WYOMING EDUCATION FINANCE ISSUES REPORT

The Feasibility of Developing a Cost Adjustment for Vocational-Technical Education Programs

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Introduction

Wyoming's new Cost-Based Block Grant Model for school finance is intended to ensure that each public school district in the state receives adequate funding to offer students equal access to a "proper" education, as defined by existing Wyoming statute. The new model estimates the operating revenue eligibility of school districts—on a per-student basis—using actual cost data gleaned from Wyoming school districts. To ensure that district grants accurately reflect the cost of educating students to the legislative standard, the model incorporates data on approximately 25 instructional and operating components that capture the major costs of educating youth.

One criticism of the new block grant model is that, while it accounts for costs associated with various instructional strategies, it does not include a separate cost component for vocational education. Because historically providing vocational education usually costs more per full-time-equivalent (FTE) student than does academic instruction, some argue that such cost differences should be explicitly addressed in Wyoming's new state funding system.

In fact, the proposed new system does already account for these cost differences. The basic block grant provided by the new system is based on actual data from Wyoming's school districts on costs and expenditures. In the aggregate, total spending statewide for education under the new system will not decline. Therefore, *on the average*, the proposed new funding level is sufficient to cover the costs of all modes of instruction presently being used in Wyoming's schools, including vocational education.

Nevertheless, while the block grant is sufficient, on the average, to fund vocational education, if there are significant variations among districts in requirements for providing vocational education, then failing to take these considerations into account may make it difficult for some districts to maintain their current quantity or quality of vocational services. Should the new funding system, therefore, explicitly make adjustments among districts for differences in the delivery of vocational education? That is the question this paper considers.

The paper consists of three major sections. The first reviews the proposed block grant system and examines the rationale for introducing adjustments among districts to reflect differences in the costs of providing vocational education. Are there sound arguments for making such modifications, and if so, are there practical implementation strategies? The second section provides detail on the various factors that contribute to the higher costs of vocational

education. If vocational education cost adjustments were deemed desirable for education funding in Wyoming, what is known about the causes of higher costs, and what kinds of practices have other states adopted? The third section offers some guidance on how Wyoming might proceed with vocational education cost adjustments. What kinds of data is the state likely to need, and are there strategies other than cost adjustments that could be pursued to ensure that students have access to high-quality vocational instruction? The paper concludes with a brief summary.

I. Is a Vocational Education Cost Component Necessary?

Wyoming's new block grant model is designed to compensate districts for the average cost of providing all students with an essential set of educational services, as defined in existing state law. In imputing costs, the model accounts for a wide variety of costs associated with different instructional programs—academic as well as vocational. Consequently, in the aggregate, the basic block grant under the new system should be sufficient to pay for the amount and quality of vocational education that was being offered before these changes in the state's school finance system were made. However, there is substantial variation among districts in a number of factors that affect the cost of delivering the essential package of educational services. Indeed, the new system explicitly recognizes such important variables as district size or the percentage of students requiring special education services and makes adjustments to an individual district's allocation to reflect these factors. Can a case be made that districts' allocations should also be modified because of differences in their requirements to provide vocational education?

Answering this question requires attention to three issues. First, does the block grant adequately provide for vocational education? Second, is there significant variation among districts in the provision of vocational education to warrant concern about intrastate disparities in funding for vocational education? Third, if there are significant disparities, are there defensible, practical strategies for adopting a policy that provides differential funding for vocational education?

About the Block Grant Model

Wyoming's new cost-based block grant model provides local school districts with adequate funding to offer every student access to a common core of knowledge and skills identified by the state. The model is constructed around approximately 25 instructional and operational cost components: district revenue eligibility is calculated by summing across individual cost components, determining which categories should be augmented, and multiplying the result by average district membership (ADM), after adjusting for student and school characteristics. The use of historical state expenditure data to impute dollar amounts for each cost component ensures that districts' actual resource needs are accommodated.

Instructional and operating components contained in the cost-based model were gathered from a variety of sources, including repeated conversations with Wyoming education experts, observation of actual practices in Wyoming school districts, studies of best practices in other states, and consultations with national experts and professional associations (MAP 1997).

An underlying assumption in the cost-based model is that prior year district expenditure data are sufficient to capture the long-run cost of providing educational programs. While this assumption likely holds for regularly recurring costs (e.g., salaries, materials, and supplies), the costs of equipment and other capital outlay with a useful life of more than one year tend to be "lumpy." School districts do not depreciate or amortize capital expenditures; rather the entire cost is expensed in the year that a purchase occurs. Given that vocational education is more "capital intensive" than other kinds of instruction, is it possible that the procedure used to determine the block grant amount did not sufficiently address capital outlay and therefore indirectly underfunds districts for the costs of providing vocational education?

Vocational education equipment does have a relatively long useful life. For example, when computing state funding needs for the replacement of vocational equipment in its area centers, the State of Washington estimated a 10-year replacement schedule (Northwest Regional Educational Laboratory 1985). Consequently, it is reasonable to ask whether the procedure used to calculate the block grant in Wyoming paid adequate attention to this factor.

To illustrate, suppose that in the year used as the basis for calculating the block grant, only a few very small districts incurred relatively large costs for capital outlay (the base year just happening to be the one when these districts were at the beginning of another 10-year replacement cycle). Then, the resulting block grant will underestimate the capital outlay needs of Wyoming school districts, including capital costs for vocational education. On the other hand, if the base year happened to be one in which an unusually high percentage of the large districts in the state replaced equipment, then the block grant provides more than is needed to fund capital expenses. It is also possible, of course, that the base year was quite representative of spending patterns for capital outlay among large and small districts and that, consequently, the block grant amount is right on target.

In short, it is just as likely that the block grant amount overcompensates for capital outlay as it undercompensates, and in the absence of district data over several years on costs of equipment and other capital outlay, it is not possible to say much more than that. However, it is useful to keep in mind that over time expenditures for capital outlay do not amount to more than

10 percent of total expenditures. Since expenditures for vocational education rarely amount to more than 20 percent of total expenditures at the high school level, then the impact (positive or negative) on vocational education of any error resulting from capital outlay calculations affects no more than 2 percent (20 percent x 10 percent) of total expenditures.

In summary, barring some unusual characteristic of the base year used to determine the new block grant for Wyoming's school districts, it is reasonable to conclude that the proposed amount is, on the average, sufficient to fund vocational education in the state. Moreover, the amount should, over time, adequately support both annual operating expenditures and capital outlay for vocational programs. Therefore, there is no apparent rationale for statewide increases in funding for vocational education. However, is there justification for increasing the block grant allocation in some districts and decreasing it in others because of differences in the amount or quality of vocational education provided?

Variability Among Districts in Providing Vocational Education

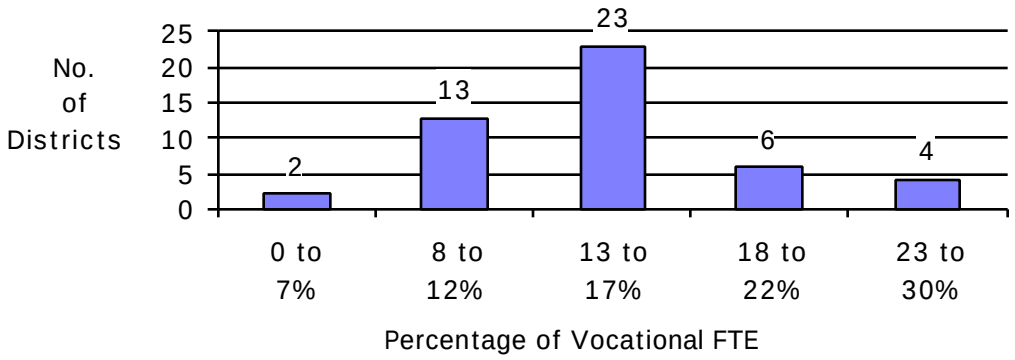
If vocational education represented the same percentage of total instruction in all districts throughout Wyoming, there would be no reason to make any further adjustments in the state's new school finance system, no matter how much more it costs to provide vocational education relative to nonvocational instruction. As has been discussed, the block grant takes these differences into account. However, if vocational education costs significantly more per FTE student than academic instruction and if some districts must provide relatively more vocational instruction than others, then it can be argued that a "fair" school finance system should take this factor into account and make adjustments, up and down, in a district's block grant allocation.

