A	$1,100
B	1,050
C	1,000
D	950
E	900

B. Other Eligible Recipients

For the total of the four weighted categories of need, High Cost Students, Manpower Need, Vocational Need, and Relative Ability, the available federal funds are paid to the nine planning districts under the standard formula

$$AL_d = \text{Federal Funds for Other Eligible Recipients} \times \frac{W_d}{W_i}$$

COMMENTS ON THE TENNESSEE PROCEDURE

Step 1: No malleable data appear to be used.

Step 2: A variation of the Non-procedural Point Scale is used. No explanation is offered for choice of weights.

Step 3: A variation of the Tabular Method is used to determine reimbursements for LEAs. It appears that the Weighted Points Method is used for other eligible recipients, but the plan offers no clear explanation.

i) With regard to the distribution of federal funds to LEA's, we should note that the number of programs for which each LEA is eligible for funding was decided a number of years ago on the basis of a survey of needs. The number of students served as well as other factors were considered in making this determination. (Here "program" refers to a particular type of vocational education at a particular LEA. Consumer and Homemaking instruction at a particular LEA is considered one "program.")

Tennessee's formula is used to determine the number of dollars that an LEA will receive per program, but since the number of programs that each LEA is allowed is pre-determined, the formula described probably has little impact. The number of dollars that an LEA receives depends heavily on the number of programs for which it is allowed funding, and since this is not controlled by the formula, our conclusion is that Tennessee's distribution of funds to LEAs is essentially non-formula.

With regard to distribution of federal funds to "other eligible recipients," there is a different kind of problem. The state determines the composition of each planning region, i.e., it decides which institutions are in each of the regions. The state also determines the intra-planning-district distribution of federal funds. These two decisions that can be made at the state level would appear to allow state officials to control the flow of funds to any particular institution, regardless of the main state-wide formula.

TEXAS

In FY79, Texas did not use a formula to distribute federal funds. A "relative ability ratio" is determined which indicates how much of the vocational program cost is to be paid by the district. This amount is the district assessed value multiplied by a scaling factor of .0016. Apparently districts generally receive the remainder of what they apply for.

The matching requirements for handicapped and disadvantaged set-asides are met by special state-funded vocational education programs for the handicapped and disadvantaged.

1. DATA SELECTED

Secondary

Level of Need:

LIF (Number of students in low-income families, as defined in tables below).

Ability to Raise Revenue:

Level of State assistance for regular education

Effort:

ADM

Postsecondary Institutions

FTE

2. TRANSFORMATION OF DATA INTO POINT SCORES

Secondary Institutions

Step 1. The low-income factor is determined as each district's proportion of the total number of K - 12 students in the state qualifying for free or reduced lunch.

$$\text{Low Income} = \frac{\text{Total District Free or Reduced Lunch Students}}{\text{Total State Free or Reduced Lunch Students}}$$

Eligibility for free or reduced lunch is determined from family income by the following tables:

Family Size Income Scale

Scale A		Scale B
FREE MEALS AND FREE MILK		REDUCED PRICE MEALS
Family Size	Yearly Income	Yearly Income
One	$ 0 - $4,590	$4,591 - $ 7,160
Two	0 - 6,040	6,041 - 9,420
Three	0 - 7,490	7,491 - 11,680
Four	0 - 8,940	8,941 - 13,940
Five	0 - 10,390	10,391 - 16,200

Family Size Income Scale

Scale A FREE MEALS AND FREE MILK Family Size	Yearly Income	Scale B REDUCED PRICE MEALS Yearly Income
Six	$ 0 - $11,840	$ 11,841 - $18,470
Seven	0 - 13,290	13,291 - 20,730
Eight	0 - 14,740	14,741 - 22,990
Each additional family member	$1,450	Each additional family member $2,250

Step 2. The Ability to Pay factor (AP) is determined as each district's proportion of the total state 9 - 12 enrollment weighted by the percentage of that district's educational expenditures paid for by the State.

$$AP = \frac{\text{District 9-12 Enrollment}}{\text{State 9-12 Enrollment}} \times \frac{\text{State Assistance to District}}{\text{Total District Expenditures}}$$

Step 3. The Effort factor is each district's proportion of the total State 11 - 12 vocational education enrollment.

$$\text{Effort} = \frac{\text{District 11-12 Average Daily Membership}}{\text{Total State 11-12 Average Daily Membership}}$$