Does vocational education cost more? There are no good data to answer this question specifically for Wyoming. However, as discussed in more detail in Section Two below, information from other states and research on national data suggest that vocational education costs approximately 20 to 40 percent more per FTE student than academic instruction. Assuming the same to be true for Wyoming, how great are the differences among districts in vocational education delivery?

The only available direct measure of differences in the provision of vocational education among Wyoming's school districts is the number of FTE vocational instructors as a percentage

of total FTE instructors.[1] On the average, on October 1, 1997, vocational educators accounted for about 15 percent of all FTE instructors in the state (506 vocational FTE versus 3,441 total instructional FTE). As Figure 1 displays, there was considerable variation around this mean. In 15 of the state's 48 districts, vocational teachers represented less than 12 percent of total FTE, while in 10 other districts they represented more than 18 percent.

Figure 1— Distribution of Wyoming School Districts by FTE vocational instructors as a percent of total FTE instructors: October 1, 1997



What do these variations imply about the impact of the new block grant system? First, for about half of Wyoming's districts—those in which vocational FTE ranges from 13 to 17 percent of total FTE—the block grant should have little or no effect on instructional decisions. These are, in effect, average districts with respect to the provision of vocational education. Since the block grant is sufficient, on the average, to fund vocational education, these districts should be able to continue to offer the same level of vocational education as they did before the block grant.

For the 15 districts with below average percentages of vocational FTE, relatively speaking these districts will have more money than is needed to offer the mix of academic and vocational programs they provided before the block grant was instituted.[2] They will be able to

[1]Wyoming does not have data on actual spending for vocational education, nor does it have information on FTE vocational education enrollment. However, FTE instructors are an indicator of vocational education activity since instructional salaries and benefits represent a substantial portion of direct costs. Although used as a surrogate for vocational quantity, it is worth noting that data on FTE instructors provide little insight into the quality or cost of instruction provided within districts.

[2]Some of these districts have actually experienced a decline in spending under the new block grant, presumably because they were high wealth districts before finance reform. Still, other things equal, these districts will have relatively more money given their below average ratios of vocational education to total instruction.

either 1) increase the amount of vocational education offered; 2) continue to offer the same amount of vocational education but spend more per FTE student on it; or 3) spend more per FTE student on academic instruction than is assumed by block grant calculations. This is consistent with the operation of Wyoming's block grant, which is designed to allow districts to allocate resources among vocational and academic programs as they see fit.

Conversely, the 10 districts with above average percentages of vocational FTE will be financially squeezed by the block grant. They will either have to 1) reduce the amount of vocational education they offered before the block grant; 2) find more efficient and lower cost strategies for providing the same level of vocational education; or 3) spend less per FTE student on academic instruction than was assumed by the calculations that were used to determine the block grant amount.

In short, unless they make changes in instructional offerings, districts with relatively low percentages of vocational education FTE instructors will be able to expand or improve the quality of their existing vocational programs and/or offer a higher level of academic services than districts providing relatively greater amounts of vocational education. But is this unfair? The answer depends, in part, on the reasons for the differences in the relative amounts of vocational education offered among districts. Why do some districts spend relatively more and others less on vocational education? There are several possible explanations.

First, the decision may simply be a local choice reflecting student, parental, or community preferences for vocational versus academic education. The tradition of local control gives communities substantial discretion over educational offerings. Other things equal, districts may choose to pay above average salaries for their teachers and offset this added expense with higher class size. They can buy more expensive textbooks and replace them less frequently. As with these examples, if the reason for variation in the amount of vocational education offered is simply local preference, there is no apparent rationale for accommodating these different preferences through the state's school finance system.

Second, the differences may reflect variation among districts in the distribution of K–12 enrollment by grade level. Since vocational education is largely a secondary school program, K–12 districts with above average concentrations of high school students will have above average requirements for vocational education. Over time, of course, these variations in age distributions should even out as the various demographic bulges work their way through the local school system. However, school district financial arrangements are not structured to

allow districts to accumulate surpluses in years of "low-cost" demographics in order to have excess resources in high-cost years. If the variation in the amount spent to provide vocational education is driven by interdistrict differences in how students are distributed by grade level, there may be justification for addressing these differences annually through the block grant allocation.

Third, the differences may reflect variation among districts in the "need" for vocational education. Traditionally, vocational education has been targeted on high school students who are less likely to pursue a four-year postsecondary education. If relatively higher doses of vocational education are the appropriate education strategy for these students and if it is possible to identify them accurately and fairly, then just as schools are compensated for the higher costs of serving students with "needs" for other types of special education, it can be argued that the state's finance system should enable schools to meet greater demands for higher cost vocational education. Since the percentage of students able to pursue a four-year college degree probably does vary considerably among districts, this variation could be addressed through the block grant system, as is the case for variation in district size or the proportion of special education students.[3]

There are, however, potential problems with this third explanation that merit careful consideration. First, the long-standing presumption that vocational education is suited mainly for students not intending to go to four-year college is less widely held today than previously. Labeling any educational program as intended primarily for "non-college-bound" students relegates the program to second class status that can stigmatize both students and teachers. Additionally, such a policy tends to promote "tracking" and the low expectations that seem to follow students assigned to the lower path. These practices are at odds with many of the current efforts to break down the barriers between vocational and academic education and to raise the knowledge and skill levels expected of all students.

Furthermore, even if vocational education were the preferred mode of instruction for non-college-bound students, it is not easy to determine ahead of time (that is no later than the end of 10th grade) precisely who will not go to four-year college. The fact is that about 90 percent of all high school students *aspire* to attend four-year college. While as many as 60 percent of high

[3]It is worth noting that since the current basic grant formula provides additional resources for schools with high concentrations of economically disadvantaged students, the existing school finance system may already be targeting funding on districts with larger vocational programs, to the extent that vocational need is associated with economic factors.

school students will not achieve this goal, making the determination for them by the 10th grade is not acceptable to most parents.

Finally, there is the very difficult matter of distinguishing "need" for vocational education from mere preference. Even if there were consensus that the state finance system should address differences in need for vocational education among districts, how would the state distinguish the students who "need" an automotive or cosmetology program to pursue employment after high school from the students who just want to work on their own cars and do their own hair? There is nothing wrong with the latter preferences. It is simply that they are just that—preferences—and, therefore, are not a factor that demands attention in the state's school finance procedures.

In reality, probably all three of these explanations are valid to some degree. That is, the variation among school districts in the amount of vocational education provided reflects local preferences, demographic differences in the ages of students, and different degrees of "need" for work force preparation in lieu of four-year college. Unfortunately, it is not possible to disentangle the relative influence of any one of these factors. For the present, the legislature is left simply with the knowledge that the way in which vocational education is provided does vary among districts and that consequently some districts will feel more financial pressure from finance reform than others. Whether state policy should seek to remedy this particular fiscal impact is ultimately a political decision, one that may require the legislature to reconsider the components of its basket of essential education goods and services using non-cost-based criteria. One additional piece of information that may aid the deliberations is an examination of how districts with above and below average levels of vocational education fare under the block grant.

Finance Reform and District Concentration of Vocational Education Programs

Preliminary state finance data suggest that the majority of students in Wyoming will benefit under the new cost-based model. Analysis of school district allocations indicate that 84 percent of Wyoming students attended districts in 1997–98 that had experienced increased state and local funding eligibilities for the following school year. Given that these school districts had routinely offered vocational services before implementation of the block grant, and the new model augments districts' prior year allocations, it is not likely that the absence of a vocational

cost factor in the funding formula will have a deleterious effect on providing vocational education in these sites. Moreover, the continued infusion of federal funding via the Carl Perkins Vocational and Applied Technology Education Act and recent School-to-Work Opportunities Act should supplement increased state aid, meaning that many of these districts should realize considerable fiscal gains over prior year allocations.