Postsecondary Instututions

Point Scores are simply each institutions relative FTE

$$\text{Score} = \frac{\text{Institution FTE}}{\text{Total State postsecondary FTE}}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary Institutions

Each district's total proportion of the federal funds allocated

to secondary institutions is then calculated as the sum of these three factors, Low Income, AP and Effort, weighted at 60%, 30% and 10% respectively.

$$\text{District Allocation} = [(\text{Low Income})(.60) + (\text{AP})(.30) + (\text{Effort})(.10)] \times \text{Funds Available}$$

Postsecondary Institutions

The federal allocation for postsecondary institutions is divided proportionally to each institution's enrollment (by FTE).

$$\text{Institution Allocation} = \frac{\text{Institution FTE}}{\text{Total State Post-sec FTE}} \times \text{Funds Available}$$

COMMENTS ON UTAH'S PROCEDURE

Step 1: No malleable data used.

Step 2: A continuous Proportion of Total method is used.

Step 3: Dollar allocations are determined by the Weighted Points Method.

1. In total, Vocational Education funds are distributed as follows:

a) Most of the Subparts 2 and 3 funds are allocated equally between Secondary and Postsecondary institutions by the formulas described above.

b) The rest of Subparts 2 and 3 funds are distributed to various categorical purposed (such as handicapped, disadvanteged and energy programs) on a competitive, non-formula basis.

c) Subpart 4 funds all go to two "skill centers" whose enrollments are 100% disadvantaged. The money is divided between the two centers on the basis of their relative enrollments.

d) Subpart 5 funds are distributed to five different types of programs on a competitive, non-formula basis.

ii) Because Utah equalizes the influence of ability to pay for general education expenditures, conventional measures of relative financial ability are not relevant.

1. DATA SELECTED:

DE, E, AFDC, LIF, POP, AV, ADM, UR

2. TRANSFORMATION OF DATA INTO POINT SCORES:

A "district index," DNI, is computed from the following components:

a) Disadvantaged Pupil Index (DP)

$$DP_d = \frac{DE_d}{E_d} \Big/ \frac{\Sigma DE_i}{\Sigma E_i}$$

b) Low Income Family Index (LI)

$$LI_d = \frac{AFDC_d + LIF_d}{POP_d} \Big/ \frac{\Sigma AFDC_i + \Sigma LIF_i}{\Sigma POP_i}$$

c) Ability to Pay Index (EGL)

$$EGL_d = \frac{AV_d}{ADM_d} \Big/ \frac{\Sigma AV_i}{\Sigma ADM_i}$$

d) Unemployment Index (UN)

$$UN_d = \frac{U_d}{POP_d} \Big/ \frac{\Sigma U_i}{\Sigma POP_i}$$

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Sections 120, 130, 140, and 150 federal funds are all distributed under a weighted formula, as follows.

First, compute

$$DNI_d = 0.2\ (DP_d) + 0.3\ (LI_d) + 0.3\ (EGL_d) + 0.2\ (UN_d)\ ;$$

then

$$AL_d = P \times DNI_d$$

where P is a constant equal to the value required to cause

ΣAL_i = funds available.

This is equivalent to the use of the standard formula:

$$AL_d = (\text{funds available}) \times \frac{DNI_d}{\Sigma DNI_i}$$

COMMENTS ON THE VERMONT PROCEDURE:

Step 1: The data appear to be non-malleable.

Step 2: Vermont employs a continuous Ratio to Average Value method.

Step 3: i) The Weighted Points Method is used.

The formula $DNI_d = 0.2\ (DP_d) + 0.3\ (LI_d) + 0.3\ (EGL_d) + 0.2\ (UN_d)$

appears to have its weights for variables explicitly presented. However, each variable is also weighted implicitly, and the values of the implicit weights are <u>not</u> shown. For example, consider the variable

$DP_d = \frac{DE_d}{E_d} \Big/ \frac{\Sigma DE_i}{\Sigma E_i}$. In effect this is equivalent to the proportion of disadvantaged youth in the schools of the district weighted by $\frac{\Sigma E_i}{\Sigma DE_i}$, with the latter expression serving as an implicit weight. Each of the other variables can be regarded to have an implicit weight of a corresponding type.

ii. The fact that Section 140 money is distributed under the formula described above means that some districts that are trying to establish special programs for the disadvantaged do not get funded for same because they are too wealthy.