While a large proportion of students are projected to benefit from the new funding model, nearly half of Wyoming school districts (as many as 22 of 48 sites) will register a resource decline for the 1998–99 school year. Generally, these districts were among the smallest in Wyoming: ADM in districts projected to lose funding averaged 698 students in 1997–98, compared to an average of 3,070 in districts projected to gain funding. It is possible that economies of scale may cause smaller districts with decreased funding eligibilities to have difficulty financing relatively high-cost programs such as vocational education, and this may be especially true for districts providing greater student access to vocational services.[4]

Table 1 shows the relationship between the fiscal impact of the block grant and the relative levels of vocational education activity in the state's 48 school districts. Of the 10 school districts with above average concentrations of vocational education, eight are projected to lose money under the block grant. Conversely, of the 15 districts with below average concentrations of vocational education, nine are projected to gain under the block grant, and six lose. Consequently, districts with high concentrations of vocational education are more likely to lose under the grant, and districts with low concentrations are more likely to gain.[5] There are, however, exceptions to this general conclusion.

[4]Economists typically use the term *economies of scale* to describe the increases in productivity, or decreases in average cost of production, that arise from increasing the size or scale of an institution. In earlier reports, MAP has used the term *diseconomies of scale* to describe the increased cost that smaller districts face in providing services. Although this paper uses a different terminology, it is intended to describe the same effect.

[5]The reader is reminded that the measure of concentration of vocational education in this illustration is the percent of FTE teachers who teach vocational subjects and that it may or may not be a reliable surrogate for the cost of vocational education programs offered in the districts.

Table 1—Distribution of FTE vocational instructors and absolute change in projected block grants to Wyoming School Districts: 1997–98

		Percent FTE vocational instructors					
		0 to 7	8 to 12	13 to 17	18 to 22	23 to 30	
Absolute Change	Gained $	0	9	15	1	1	26
	Lost $	2	4	8	5	3	22
		2	13	23	6	4	48

These data suggest that Wyoming's new cost-based block grant model may have some unanticipated consequences for educational delivery in the state. First, it may be that districts offering relatively less student access to vocational education and/or relatively lower cost vocational programs may have additional resources available for other instructional priorities, and this may be particularly true of districts increasing their state funding. Since the new finance model accounts for the average, presumably higher cost of vocational services across the state, districts opting to offer less student access to vocational programs may be able to allocate supplemental resources in support of other less expensive academic instructional programs.

Perhaps more importantly, districts losing state resources may be unable to support their existing level of vocational services. Given that these districts may have been overfunded in prior years, it is likely that all instructional programs in these sites—academic and vocational—will suffer some resource decline. While the effect of diminished funding on vocational education in these districts is difficult to assess, in part because little is known about the type and cost of vocational services offered, it is possible that economies of scale will cause smaller districts to face greater challenges in maintaining their existing programs.

Strategies for Addressing Variation in District Vocational Education Services

If the legislature should decide that the fiscal aspects of variation among districts in providing vocational education merit explicit attention in the state's school finance system, what strategies would be available? There are at least three alternatives that could be pursued: 1) adding a vocational education factor to the determination of the block grant; 2) categorical funding for vocational education; and 3) incentives to adopt more innovative and efficient

instructional practices and curriculum. It should be stressed that any three of these options can be pursued without increasing state or local expenditures.

The first strategy, including a vocational education factor in calculating the block grant, is conceptually quite simple. The block grant already includes adjustments for particular kinds of student characteristics, and assigning a weight for FTE vocational education students could be added to the block grant model. The basic approach would be to adjust a district's allocation up or down depending on its relative concentration of FTE vocational education students. The net effect on total state spending would be zero, with gains in districts with above average concentrations of vocational students offset by losses in districts with below average concentrations.

Implementing such a strategy depends on resolving two practical concerns: 1) how should vocational education students be weighted, and 2) how should vocational education students be counted? The weight should reflect the ratio of cost per FTE vocational enrollment to cost per FTE enrollment in other types of classes. Currently, Wyoming has no data on either relative costs or FTE vocational enrollment. (The second section of this paper presents detailed information on what is known about the relative cost of vocational education in other states.) If Wyoming decided to make cost adjustments in its school finance model, it could begin by using estimates based on experience in other states, refining the weight as it collects and interprets information on actual costs in Wyoming. Additionally, the state would need to begin collecting data on FTE vocational education enrollment.

The second strategy, categorically funding vocational education, is in many respects very similar to the first. Like the weighted student feature of the block grant, categorical funding would require determining the relative cost of vocational education and each district's FTE vocational education enrollment. The main difference is that, unlike the block grant, categorical funding would restrict expenditures of categorical funds to vocational education programs. In contrast, the block grant does not require districts to spend the funds in any particular way; it simply bases the district's allocation on weighted FTE vocational education enrollment. Under this second approach, the net cost to the state would still be zero. The average block grant per FTE would be reduced by the average categorical grant per vocational FTE.

Both of these first two strategies depend on measures of vocational FTE enrollment to determine a district's allocation. This feature raises the possibility that districts may try to "game" the system—taking steps to increase vocational education enrollment, which carries a

greater weight than nonvocational enrollment, in order to increase total funding. This incentive might be especially problematic under the block grant, which would not require the district to actually spend the money on vocational education. In other words, a district could "make money" for nonvocational activity by finding ways to increase vocational education FTE enrollment. Categorical funding mitigates this possibility to some extent by restricting expenditures to vocational education programs.

While this kind of "gaming" is possible, there are relatively easy ways for the state to minimize the likelihood that it would happen. One simple measure is to cap annual increases in vocational education FTE enrollment. Another strategy is to cap either total block grant or categorical funding and then adjust weights to reflect increases or decreases in vocational education FTE enrollment. Additionally, state standards for academic course-taking requirements will also constrain any local efforts to artificially drive up vocational education enrollments. In short, this kind of unintended consequence of block grant weighting is not very likely.

Introducing categorical funding for vocational education could have some negative consequences for state and local agencies, however. The need to develop and monitor categorical receipts would increase statewide bureaucracy, and this could be manifested in increased data burden at the district level and an increased need for state oversight of district budgeting and expenditures. Categorical funding would also erode local control over block grant expenditures, since districts would lose the ability to allocate a portion of their state basic grant to reflect local preferences for vocational and other types of instruction.

A third strategy is to encourage districts to adopt new approaches to vocational education that are both less costly and also more in line with the increased emphasis on academic achievement that is now the priority for elementary and secondary education in most states. As will be discussed in more detail in the second section of this paper, what has traditionally made vocational education more costly than academic education is relatively smaller classes and the need for more costly equipment and supplies. Moreover, these two aspects of vocational education have tended to reinforce each other; because equipment is often so costly, it is difficult to provide it for very many students, and consequently, classes tend to be smaller.

In many respects, the emphasis on high-cost, equipment-intensive vocational programs has been driven by the belief that the primary objective of vocational education is to prepare students for specific occupations, especially in some of the more technical fields that require

less than a baccalaureate degree. However, there is an emerging view that the first aim of vocational education, especially at the secondary level, should be to help students master a strong foundation of academic knowledge and skill, as well as acquire a basic understanding of key aspects of the major industries that make up the American economy. In this approach, the vocational education curriculum uses work as the context for applying academic knowledge and skill to authentic problems and situations that one might encounter on the job. The curriculum is still heavily workplace oriented, but it is much less occupationally specific. Hence, it is also less capital intensive and requires a level of instructional resources that is quite similar to academic education. Therefore, this strategy for providing vocational education is not likely to be any more costly than other kinds of education, and the rationale for cost adjustments in school finance procedures disappears.

Adopting this kind of approach, however, is not easy. It requires new curriculum, as well as preparing teachers (both vocational and academic) to implement this model effectively. Curriculum development, in-service professional development, and major changes in teacher education will require not only clear state policy statements but also the commitment of significant resources. Such activities are an appropriate use of federal funds for vocational education and work force preparation and do not necessarily require appropriation of state moneys.

In summary, it is clear that there is significant variation among Wyoming's school districts in the concentration of vocational education programs. Furthermore, it is also apparent that some districts with above average concentrations of vocational education are likely to experience declines in overall funding as a result of moving to the block grant system. Consequently, if vocational education in Wyoming has a higher cost than other forms of instruction, these districts with high concentrations of vocational education will be especially hard pressed to continue their current offerings. Whether this is a situation that the state school finance system should remedy is up to the legislature, which has several strategies at its disposal. At least two of these strategies require some determination of the relative cost of vocational education, which is not presently available for Wyoming. Therefore, the following section presents information on what is known about the relative costs of vocational education from national data and the experiences of other states.

II. What Is the Relative Cost of Vocational Education?

If the average cost of providing vocational education can be objectively measured, then Wyoming's new education block grant model can be adjusted to reflect the true cost that districts face when educating students. This section uses data from the 1993–94 Schools and Staffing Survey (SASS) administered by the U.S. Department of Education, National Center for Education Statistics, along with national and state data from the school finance literature to disaggregate the component costs of vocational education relative to other forms of instruction.[6] It suggests that, when the costs of vocational education are disaggregated by expenditure area, the relative cost of instruction is not significantly higher than that for academic instruction. State fiscal data are also used to illustrate different strategies that states have adopted to provide supplemental funding for vocational education.

Costs of Vocational Education

It is generally accepted in the education community that vocational education is more expensive to provide than other forms of instruction. Estimates of the actual cost of vocational programs vary, with some researchers suggesting that instructional costs are as much as two to three times those of academic programs (Elkin and Tucker 1988). Higher costs are ascribed to the unique resource demands of vocational classrooms, with the majority of these costs captured by three factors: 1) the cost of salaries for vocational teachers; 2) the size of vocational classes; and 3) the purchase and maintenance of vocational instructional equipment.[7]

[6]For the purposes of the statistical analysis, vocational educators are those who identified their primary field of instruction as accounting, agriculture, business and marketing, health occupations, industrial arts, trade and industry, technical, home economics, or other vocational/technical education. Academic instructors were confined to four subjects areas: mathematics; science (e.g., biology, chemistry, earth science, physics); English/language arts; and social studies.

[7]This paper does not address costs associated with constructing specialized vocational instructional facilities (i.e., area vocational schools) or vocational classrooms located in comprehensive high schools. These construction costs are typically funded by state appropriations that are not tied to annual district enrollments.

Vocational staff salaries

Since school districts must compete against local employers when hiring staff, it is often assumed that excess demand will drive up the cost of vocational instructor salaries. Most states do not, however, maintain separate salary schedules for vocational teachers, meaning that, other things being equal, the average salary of vocational and academic educators should be roughly equivalent. Nevertheless, a variety of factors can contribute to earnings disparities among the two groups.

For example, most states have adopted salary schedules that tie teacher compensation to a combination of educational attainment and years of teaching experience. National data suggest that while vocational educators are relatively less likely than academic teachers to have earned advanced degrees, they are more likely to have attained greater seniority in the classroom. According to the 1993–94 SASS data, vocational teachers were as likely as academic teachers to earn a bachelor's degree (47 percent versus 48 percent), but were more likely to hold less than a bachelor's degree (7 percent versus 0.1 percent) and less likely to hold a master's degree (40 percent versus 46 percent) than academic educators (table 2). This can translate into lower salaries for vocational instructors.

Table 2— Percentage of full-time public vocational and academic secondary school teachers, by highest degree earned and type of professional development, and their years of teaching experience: 1993–94

	Total	Vocational	Academic
Highest degree			
Less than a Bachelor's degree	1.4	7.3	0.1
Bachelor's degree	48.2	47.3	48.4
Master's degree	44.5	40.1	45.5
Other	5.9	5.2	6.0
Professional development			
Workshop or inservice	92.2	91.2	92.4
University extension or adult ed.	37.8	42.7	36.7
Professional association activity	50.3	56.0	49.0
Years of teaching experience	16.2	16.8	16.0
Less than 3 years	11.6	8.5	12.2
4 to 9 years	18.6	17.0	19.0
10 to 19 years	28.6	32.2	27.8
20 or more years	41.2	42.3	41.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Vocational teachers were, in contrast, slightly more likely to have greater classroom experience than academic teachers: the average vocational teacher in 1993–94 had 16.8 years of teaching experience, compared to 16.0 years for academic teachers (table 2). Vocational teachers were also more likely than academic teachers to participate in professional development activities. Specifically, vocational educators were more likely to enroll in postsecondary education courses (43 percent versus 37 percent) or to participate in professional association activities (56 percent versus 49 percent) than their colleagues teaching academic courses. This extra experience and class time might be expected to contribute to increased earnings for vocational instructors.

In addition, public school districts sometimes use financial incentives to attract teachers in fields where there are shortages. These incentives can take a variety of forms, ranging from cash bonuses to step increases in salary schedules, reclassification, or other types of salary compensation. Although the practice occurs, the 1993–94 SASS data show that only a small percentage of public school districts adopt such salary adjustments; for example, only 5 percent of districts surveyed provided step increases for teaching in fields with shortage (U.S. Department of Education 1997).

Many school districts also offer vocational teachers extended contracts, which provide them with supplemental pay for extra work performed during the regular school year—for example, to set up and take down lab materials or to pursue professional development. Although this practice is widely practiced in the field, the SASS survey does not differentiate between extended contracts and other forms of teacher income. As such, it is not possible to determine whether vocational educators are more likely than other instructors to benefit from these compensation packages.

Table 3— Average base salary (in dollars) for full-time public vocational and academic secondary school teachers, by years of teaching experience: 1993–94

	Total	Vocational	Academic
Average salary	$34,820	$35,080	$34,762
Less than 3 years	24,232	24,785	24,147
4 to 9 years	27,671	27,851	27,635
10 to 19 years	33,764	33,343	33,872
20 or more years	41,754	41,389	41,837

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (School and Teacher Questionnaires).

While variation in the education, tenure, professional development, and contractual incentives offered to vocational teachers likely contribute to salary differentials among the two groups, average base salaries for full-time vocational and academic teachers were not statistically different across the nation in 1993–94 ($35,080 and $34,762, respectively) (table 3). This indicates that, on the average, vocational teachers are no more expensive to compensate than academic instructors.

Vocational teachers may, however, be somewhat more expensive to train than academic teachers. This is because most vocational teachers hired directly from the field have little or no experience in curricular development or instructional pedagogy. Consequently, these individuals may require considerable inservice training or additional professional development staff days than regular secondary school faculty, which may particularly apply to vocational educators based in area or regional vocational centers (Northwest Regional Educational Laboratory 1985).

In keeping with national figures on teacher salaries, vocational educators in Wyoming are only slightly more expensive to employ than other types of instructors. As Table 4 shows, the average secondary vocational teacher in Wyoming earned $32,296 in the 1996–97 school year, an amount only slightly higher than that for teachers of other academic courses (Wyoming Department of Education 1998).

Table 4—Average base salary of all FTE teachers in Wyoming public secondary schools, by subject area: 1996–97

Vocational education	$32,296
History	32,277
English	32,066
Science	31,987
Mathematics	31,584

SOURCE: Wyoming Department of Education, Federal Programs Unit, 1998.

Although the average cost of employing a vocational teacher in Wyoming is slightly higher than that for academic instructors, and likely varies by vocational program specialty area, it does not appear that school districts within the state, regardless of the mix of academic and vocational services, bear an exceedingly high cost in staffing vocational programs. Statewide, Wyoming school districts employ an average of 10.5 FTE vocational teachers (Wyoming Department of Education 1998), meaning that at the margin, the average school district must spend a relatively small amount to employ equal numbers of vocational and academic teachers (e.g., an extra $200 for vocational teachers in comparison to history teachers). Since the cost-based model also takes

into account various factors that can contribute to the added expense of employing vocational teachers (e.g., seniority), on the basis of vocational teacher salaries alone, it does not appear that a separate cost factor is needed in the block grant model that Wyoming has adopted.