VIRGINIA

We have been unable to discover a description of Virginia's distribution formula. What follows is a narrative account of distribution procedures, drawn from Virginia Annual Program Plan for Vocational Education 1978-9.

Variables used in distributing funds include an ability to pay measure. This is based on assessed valuation per ADM, local personal income per capita, and state distributions of sales tax recipts for education per ADM. A second main variable is cost of education which is based upon local expenditures for schools per ADM. The third main variable is need for vocational education, as measured by rate of dropouts, rate of unemployment, and percentage of students completing their education at high school level.

By means not specified, eligible recipients are ranked in terms of these variables and divided into three groups, I, II, and III. The following statement is made regarding reimbursement rates in the three groups (Virginia Annual Program Plan for Vocational Education, 1978-79, p. 6.2):

> Local school divisions in Group I are eligible for 60% reimbursement of approved costs for categorical grants such as the extension of contracts, equipment, adult education programs, etc., and 50% of the approved amount of eligible costs for construction activities. Divisions in Group II are eligible for 55% reimbursement of approved costs for categorical grants such as the extension of contracts, equipment, adult education programs, etc., and 45% of the approved amount of eligible costs for construction activities. Divisions in Group III are eligible for 50% reimbursement of approved costs for categorical grants such as the extension of contracts, equipment, adult education programs, etc., and 40% of the approved amount of eligible costs for construction activities. All divisions are eligible for 50% of approved local travel for regular program activities. Work Study is reimbursed at 80% to Group I divisions, 75% to Group II divisions, and 70% to Group III divisions.

COMMENTS ON THE VIRGINIA PROCEDURE:

Too little information is given to allow a discussion of the procedure.

WASHINGTON

1. DATA SELECTED

Secondary

Level of Need:

LIF, state expenditure/pupil, voc. ed. enrollment, total enrollment, unemployment

Ability to Raise Revenue:

AV per capita, total Mills levied, per capita income, state expenditures on education, state expenditures for voc. ed., P, number of voc. ed. pupils, co-op programs

Quality of Program:

New Programs

Vocational Technical Institute (VTI)

Level of Need:

UR, population receiving public assistance, DR

Ability to Raise Revenue:

AV

Community College

Level of Need:

UR, LIF, DR, population receiving public assistance

Other:

State population, population of college area, state college enrollment by institution

2. TRANSFORMATION OF DATA INTO POINT SCORES

Secondary

Level of Need

1) low income (LIF). The LIF* points are calculated from the

following criteria:

$$LIF^* = \text{Percent Low Income Each LEA} \times \frac{\text{State Expenditure per Pupil w/o Community Ed., Food Services, Transportation \& Adult Ed.}}{\text{LEA Expenditure per Pupil w/o Community Ed., Food Services, Transportation and Adult Ed.}} \times \frac{\text{Vocational FTE's}}{\text{LEA 9-12 FTE's}}$$

ii) Unemployment (UR)

The points for unemployment are equal to the unemployment rate.

$$UR^* = UR$$

Ability to Raise Revenue (AP)

The AP* is a composite of the following factors:

$$\frac{\text{State Average Assessed Valuation Per Capita}}{\text{LEA Average Assessed Valuation per Capita}} \times \frac{\text{State Average Total Mills Levied by all Gov. Units}}{\text{LEA Total Mills Levied by all Gov. Units}} \times \frac{\text{State per Capita Income}}{\text{LEA per Capita Income}}$$

$$\times \frac{\text{State Expenditures per Pupil w/o Community Ed., Food Services, Transportation and Adult Ed.}}{\text{LEA Expenditure per Pupil w/o Com. Ed., Food Services Trans. and Adult Ed.}} \times \frac{\text{State Expenditure for Voc ed per pupil}}{\text{LEA Expenditure for Voc ed per Pupil}} \times \frac{\text{LEA Vocational FTE's}}{\text{LEA 9-12 FTE's}}$$

$$\times \text{ Inter-district Co-op}$$

The value of the Inter-district Co-op variable is 1.0 for any district that does not have a cooperative program that serves other school districts, and 1.1 for a district that does offer such a program.

Quality of Program

The points alloted for the number of new programs (NP*) can be determined from the chart below.

No. of new programs	Index IV
0	0
1	1.02
2	1.04
3	1.06
4	1.08
5 or greater	1.10

Vocational-Technical Institute (VTI)

The VTI funding factor, R, is computed for each VTI i as follows:

$$R_i = X(A_i + B_i + C_i + E_i)$$

X = an adjustment factor chosen such that all available funds are distributed.

$$A_i = \frac{\text{unemployment rate of VTI}_i\text{ area}}{\text{unemployment rate of state}}$$

$$B_i = \frac{\text{proportion of VTI}_i\text{ area's population receiving public assistance}}{\text{proportion of state's population receiving public assistance}}$$

$$C_i = \frac{\text{state average per capita valuation}}{\text{VTI}_i\text{ area per capita valuation}}$$

$$E_i = \frac{\text{VTI}_i\text{ area dropout rate}}{\text{State dropout rate}}$$

When the area served by a VTI is wholly contained within one county,

then VTI area data are equivalent to county data. When a VTI serves more than one county, a composite of the data from the counties served is used.

Community Colleges

The City College funding factor C for each city college i, is computed as follows:

$$C_i = .35(a_i + b_i + c_i + d_i)\, P_i + .60e_i + .227$$

$$a_i = \frac{\text{college i area's unemployment rate}}{\text{state's unemployment rate}}$$

$$b_i = \frac{\text{college i area's percent of families below poverty line (1970 census)}}{\text{state's percent of families below poverty line}}$$

$$c_i = \frac{\text{college i area's dropout rate}}{\text{state's dropout rate}}$$

$$d_i = \frac{\text{college i area's proportion of population receiving public assistance}}{\text{state's proportion of population receiving public assistance}}$$

P_i = proportion of state's population that lives in college i area

e_i = proportion of state's total college FTE at college i

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS:

Secondary

In determining the district reimbursement amounts, every variable is weighted by a factor of district enrollment. The total available funds are divided according to each variable; and each district receives a bit of each fund based on the proportion

of the district's weighted point total to state total points. For example, the reimbursement amount from the ability to pay fund for every district d, is

$$\text{AP reimbursement}_d = \left(\frac{(AP^*_d)\,(\text{enrollment}_d)}{\sum_{\text{all districts } i} (AP^*_i)\,(\text{enrollment}_i)} \right) \times \left(\begin{array}{c} \text{dollars available for} \\ \text{distribution on the basis} \\ \text{of AP} \end{array} \right)$$

A similar calculation determines the distribution to districts on the basis of each of the other three point variables (LIF*, UR*, NP*).

Vocational Technical Institute

The funding factor "R" for each VTI is adjusted by FTE enrollment of the VTI relative to that of the state total. This is then multiplied by the state total funds available for distribution to VTIs to determine the allocation to the particular VTI.

$$\text{Reimbursement to VTI}_i = (R_i) \frac{FTE_i}{\sum_{\text{all } t} FTE_t} \times (\text{total funds available})$$

Community College

The funding factor C for each city college i is transformed into a dollar allocation merely by multiplying C_i by the funds available.

$$\text{Reimbursement to City College } i = (C_i)(\text{Funds available for city colleges})$$

COMMENTS ON THE WASHINGTON PROCEDURE:

Step 1: Secondary i) The value of the numerator of the "state expenditure/pupil" variable is constant across all districts. The denominator varies by the expenditure in the given LEA. As defined, those districts that spend money for disadvantaged or disabled programs would have a larger denominator, and thus a lower variable point value. ii) See the state plan for the source of the data.

Step 2: Secondary i) At the secondary level, Washington converts data to points mainly by the Ratio to Average Value Method, which is continuous. For some variables, the proportion of total method is used. For "Quality of Program," the procedural Point Scale Method is used.

VTI and City Colleges. For VTI and City College levels, Washington converts data to points using the Proportion of Total Method, which is continuous.

Step 3: All levels convert the point scores to reimbursement amounts using the Weighted Points Method.

i) The percent of total federal funds alloted to each variable in the secondary formula for 1978 and proposed 1979 are shown below.

	1978	Proposed 1979
AP	35%	35 - 40%
LIF	35	35 - 40
UR	10	10
NP	20	10 - 20

The percents actually used in 1979, and the computations used to derive these percents, are not explained.

The secondary formula is used to distribute Subpart 2 money only. The VTI formula distributes funds under all subparts. The Community Colleges formula is used to distribute funds from Subpart 2 to all

Community Colleges and funds from Subpart 4 and 5 for those that requested them.