Class size

Vocational class sizes are often smaller than academic classes, in part because the high cost of specialized instructional equipment and the potentially higher risk associated with equipment use dictate lower student-teacher ratios. According to SASS national data, the average class size of a full-time vocational teacher in 1993–94 was 20.6 students, compared to 24.5 students in academic classrooms. This implies that nationally districts must employ a relatively larger number of FTE vocational instructors to generate a similar number of student contact hours. Given that the actual cost of employing vocational instructors nationwide is not appreciably higher than that of employing academic teachers ($35,080 versus $34,762, respectively), the smaller class sizes associated with vocational education can boost the average cost of vocational instruction by approximately 20 percent over the cost of academic courses ($1,703 versus $1,419 per student per FTE instructor).

While enrollments for vocational education are, on the average, smaller than those in academic classrooms, the average size of vocational classes likely varies by course level and program area. In 1992, almost all public high school graduates (97 percent) completed at least one vocational education course; however, only 8 percent specialized in vocational education (NCES 1995).[8] Given that introductory courses often emphasize less advanced skills or require less student exposure to advanced instructional equipment, vocational enrollments in beginning classes may equal or exceed those of academic classrooms (Hudson 1978).

Only a small percentage of students—generally those seeking immediate employment upon graduation—go on to take more advanced vocational coursework. These students require greater instructor attention and access to more sophisticated equipment, often because they are striving to achieve industry certification. Average class sizes typically shrink as skill specificity rises, and this may be particularly so in some vocational program areas, such as trade and industry where greater teacher supervision is required. Accordingly, the cost for vocational instruction within a given school or district may depend on a variety of factors, including the

[8]Vocational specialization refers to students earning 4.00 or more credits in a single occupationally specific program area, with at least 2.00 of those credits beyond the introductory level.

number of students enrolled in vocational courses, the number of introductory and advanced vocational courses offered, the type of vocational programs offered, and the availability of different types of vocational equipment for instruction.

National data indicate that average class sizes in Wyoming are relatively smaller than those reported nationwide. In the 1993–94 school year, for example, class sizes in Wyoming averaged 20.3 students, compared to 23.5 students among all full-time public secondary school teachers in the country (U.S. Department of Education 1997). This suggests that Wyoming spends comparatively more for education than most other states. Indeed, national data on state expenditures per pupil in public elementary and secondary schools indicate that Wyoming currently spends well above the national average of $5,689. In the 1995–96 school year, the most recent year for which national data are available, Wyoming school districts ranked 16th in the nation in per pupil expenditures, with average expenditures of $5,826 per student (U.S. Department of Education 1998).

Although the Wyoming Department of Education collects data on average class size, state staff note that inconsistencies in reporting across districts compromise the integrity of these data. If student demand for vocational education is similar to that nationwide, then average vocational class sizes in Wyoming are likely to be smaller than those reported nationally and are proportionally smaller in comparison to academic enrollments, factors that would tend to drive the average cost of vocational instruction above that offered in academic classrooms. Conversely, if student demand is high or districts can accommodate vocational students in larger classes that approach national norms, then the average cost of vocational education should fall. In the absence of reliable information on average class sizes of vocational and academic teachers in Wyoming, it is not clear that an element making an adjustment for class size is necessary.

Purchase and maintenance of vocational instructional equipment

Two recurring costs that school districts face are purchasing vocational equipment and materials and maintaining vocational facilities. Unfortunately, the literature contains relatively little information on these capital costs, in part because few states collect data on district expenditures by purpose. Further complicating the calculation is that school districts offering different types of vocational programs face different costs and have identified different strategies for obtaining instructional supplies and equipment. Materials may be donated by local

employers, purchased periodically or via specially negotiated agreements with manufacturers, funded using federal Perkins dollars, or obtained using other, more creative means.

In a study comparing the costs associated with vocational education in career-oriented and comprehensive high schools, Chambers (1990) reported that the cost of supplies for vocational instruction was substantially higher than that for academic classrooms. He reported that academic classrooms generated a cost of roughly $0.50 per student, while laboratory courses in the same school ranged from $1.08 to $7.44 for chemistry. In comparison, costs for career-related instruction in vocational schools ranged from $6.72 for drafting to more than $30 per student in commercial art, welding, and machine tools courses. Conflicting results were noted in a 1993 study of vocational coursework offered in New Mexico's school districts. In these school districts, the average cost of supplies in comprehensive high schools averaged $51.29 per class for general education, compared to $27.34 for vocational classes (Swift, Ludwig, and Milanovich 1993). According to the researchers, lower vocational costs in the New Mexico study were due to vocational program funding levels that did not reflect the true costs associated with instruction.

It is likely that the cost of maintaining vocational facilities within comprehensive high schools is marginally more expensive than that of academic classrooms. Again, these costs likely vary by program area, with relatively more space- and machine-intensive programs, such as trade and industry, being more expensive to sustain. For example, in the New Mexico study, the ratio of space occupied by vocational education laboratories to standard classrooms averaged 1.86, which could translate into higher costs for physical plant operation (e.g., heat and custodial services). Interestingly, Swift, Ludwig, and Milanovich (1993) also noted that per-pupil costs associated with equipment maintenance were higher for general education ($34.77) than for vocational classes ($29.96). Lower costs for vocational education were attributed to poor record-keeping of expenditures for equipment maintenance and the ability of vocational staff to make their own repairs to instructional equipment.

In the absence of state or national data on equipment costs, an alternate means of quantifying the relative cost of vocational education is to examine state cost data. One advantage of using state-derived data is that these data can shed light on actual state vocational funding practices, and thus provide a more complete picture of the relative cost associated with vocational delivery. Unfortunately, state finance data are generally not available on individual cost components (e.g., teacher salaries), and as such, care must be taken when interpreting aggregate state-level data. Variability among states in the actual cost of educational inputs and

total resources provided to districts further complicates interstate comparisons, Accordingly, the following section is intended only to provide the reader with a sense of the relative cost of vocational education compared to other types of instruction.

State Vocational Cost Data

A number of states have formalized procedures to channel additional resources into vocational programs, and in some cases, these data can be useful in triangulating the actual cost of vocational programs. State fiscal adjustments can take a variety of forms—ranging from weighted cost factors that, when multiplied by a base per-student foundation level, provide districts with supplemental funding for vocational programs, to categorical funding schemes that reimburse districts for approved vocational expenses. What is perhaps most intriguing about these reimbursement strategies is the variation across states in how allocation formulas are structured and applied. The following section reviews vocational allocation formula from 13 states—Alaska, Arizona, Florida, Illinois, Indiana, Minnesota, Missouri, Nebraska, New Mexico, New Jersey, Ohio, Oregon, and Texas—to identify state expenditures for vocational education compared to other forms of instruction.[9]

Weighed cost factors

States typically allocate educational funding to school districts based on student attendance. Weighed cost factors used within state operating formulas provide supplemental funding to districts for students enrolled in vocational coursework. Weighting formulas usually take one of two forms: *add-on weights*, which are extra funding units generated by vocational students in addition to their regular program entitlement, and *vocational student weights*, which are special larger weights assigned only to students in vocational programs. Although these two forms of weighting are subtly different in definition, the effect of weighting vocational student participation is similar: youth enrolling in approved vocational programs are eligible for more state funding than those in other instructional areas. According to a survey by Gold et al. (1992), 13 states used some form of weighting formula to generate vocational education units in the 1990–91 school year.

[9]Information for Alaska and New Jersey is based on state funding practices in the 1990–91 school year, as reported by Swift, Ludwig, and Milanovich 1993.

Few states have the technical capacity to compute annual cost factors based on actual district expenditures. Of the states responding to this study, only Florida maintains a management information system sophisticated enough to track annual district expenditures for vocational and nonvocational program areas. These data are particularly important because they provide a timely, direct measure of the aggregate costs associated with vocational education. As indicated in Table 5, per-student expenditures in Florida were relatively higher for vocational education than for academic and other types of instruction.