WEST VIRGINIA
FY 1980

1. DATA SELECTED

E, LI (number of low income children), DR, Number of Local Dollars district is required to spend on education according to the state's equalization formula, POP

2. TRANSFORMATION OF DATA INTO POINT SCORES

A. Regular Secondary Formula

The following formulas are used to compute point scores:

Ability to Pay Score AP*

$$AP_d^* = \frac{\frac{\Sigma x}{\text{no. pupils in state}}}{\frac{x_d}{\text{d's no. of pupils}}}$$

where

x_d = no. of local dollars d is required to spend on education according to the equalization formula;

Σx = state total no. of local dollars spent on education.

Low Income Score LI*

$$LI_d^* = \frac{\frac{LI_d}{\text{enrollment}_d}}{\frac{\text{State total LI}}{\text{state total enrollment}}}$$

where LI_d = d's number of low income children

Dropout Rate Score DR*

$$DR_d^* = \frac{\text{d's dropout rate}}{\text{state dropout rate}}$$

280

Total Score TS*

$$TS_d^* = .45AP^* + .45LI^* + .10DR^*$$

B. Disadvantaged and Handicapped Formula

i) LEAs are first arranged in ascending order of their values of TS*.

ii) Then they are assigned values of Y* on the basis of their position on the list.

d's Position on Step i's list	Y*
top 7	.90
next 6	.91
next 6	.92
next 6	.93
next 6	.94
next 6	.95
next 6	.96
next 6	.97
next 6	.98
bottom 7	.99

C. Postsecondary Formula

The description of this formula in the 1980 State Plan is not intelligible.

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

A. Regular Secondary and Related Programs

Values of TS* are transformed to a scale ranging from 1.0 to 1.31 in order to define the values of ATS*. The procedure for making this translation is not explained.

$$\text{Allocation to county } d = \text{Total Funds Available} \times \frac{ATS_d \times \text{Student-Teacher Contact Hours}_d}{\sum_{\text{all } j} (ATS_j \times \text{Student-Teacher Contact Hours}_j)}$$

where $d \in j$; j = set of all eligible recipients.

The above formula is also used to distribute funds earmarked for the following purposes: Guidance and Counseling, Administration and Supervision, and Job Placement.

B. Disadvantaged, Handicapped and Related Allocations

For each application for federal funds, the state authorities determine whether the amount requested is appropriate and how much of that amount will be covered by state and local funds. The procedure for this latter step is not shown.

Then, the allocation of federal funds is determined as follows:

$$\text{Allocation of federal funds to d for handicapped and disadvantaged programs (continuing programs only)} = \left(\begin{array}{c}\text{No. of Dollars Requested by d and approved by State}\end{array} - \begin{array}{c}\text{No. of State \& local dollars that will be used to fund this application}\end{array}\right) \times Y^*_d$$

If the allocations so determined add to more than the amount of federal money available, then the allocations are decreased proportionately until the sum equals the amount of federal funds at hand. If there is money left over after this main allocation is made, additional sums are paid to eligible recipients on criteria of economic depression in the region of the LEA, unemployment rate, and cost-effectiveness of programs offered by the LEA.

The above formula is also used to distribute funds in the following categories: Cooperative Programs, Adult Programs (for Adult Programs, Y* is weighted at 1.2.)

C. Consumer and Homemaking Programs

This allocation is based on the formula

$$\text{Allocation to d} = \frac{\text{No. of adults in d's district}}{\text{State adult Population}} \times \text{Funds Available} \times \text{Value of } Y^*_d \text{ from disadvantaged and handicapped formula},$$

except that allocations are not to exceed $9 per instruction hour.

COMMENTS ON THE WEST VIRGINIA PROCEDURE

Step 1: No Malleable Data used.

Step 2: Ratio to Average Value, a continuous method, is used.

Step 3: Weighted Points Method used.

i) At certain crucial steps in the distribution process, we were unable to fathom the techniques employed, even after engaging in correspondence and telephone conversations with West Virginia officials. We doubt the descriptions of these procedures given in the State Plans serve to inform the interested citizens of the state either.

WISCONSIN

1. DATA SELECTED

Cost of Instruction (Post-Secondary), FTE (Post-Secondary), Local Tax Dates (Post-Secondary), PCI, UR, POP (age 18 and over), Student Placements, Enrollment Trends, Building Utilization, Program Characteristics (Secondary).

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Postsecondary

Several post-secondary allocations are based on a Multi-Factor Index Score (MFIS). There are 16 post-secondary institutions and these are divided into quartiles by the criteria of efficiency, effort, income, need, and service.

1. Efficiency. This ranking is based on cost per FTE student, 1975-76. The four institutions with the lowest cost per FTE receive a "four" and the four with the highest cost receive a "one" and the other 8 districts are likewise distributed in the middle two quartiles by their ranking and receive either a "two" or a "three".

2. Effort. This is based on local tax rate. The four districts with the highest tax rates receive a four and the other districts are ranked downward, as in the case of the efficiency index above.

3. Income. This ranking relates to income per capita, 1974 data for county of which the district is located. The districts with the lowest income per capita receive an index value of four.

4. Need. Need is measured by annual average unemployment rate, 1976. Four districts with the highest unemployment rates receive a four, etc.

5. Service. Service is measured by proportion of post-secondary and adult enrollments in vocational education in the population aged 18 and over, 1974-75 data.

The five separate index scores are cast up for each district. The highest total score is 16 and the lowest is 8. Then P_d is computed as

$$P_d = [\text{Indices Score}] \times \frac{\text{District Student FTEs}}{\text{State Total Student FTEs}}$$

There is also computed a "reimbursement percentage rate." This is an index score obtained as the simple sum of the index values described just above under the headings of Effort, Income, and Need. The total index score is translated into a Reimbursement Percentage Rate as follows:

Table 1

Index Score	Reimbursement Percentage Rate
10 - 12	55
6 - 9	50
0 - 5	45

Next, there is for post-secondary institutions a Construction Federal Funding Reimbursement Index. It is derived, as before, by adding together as a single sum various separate components. These are income, unemployment and effort, all already described. There is also an utilization index, derived from data on how many times a week a room is scheduled for use and number of student stations used per week compared to the number of stations scheduled. In the construction index there are additional subjectively-derived measures of the district's need for the new facility, placement success rate, and enrollment trends.

For consumer and homemaking education at the post-secondary level, there is a score developed from a state-administered assessment of the quality of the district's program in terms of progress toward sex equity, adequacy of supervision and coordination, reasonableness of the budget, existence of local advisory committee, and annoucement of measurable objectives. Point scores are translated into reimbursement rates under the following table:

Table II

Score	Reimbursement Rate
85-100	85%
70-84	80
55-69	70
40-54	50
25-39	40
10-24	20

Secondary Level

One master index is used for distributing federal vocational money at the secondary level. The components and index values are shown below:

Table III

	Points
Schools in Economically Depressed Areas	0, 20
Schools in an economically depressed area as defined by the Department of Industry, Labor, and Human Relations are those in communities with lower than average per-capita incomes and would receive 20 points and those schools not in an economically depressed area would receive 0 points.	
Relative Ability to Pay	
Low	20
Low Average	10
High Average	5
High	0

	Points
A scale is developed listing the property valuation per student of each school district ranging from the most property valuation to the least. The first one-sixth of the scale, or those schools with the most property valuation per student (high), would receive no points. The next one-third of the scale would be the high average and receive 5 points. The next one-third of the scale would be the low average and receive 10 points. The remaining one-sixth of the scale, or those schools with the least property valuation per student (low), would receive 20 points.	

Role Stereotyping

A school must identify the number of males and females in all funded projects for the last three years and project the enrollment for the next three years to receive vocational education funds.	0
A school will receive 5 points for describing procedures to be used to identify sex role stereotyping problems/concerns within total vocational program with emphasis on program areas.	5
A school will receive 10 points for completing the first two steps and for describing procedures to be used to develop a plan for addressing problems stated above.	10
A school will receive 15 points for describing proposed sex role stereotyping in-service program based on the need(s) identified above and completing the program by the end of the fiscal year.	15

Special Needs

Special target group -- unique, extensive services	15
Special target group -- normal services	10
Basic program including target group students but less than 50% of class enrollment	5

Basic capstone program receives 5 points.
Capstone program in which 50% of the students are either disadvantaged or handicapped and receiving special services receive 10 points.
Capstone program in which an additional period for special services for these disadvantaged or handicapped students is provided receives 15 points.

Special Costs

High	11
Average	9
Normal	7
Low	5

Special costs relate to costliness of a given project --

Points are cumulative; i.e. a co-op project with $6,500 in hardware and a summer program would receive 11 points.

Basic capstone program receives 5 points.
Simulation or cooperative capstone program with approved coordination time receives an additional two points.
Capstone program with approved hardware totaling $6,000 or more receives an additional two points.
Capstone program with approved summer salary for vocationally certified teacher receives an additional two points.