Table 5— Cost factor adjustment for public secondary vocational education

	Florida	
	(3-year average of actual cost)	(Actual state factor used)
Basic	1.057	
Grades K–3	1.000	1.054
Grades 4–8	1.154	1.000
Grades 9–12		1.169
All Vocational 6–12		1.272
Agriculture	1.391	
Office	1.175	
Distributive	1.158	
Diversified	1.197	
Health	1.251	
Public service	1.080	
Home economics	1.193	
Trade & industry	1.578	
Exploratory	1.142	
Mainstream	1.856	

SOURCE: Florida Department of Education, Financial Management Section, 1998.

Florida collects data on district-by-district expenditures for 26 academic, vocational, and special student population program areas. Annual cost factors for each program are calculated based upon their relative cost to a basic program in grades 4 to 10—which are assigned a cost factor of 1.00—with the other 25 factors assigned individual cost factors as a derivative of this factor. To control for year-to-year variation, annual readjustments to cost factors are made based on a three-year average of computed factors.

Data used to calculate Florida's cost factors incorporate all expenditures from the State General Fund, exclusive of transportation and food service. It is important to note that expenditures for operating capital outlay are included in these totals, meaning that it is possible, over time, to capture the cost of purchasing vocational equipment in addition to other vocational disbursements. Analysis of Florida's data reveals that while vocational education is relatively more expensive to provide than other forms of instruction, the state has adopted a vocational

cost factor for the 1996–97 school year that is only 9 percent higher than that used for academic courses (1.272 versus 1.169). This factor likely underestimates the actual cost districts incur in providing vocational education at the secondary level, since the base of students included in the calculation includes those enrolled in grades 6 to 8—students presumably receiving less expensive vocational services.

As might be expected, districts reported that certain types of instruction (e.g., agriculture and trade and industry) were relatively more expensive to provide than academic instruction. This is most likely due to smaller class sizes and higher costs associated with purchasing equipment and supplies. Since school districts in Florida have considerable discretion in allocating state revenue across vocational program areas, and can supplement local spending with funding from other state and federal sources, it is not clear that using a single cost factor for vocational education has a deleterious effect on instructional programs with higher than average operating costs.

States that seek to provide additional funding for vocational programs, but do not have the technical capability to assess annual district spending, often adopt historical *vocational cost factor constants* that are reapplied year-after-year. Typically, these cost factors are based on state-specific school finance studies conducted in earlier years, or are the result of political negotiations or recommendations from state departments of education. As one state administrator commented, these cost factors can reflect the strength of the vocational education lobby within a state rather than the actual cost of providing vocational services.

As Table 6 shows, state cost factors can vary across states, and within states by program area. In reviewing the table, it becomes apparent that Indiana has adopted one of the more complex formulas in order to allocate its vocational resources. As part of its state funding formula, districts enrolling students in approved vocational courses or programs may add on weights for student counts in these classes. Thus, a student in a half day agriculture program would generate an additional 0.38 factor to a district's ADM count. To encourage comprehensive high schools to send students to area vocational centers, districts may add on a weight of 0.09 for each student to include the cost of transportation to and from the center.

One reason that the state has encountered little resistance from vocational educators is that sending schools are entitled to keep the difference between what they receive from the state and the cost of instruction at area centers. Given the fairly generous student weightings in comparison to other states, depending upon the number of students enrolled and their area of

study, districts in Indiana may more than offset their associated costs of providing vocational programs. Moreover, since the same cost factors have been used over the last 20 years, district administrators can budget their programs around historical precedent.

Table 6— Cost factor adjustments for public secondary vocational education

Alaska*		
	0.50	Add-on weight for students in all vocational programs
Indiana		
	0.38	Agriculture (1/2 day)
	0.19	Agriculture (1 period per day)
	0.33	Distributive education
	0.33	Health occupation (laboratory)
	0.14	Consumer and homemaking (1 period per day)
	0.33	Occupational home economics (laboratory)
	0.33	Business education (laboratory or 1/2 day)
	0.48	Trade and industrial education (1/2 day)
	0.33	Trade and industrial education (2 periods per day)
	0.28	Cooperative education (all areas)
	0.09	Sending school adjustment for students attending area schools
New Jersey*		
	0.26	Add-on weight for students in all vocational programs
New Mexico		
	0.05	Add-on weight for all secondary students in grades 7–12
Texas	1.37	Vocational student weight, all program areas

*Data based on 1990–91 school year (Gold et al. 1992).

SOURCES: Indiana Department of Education, Division of School Finance, August 1998; Texas Education Code, Sec. 42.154; and New Mexico Department of Education.

In the early 1990s, the state of New Mexico commissioned a study of the relative cost of providing vocational education. After an extensive review of the literature, focusing on programs in two other states and in New Mexico district services, the contractor recommended that the state reduce its existing funding formula for secondary students in grades 7–12 from 1.25 to 1.20, and insert a vocational add-on weight of 0.8 per FTE student in vocational skill development courses, and of 0.4 per FTE student in exploratory courses. Lobbying on the part of the Vocational-Technical and Adult Division of the State Department of Education was unsuccessful; currently, each student enrolled in grades 7–12 in New Mexico generates a 0.05 weight for vocational education funding.

Rather than differentiate by program area, the states of Alaska and New Jersey adopted add-on weights for students in vocational programs in the 1990–91 school years, regardless of the excess cost associated with their individual program area. Similarly, Texas has adopted a weight of 1.37 per FTE secondary student in average attendance in an approved career and

technology program. This factor is nearly 8 percent higher than that adopted in Florida, and roughly equivalent to add-on factors offered in Indiana. As in Florida, since cost factors are not calculated for individual programs, Texas school districts may choose to reallocate vocational funds across high-cost and low-cost programs to provide balanced vocational services.

While weighted cost factors from Florida may provide the most realistic assessment of the actual cost of vocational education, as it relates to Florida, overall state allocation formulas suggest that vocational program costs vary widely. Depending upon the criteria used, state allocations for vocational education may range anywhere from 5 to 50 percent higher than those for other forms of instruction. Generally, instructional costs appear to be a function of vocational program area, with agricultural and trade and industry programs among the most expensive to provide.

Other funding strategies

Although most states contacted for this study provide some state financing for vocational services, not all have developed separate cost factors for vocational education. Instead, some states have developed categorical funding schemes that reimburse districts for the costs of providing specific types of vocational services. According to Gold et al. (1992), 20 states used some form of categorical funding to support vocational education in the 1990–91 school year.

Recent data from seven states reveal that allowable expenses vary across agencies. For example, before the 1998–99 school year, districts in Ohio received state funding for each approved vocational course enrolling a minimum of 12 students. As a state administrator pointed out, reimbursements—calculated using a complex formula based on teachers' salaries or student enrollments—averaged roughly $43,000 a course regardless of class size. Ohio is currently restructuring its school finance system, which has been declared unconstitutional: in the 1998–99 school year, districts are to be reimbursed $3,850 per ADM student, regardless of whether the student takes academic or vocational classes. Vocational courses that prepare students for job training will qualify for an additional $6,800.

Alternatively, Illinois and Missouri have each developed their own unique formulas to distribute vocational resources. In Illinois, the state provides a separate pool of funding that is used to fund regional vocational education programs. Regional eligibilities are generated by student credit hours based on a formula that accounts for students enrolled in vocational

classes, program delivery characteristics, and administrative support. According to state sources, state vocational appropriations are seldom sufficient to cover all of the costs associated with vocational delivery; in fact, it is estimated that vocational education program funding disbursed in Illinois cover only about 10 percent of total district expenditures for vocational instruction.