Manpower

Employment needs -- surplus to severe need	5,15

Basic capstone program receives 5 points.
Capstone program in Health Care Occupations and/or approved cooperative capstone programs receives 15 points.

Additional Points for New Projects

First year project	12
Second year project	8
Third year project	4

High Dropout

Top one-third above average	10
Second one-third above average	7
First one-third above average	4
Below average	0

Points are awarded to those school districts with dropout rates above State average.

Other

Vocational student organization opportunities	0, 4, 8
Demonstration projects, pilot projects, or projects for new and emerging occupations	0, 10

A school will receive 8 points for vocational student organization opportunities if state and nationally affiliated and local program of work and end-of-year evaluation is submitted. A school will receive 4 points if state and nationally affiliated and program of work submitted or local program of work and end-of-year evaluation submitted. A school will receive 0 points if program of work and end-of-year evaluation is not submitted and not state and nationally affiliated, or only program of work submitted, or only dues submitted.

TOTAL POSSIBLE POINTS	136

3. TRANSFORMATION OF POINT SCORES INTO DOLLAR ALLOCATIONS

Secondary (All)

The point scores in Table III are used to distribute all funds to secondary institutions. However, just as in the case of postsecondary allocations, there are state-determined setasides: 25 percent of Section 120 money is for disadvantaged students and 15 percent is for the handicapped.

The points in Table III are used as follows: The total number of points for all schools is divided into the number of dollars available for the purpose for which funds are being distributed (handicapped, special disadvantaged, regular programs, or whatever) to yield a dollars point figure. This dollars/point figure is then multiplied by each district's number of points to arrive at the number of dollars for which it is eligible. Matching ratios are derived and used in the same fashion as in the case of postsecondary allocations (see below).

Postsecondary

Sixty percent of Section 120 money is reserved for postsecondary institutions; as is sixty percent of Section 140 and 150. Of the Section 120 postsecondary distribution, 25 percent is reserved for disadvantaged persons and 15 percent for the handicapped. Additional funds (the amounts vary from one year to the next) for previous commitments, high priority areas, construction, state administration, and special project.

1. Regular Programs

The following relationship is calculated

$$RR_d = \frac{P_d}{P_j}$$

The reimbursement rate is applied to federal funds available to determine a "Planning Figure" for the given district. Each district receives 75 percent of the Planning Figure.

The remaining 25 percent of available funds is handled in the following manner. Districts are rated by the state on the same basis, approximately, as the state uses in evaluating consumer and homemaking education. Districts are then ranked from high to low. Starting at the top of the list, districts are paid at the Reimbursement Percentage Rate (range 55 - 45 percent, see Table I) on those amounts of their Planning Figure not covered by the initial distribution of 75 percent of the money. This process is carried along until the federal money is exhausted.

Districts are not restricted to the Planning Figure as a ceiling for their budgets. A district may, for example, plan programs whose total cost is 200% of its Planning Figure. This district will then receive 75% of its Planning Figure in federal money, and assuming it is sufficiently high on the priority list, it will also receive an amount equal to its Reimbursement Percentage Rate times 125% of its Planning Figure (since 200% - 75% = 125%). As long as the district is willing to provide the matching funds its budget can be as large as it wants.

The Reimbursement Percentage Rate thus has another use: it establishes a local matching requirement:

where P = Planning Figure, R = Reimbursement Percentage Rate, and L = Local Share (matching), each district receives P in federal funds and must match that money with at least $L = \frac{P \times R}{(1-R)}$. This is equivalent to saying that the federal funding for a particular program must never comprise more than R (the Reimbursement Percentage Rate) of the budget.

The recipient must provide (1.0-R) of the total budget in order to receive the federal money.

2. Construction

For construction the index previously described is used as follows:

$$RR' = \frac{P_d}{P_j},$$

where RR' indicates preliminary RR. Then, for each district, there is computed

RR' x Local Cost of Construction (LLC) = S'_d

Then one takes the ratio of

$$\frac{S'_d}{\text{Federal Funds Available}} = \text{allocating percentage, AP.}$$

Finally,

$$S_d = S'_d \times AP,$$

3. Postsecondary Handicapped and Disadvantaged Setaside

From MFIS is derived P_d (used also in the distribution of regular postsecondary funds). The distribution takes the form

$$S_d = \frac{P_d}{P_j} \times \text{Federal Funds Available}$$

4. Postsecondary Section 140 Funds

These funds are distributed on the basis of an historical relationship.

5. Postsecondary Section 150 Funds

The reimbursement rates shown in Table II govern this distribution subject to a maximum allotment that is established by historical data on economic depression in the area.

1. DATA SELECTED:

AV, ADM, FTE, LIF, UR, DE, HE, DR, LESA , Occupational Enrollment, Job Openings, Excess Local Costs of Teachers' Salaries

2. TRANSFORMATION OF DATA INTO POINT SCORES:

Ten different scales are used. These are as follows:

i) Relative Financial Ability

$$\frac{AV_d/ADM_d(sec.)}{AV_s/ADM_s(sec.)} \quad \text{or} \quad \frac{AV_d/FTE_d(postsec.)}{AV_s/FTE_s(postsec.)}$$

	Points
0 - 0.49	5
.5 - .99	4
1.00	3
1.01 - 1.49	2
1.50 plus	1

ii) Low Income Families

$$\frac{LIF_d}{LIF_s}$$

	Points
16.5 - 5.57 %	5
5.56 - 3.57	4
3.56 - 2.57	3
2.56 - 1.57	2
1.56 - .00	1

iii) Manpower Needs

UR_d	Points
7.5 %	5
6.0	4
4.5	3
3.0	2
1.5	1

iv) Disadvantaged

$\frac{DE_d}{DE_s}$	Points
Highest Quartile	5
Third Quartile	4
State Average	3
Second Quartile	2
First Quartile	1

v) Handicapped

$\frac{HE_d}{HE_s}$	Points
Highest Quartile	5
Third Quartile	4
State Average	3
Second Quartile	2
First Quartile	1

vi) Occupational Needs

DR_d	Points
8 %	5
6	4
4	3
2	2
0	1

vii) Enrollment in Occupational Education

Enrollment	Points
1700	5
1300	4
900	3
500	2
100	1

viii) Limited English Speaking Ability

$\frac{LESA_d}{LESA_s}$	Points
Highest Quartile	5
Third Quartile	4
State Average	3
Second Quartile	2
First Quartile	1

ix) Job Openings

$\frac{\text{Job Openings}_d}{\text{Job Openings}_s}$	Points
21 %	5
20 - 16	4
15 - 11	3
10 - 4	2
3 - 0	1

x) Excess Local Costs of Teaching

Average Teacher's Salary in LEA	Points
Highest Quartile	5
Third Quartile	4
State Average	3
Second Quartile	2
First Quartile	1

3. TRANSFORMATION OF POINT SCORES INTO REIMBURSEMENT RATES:

The point totals from each eligible recipient are added up and weights are applied. The maximum point score is 275. Weights are as shown in Table I.

Table I

Elements	Weight	Estimated allocation of weight 5	4	3	2	1	Total
1. Relative Ability to Pay	10						
2. Low Income Families or individuals	9						
3. Manpower Needs	8						
4. Disadvantaged	7						
5. Handicapped	6						
6. Occupational needs (Dropouts)	5						
7. Enrollment in Occupational Ed.	4						
8. English is not the dominant language	3						
9. Job availability	2						
10. Excess local costs	1						
						Total	

The point totals for each eligible recipient are translated into reimbursement rates as in Table II.

Table II

Total Points of Eligible Recipient	Reimbursement Rate, Federal Funds
0 - 92	2% Regular Secondary 4% Regular Postsecondary 16% Adult, Both Levels

Table II (Con't.)

Total Points of Eligible Recipient	Reimbursement Rate, Federal Funds
93 - 184	8% Regular Secondary 6% Regular Postsecondary 18% Adult, Both Levels
185 - 275	10% Regular Secondary 7% Regular Postsecondary 21% Adult, Both Levels

COMMENTS ON THE WYOMING PROCEDURE:

Step 1: No malleable data are employed.

Step 2: Non-continuous Procedural and Non-Procedural Point Scales are used. One point of difference at the secondary level, in total score, i.e., going from 92 to 93, quadriples the reimbursement rate. This seems arbitrary.

Step 3: A Tabular Method is used to determine a reimbursement rate.

i) The use of "state average" in scoring is not clear. Must a district be precisely at state average to receive a "3"? And to how many decimal places is state average computed? Small differences in the variable could lead to rather large differences in reimbursement rate under the procedure that is apparently in use.

ii) No justification is given for the selection of the values of weights (as in Table I).