Table 7— State strategies to fund public secondary vocational education

Arizona	
	Block grant to districts based on:
	10 percent vocational student placement
	90 percent vocational student enrollment
Illinois	
	Orientation-level funding (based on student credit hours)
	Quality/efficiency funding
	0.3 factor for credits by students in courses drawing from two or more districts
	0.3 factor for credits by students in double-period courses
	0.5 factor for credits by students in a state-designated facility
	0.3 factor for credits by students with 60% of instruction in private sector
	Administrative support (based on student credit hours)
Minnesota	
	$80 for each student (academic or vocational) enrolled in grades 10–12
Missouri	
	Effectiveness index
	Incentive formula
	Base funding
	$300/month for full-time certificated vocational teachers
	$35/class/month for part-time certificated vocational teachers
Nebraska	No state funding for vocational education
Ohio	$3,850 per ADM student (vocational and academic)
	$6,800 per vocational class
Oregon	No state funding for vocational education

SOURCES: Illinois State Board of Education, 1988; Missouri Department of Elementary and Secondary Education, 1998; Nebraska, Ohio, Oregon, personal correspondence, 1998.

In contrast, Missouri reimburses districts for vocational education programs offered in both comprehensive high schools and area vocational schools using an effectiveness index and incentive funding formula together with a base funding amount. The effectiveness index incorporates the relative success of student placement in jobs as well as the responsiveness of a program to labor supply and demand factors, while the incentive formula allows for a 10 percent incentive to schools enrolling students in target groups (disadvantaged, disabled, and nontraditional students). Base funding for instructional salaries is allocated at $300 per contract month for each full-time certificated vocational education teacher, or $35 per class period per contract month for part-time certificated vocational teachers.

Similarly, Arizona has recently dropped its add-on weighting formula and replaced it with a block grant system. Under its previous funding approach, the state provided an 0.071 add-on weight for students in all vocational programs where the cost of offering the program was at least 40 percent more than that of a nonvocational program. Under the new, more complex system, state funding for vocational education—$3.6 million in 1998—is released based on a formula that incorporates program effectiveness in placing students (10 percent) and student enrollments in vocational programs (90 percent). Eligibilities are adjusted by program area to ensure that high-cost vocational programs receive greater funding.

Having recently adopted a new funding formula for vocational education, Minnesota is now phasing out use of its previous finance formula. Under the old formula, excess cost aid to districts was calculated by secondary vocational program area, with eligibilities determined by subtracting 50 percent of general education revenue generated by secondary vocational students from 75 percent of the cost of secondary vocational teacher salaries. While this funding mechanism succeeded in funneling resources to relatively more expensive classes (e.g., those taught by licensed instructors), the formula also tended to isolate vocational students in vocational programs as well as encourage smaller classes. Under the new formula, each student enrolled in grades 10–12 generates $80 for the district regardless of whether or not the student participates in vocational education.

Finally, not all states provide supplemental funding for vocational programs. As reported in Gold et al. (1992), a total of 16 states did not recognize vocational education in their school finance formulas during the 1990–91 school year—two of which, Nebraska and Oregon, were contacted for this study. Sources within each of these states report that districts offering vocational services must rely on state dollars generated by student enrollment eligibilities and federal Perkins funding to maintain vocational programs. Lack of vocational funding can be traced to a number of factors within each state, including public concern over providing academic instruction, weak vocational lobbies, legislative agendas that focus on different educational priorities, and competition from other funding sources.

While the rural characteristics of a state may place some constraints on the manner in which vocational education is offered, school districts in Wyoming that seek to maintain their traditional curriculum and instruction can pursue a number of alternative strategies. The following section offers recommendations for a set of district cost data that could be used to monitor vocational program costs in order to assess whether districts' educational program offerings align with state educational policies.

III. Future Directions

The state of Wyoming collects a great deal of data on educational enrollment and expenditures offered by districts throughout the state. While this information is sufficient to address most federal and state reporting requirements, the state's existing educational data system does not provide, nor was it designed to supply, the district cost data necessary to assess state expenditures for vocational education. This section summarizes the type of district cost data that Wyoming might want to collect to monitor short- and long-term state investment in vocational education. Issues related to how state resources are distributed and the manner in which districts spend their grants are also considered.

Data Collection in Wyoming

Conversations with state data administrators and a review of state data elements indicate that the Wyoming Department of Education has a reasonably well-developed educational data collection system in place. Indeed, much of the state-level data contained in this report were compiled by Wyoming Department of Education staff in response to researchers' information requests. Unfortunately, data that are currently available are not sufficient to assess the cost of vocational education relative to other forms of instruction or to quantify total district expenditures for vocational education. Like most states, Wyoming does not collect much information on district-level expenditures for vocational education, in part because there has been little demand for this information in the past.

The introduction of a new cost-based block grant model in Wyoming has raised concerns among state vocational educators about the way in which vocational education is funded. To quantify the relative cost of providing vocational education, the state may want to develop a set of annual district reporting procedures to track district expenditures for vocational education programs, services, and other activities. Ideally, these data would be sufficient to provide state legislators with information about how the cost of vocational education compares to that of other types of education, as well as about how costs vary across different types of vocational program areas. In the event that district expenditures to provide a given level of vocational services are deemed appropriate, data could also be used to compute vocational program cost factors that could be incorporated into the cost-based model.

Collecting new cost data

As described elsewhere in this report, the state of Florida has developed a district program expenditure reporting instrument that could serve as a potential model for Wyoming. Providing actual district cost data for vocational as well as other forms of education, the Florida model has the advantage of providing a common base to permit meaningful comparisons of program costs across districts and against state averages. Since Wyoming's educational program areas differ from Florida's, adoption of the Florida model would require considerable investment on the part of Wyoming educators. At a minimum, Wyoming district administrators would need to classify and collect detailed cost data on a large number of elements—including personnel, supplies and instructional materials, equipment, maintenance, administration, student activities, professional development, and assessment—across a number of academic and vocational program areas.

It is not evident that data at this level of detail is necessary or even feasible in Wyoming. Given the relatively small sizes of districts and schools throughout the state, and the associated data burden that a collection strategy of this size would entail, Wyoming may be better off focusing its data collection around factors that contribute the largest cost to vocational program delivery. In light of the minimal cost differences associated with teacher salaries and the state's already small student to teacher ratios, the most likely data elements include district expenditures for purchasing and maintaining vocational equipment across program areas.

Collecting expenditure information may entail making additions to current school and district reporting forms or simply modifying current data collection strategies. With appropriate legislative charge, Wyoming Department of Education staff could begin designing an ongoing process for collecting data that would allow the state to reliably estimate district expenditures for vocational equipment and instructional materials.

To estimate districts' short- and long-term capital needs, the state could begin by identifying a list of minimum equipment required for quality vocational programs. Wyoming districts could then inventory their current equipment against this list, noting the model and make, year purchased or acquired, condition, adequacy for training, useful life, and current replacement cost. Equipment on the list but not in school inventories would also be indicated (Swift et al. 1993). Projections based on the amount of money needed for replacing and purchasing new equipment would thus be based on districts' actual vocational holdings, and district inventories could be periodically updated to assure continued accuracy.

Maintaining the status quo

Preliminary evidence indicates that Wyoming's new cost-based grant model should, on the average, improve the provision of vocational education in the state. More than four-fifths of Wyoming students are now enrolled in districts that have increased their funding eligibilities under the new formula, meaning that most vocational educators have expanded their ability to support existing programs. Given that these districts were able to maintain their vocational programs in prior years with less substantial budgets, absence of a vocational cost factor in the grant model should have no significant effect on vocational services in these sites. Therefore, it does not appear that any modification to the funding formula is warranted for districts gaining resources under the new cost-based model.

Although enrolling only a small number of students, a relatively large number of districts (as many as 22 out of 48 districts) are projected to have diminished funding eligibilities in the 1998–99 school year. It is possible that vocational educators in these districts may be required to reallocate funding from other sources if they choose to offer a similar level of vocational services as they had previously provided. Moreover, it may be that smaller districts and districts with higher than average rates of vocational student participation—proxied in this study by the proportion of vocational FTE to total instructional staff—may face particular challenges in maintaining their existing vocational delivery systems. If the Wyoming legislature determines that maintaining student access to existing district vocational education services is a state priority, then some form of adjustment to the cost-based model may be feasible.

Given that the courts have stipulated that differential funding for school districts must be based on actual cost differences, not local preferences, changes in historical spending patterns may not be sufficient grounds for legislative action. It should be noted that districts losing money under the new finance system were previously spending more on education than could be justified on the basis of cost alone, and were likely doing so because they had access to greater revenue than other districts. Since the block grant assures that all districts retain maximum flexibility in allocating resources across and within their educational programs, the amount and mix of vocational programs that a district chooses to offer is entirely a function of local prerogative.

While funding declines under the new finance system may adversely affect vocational services in some districts, the situation is more complex because local preference for vocational education can influence the cost of instructional delivery. Although the state has designated

career and technical education as an essential part of a student's education, a district's preference for vocational programs that include relatively high-cost instructional strategies may not be the most efficient way of preparing non-college-bound students for career success. Accordingly, in lieu of cutting access to vocational education, district administrators may choose to embrace new approaches to offering instruction.

Finally, the Wyoming legislature may also want to consider whether a vocational adjustment in the block grant formula would affect districts' provision of other essential educational services. It is not apparent that the level of services currently provided in "vocational-rich" districts aligns with the educational objectives identified by the Wyoming State Legislature. It may be that the new cost-based model equalizes educational opportunities in the state by compelling formerly high-spending vocational districts to adjust their level or balance of vocational services to reflect that of other districts in the state. Alternatively, resource declines in some districts may lead Wyoming vocational educators to consider new, potentially more effective approaches to career education, and it is to this subject that the paper now turns.

Defining Quality Vocational Education

A considerable literature documents the rise of what has been popularly termed the "high-performance workplace," in which multi-skilled workers share responsibility for, and exert greater control over, their work. Movement to this new paradigm is necessitated by changes in American industry—such as increased competition from overseas firms, a shift from a manufacturing to a service economy, and technological advances in production—all of which have combined to make many aspects of the traditional workplace obsolete. To enable workers to function in this evolving workplace, most employers are seeking individuals who have a solid grounding in basic academics. In addition, employers are looking for a number of other specific worker attributes, including responsibility, flexibility, self-discipline, enthusiasm, and motivation, as well as more general social skills, such as communication and the capacity to work with others (Buck and Barrick 1987; Busse 1992; *Vocational Education Journal* 1997).

Recognizing that vocational education needs to change to keep pace with an evolving marketplace, since the early 1980s a number of influential educators, researchers, and policymakers have advocated a new approach to work-related education and training. In lieu of traditional, occupationally specific instruction, proponents of this "new vocationalism" call for

a more broad-based approach to education, one that emphasizes learning through applied problem solving. (Bailey 1997; Grubb 1995, 1997; Hoachlander 1995). Intended to prepare all students for immediate employment, further education, and lifelong learning, this alternative conception of vocational education combines curriculum integration, career-related learning, and work-based learning to help students in both academic and vocational courses understand the basic, industry-relevant, and occupationally specific skills required for workplace success.

Recent national legislation, enacted with bipartisan support, provides evidence of a continuing federal commitment to this emerging view. Beginning with the 1990 Amendments to the Carl Perkins Act, states were mandated to provide evidence of their efforts to integrate academic and vocational education. Further endorsement was provided in the 1994 School-to-Work Opportunities Act, which links work-based learning to classroom instruction. These actions imply major changes in federal approaches to conventional vocational practice (NCRVE 1995).

Cost implications

Generally, occupationally specific training that is designed to prepare students for immediate employment in a particular job is more expensive to provide than more generic broad-based instruction. This is because occupationally specific training often requires that schools invest in more up-to-date equipment, provide more individualized instruction, and offer training opportunities to teachers so that they can stay current with evolving workplace technology. As Hoachlander (1994) points out, while a 40-year-old lathe may serve perfectly well for teaching basic principles of machining and properties of materials, a 5-year-old machine may be completely useless for training students to perform advanced manufacturing applications used in many firms. It may be, then, that movement to the new cost-based grant model may encourage some school districts to reconsider the manner in which they organize and provide vocational education.

School districts resistant to change can explore other strategies to maintain existing programs. Due to the difficulties in offering vocational education in comprehensive high schools, some researchers have suggested locating occupationally specific vocational programs—when they are offered—in specialized facilities, such as area vocational schools, that serve a large population of students (Benson 1982; Sullivan 1989). While the area vocational center concept holds some promise in more densely populated states, the dispersed

population within Wyoming makes these centers less practical for much of the state. Given that vocational education will continue to be offered within comprehensive high schools, the state may encourage districts to explore new ways of providing traditional occupational programs.

To reduce the cost of occupationally specific instruction, school districts throughout the country are developing strategies to consolidate vocational resources, thereby increasing the efficiency of instruction. These typically involve structuring program services around jointly administered programs or arranging for high school students to attend local community colleges in order to train on instructional equipment. These shared facility arrangements allow school districts to concentrate resources in a single location, reducing the need for each site to purchase the same equipment. In some cases, schools can also reduce costs by adopting a single career theme, such as aviation or fashion, that allows the school to concentrate its purchases in a single industry area. Indeed, some research suggests that students who attend career magnet schools are more likely to score higher on tests of academic achievement and to display greater confidence in their workplace abilities than students attending comprehensive high schools (Heebner 1995).

School districts within the state may also seek to partner with local industries to secure equipment donations or to arrange student placements at the worksite. Work-based placements can provide students with an opportunity to work on more up-to-date equipment than a school might otherwise be able to afford and in a setting that most schools are unable to replicate. As part of the state's application for school-to-work funding, Wyoming has identified techniques for recruiting employers and others in the business community to participate in its work-based efforts, and it is possible that vocational educators can build off these relationships to increase student access to workplaces (Wyoming Department of Education 1998a).

Summary

Evidence from national data sets and review of states' finance policies suggest that the cost of providing vocational education can be higher than the cost of providing other forms of instruction. Since states have adopted a variety of approaches to fund vocational programs, not all of which are grounded on actual expenditures, it is difficult to calculate the true cost associated with vocational services. Based on estimates provided in the literature, it is likely that the relative cost of vocational education may be up to 40 percent greater than that of academic instruction, and that this cost varies by program level and content area.

While Wyoming's cost-based block grant model takes into account the added costs associated with vocational education, not all districts offer similar levels of vocational education. This can have consequences for educational delivery in the state, since districts offering relatively less vocational education, on the average, receive greater resources than they require to provide instructional services. Perhaps more importantly, districts losing funding under the new model may be unable to support their existing level of vocational services, and this may be particularly true for districts offering relatively larger vocational programs than other sites.

One means of preserving student access to vocational programs would be for Wyoming to develop an adjustment to the cost-based basic grant model. This will likely require that the State Legislature consider developing a comprehensive data collection system to track long-term district expenditures for vocational education. While collection of detailed information could help the state compute cost factors for vocational education, the data burden and expense associated with building such a system makes its development impractical. Instead, the state might explore collecting a minimal set of district expenditure data that could account for the primary costs of vocational instruction—such as average class sizes of vocational instructors and district purchase of vocational equipment—if it wants to actively track actual district expenditures.

Alternatively, the state may choose to retain its current vocational data collection system. Preliminary evidence indicates that more than four-fifths of Wyoming's students attend school districts that have increased their funding eligibilities under the new cost-based grant model. Given that these districts have maintained their vocational program offerings in previous years with less substantial budgets, the absence of a vocational cost factor in the grant model has

little, if any, effect on districts' capacity to provide vocational services. While some relatively small districts will lose funding under the new grant model, it may be that the new cost-based model equalizes educational opportunities for students in the state by encouraging all districts to offer similar levels of vocational services.

The manner in which vocational education is delivered within classrooms can also influence the relative cost of vocational instruction. In particular, Wyoming vocational educators may choose to de-emphasize capital intensive, occupationally specific instruction in favor of lower cost instructional strategies that prepare students for a broad range of careers, or to seek out industry partnerships to reduce the cost of student training. Accordingly, the Wyoming Legislature may want to provide incentives that encourage district educators to consider alternatives to traditional vocational programs.

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