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ABSTRACT

A study was undertaken to determine whether Delaware should attempt to maintain two shared-time area vocational schools or whether the schools should be converted to full-time vocational high schools. A number of state and local officials, including all of the superintendents in Kent and Sussex Counties, were interviewed and documents were reviewed. Among the findings were that the arrangements for operating shared-time vocational-technical schools were not working and enrollments at both vocational-technical schools were down more than 40 percent from peak levels in 1977-78. Factors contributing to the declining enrollments included a general decrease in secondary school enrollments of approximately 20 percent, increased graduation requirements, higher rates of students' failing required courses, structure of the curriculum, lack of communication and integration between sending schools and area schools, structure of the funding system, transportation conflicts, inadequate attention to extracurricular activities, and incompatible governance structures. The most significant explanation was considered to be the combination of independent governance with a "win/lose" funding system that created competition for students that greatly inhibited cooperation and coordination among districts. It was felt that without forceful state action, enrollments at the shared-time schools would almost certainly continue to decline; however, conversion to full-time schools was not considered a guaranteed improvement. (The document includes an eight-page appendix of simulation summaries.) (CML)

SHARED-TIME VERSUS FULL-TIME VOCATIONAL HIGH SCHOOLS IN DELAWARE: AN ASSESSMENT

A REPORT PREPARED FOR THE DELAWARE STATE BOARD OF EDUCATION AND DEPARTMENT OF PUBLIC INSTRUCTION

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EXECUTIVE SUMMARY

In June 1989, the Delaware State Board of Education requested an independent assessment of proposals to convert Delaware's two shared-time area vocational/technical schools, one in Kent County and one in Sussex County, into full-time vocational high schools. Responding to the State Board's action, the Delaware Department of Public Instruction contracted with the National Center for Research in Vocational Education at the University of California, Berkeley, to conduct a study of shared-time versus full-time schools in Delaware.

In the course of this analysis, study staff interviewed a number of state and local officials, including all of the superintendents in Kent and Sussex Counties, and reviewed a variety of documents on the pros and cons of converting shared-time to full-time area schools. Our major findings and recommendations are briefly summarized here.

Current Status of Shared-time Operations

Present arrangements for operating shared-time vocational-technical schools in Kent and Sussex counties are not working. Enrollments at both vo-tech schools are down more than 40 percent from peak levels reached in 1977-78. While this steep decline may be partially explained by a general decrease in secondary school enrollments of approximately 20 percent during this period, there are other contributing factors that include:

- Increased graduation requirements
- Higher rates of students' failing required courses
- Structure of the curriculum
- Lack of communication and integration between sending schools and area schools
- Structure of the funding system

• Transportation conflicts

• Inadequate attention to extracurricular activities

• Incompatible governance structures

All of these factors combine to make shared-time operations in Kent and Sussex counties increasingly unworkable. Probably the most significant explanation for the current difficulties is the combination of independent governance with a "win/lose" funding system, creating an atmosphere of competition for students that greatly inhibits cooperation and coordination among districts. The deterioration of the system has been further aggravated by the incompatibility of the three-year shared-time curriculum with changing graduation requirements, along with an inattentiveness to the significant role that vocational education courses could play in students' mastering required academic subjects. As long as general high school enrollments were growing, these structural weaknesses were less obvious and, thus, could be largely ignored. However, after a decade of enrollment declines that began in the late 1970s, the basic weaknesses in the system were revealed. This created a protracted period of bickering, finger pointing, and general disarray in relations between sending and shared-time area schools.

If the state wishes to restore shared-time operations that effectively meet the needs of secondary schools students, we believe the following actions must be taken:

1. The current governance structure must be altered to foster better coordination and cooperation.

2. Barring the adoption of a single countywide school district for all secondary education, the fiscal disincentive to participate in shared-time area schools should be reduced substantially or be eliminated entirely.

3. The state should consider mandating a uniform school calendar and school day.

4. The curriculum at the shared-time area schools should be redesigned, in combination with curriculum redesign at home high schools, so that programs at the shared-time schools may be completed in two years or less.

5. The state should undertake a major effort to improve the integration of curriculum at area schools with academic and vocational curriculum at the home high schools.

6. The state should require in-service training on integrating academic and vocational education curricula and should provide time for ongoing communication between academic and vocational teachers.

7. After the vocational curriculum of area and sending schools has been thoroughly reviewed and modified, the state should designate vocational courses that may be substituted for required courses that students fail.

8. The state should conduct a study of transportation and scheduling for shared-time schools including practices in other states.

In short, making shared-time facilities work in Delaware would require the state legislature and the Department of Public Instruction to assume a much higher profile, not only in the operation of vocational education but also in the overall organization and delivery of secondary education. Greater state involvement inevitably would mean some loss of local control over school affairs—a loss that may not be politically palatable in Delaware. However, if a state role similar to the one we have recommended is not feasible, an alternative to shared-time area schools must be found. After nearly ten years of foundering at the local level, we are not optimistic that the problems of shared-time schools can be solved locally without strong state directives.

Converting to Full-time: An Alternative?

Even if some of the most serious problems could be rectified, a few difficulties intrinsic to any shared-time operation would remain, especially the large amount of time spent in transit and the dilemma of attending two schools. As an alternative to maintaining shared-time schools, there have been several recommendations during the past four or five years to convert these facilities to full-time vocational high schools. Such conversions have already occurred in Newcastle County, apparently with much success. However, is conversion appropriate in Kent and Sussex Counties?

We believe it could be if conversion incorporates an understanding of the potential educational benefits of a fully integrated curriculum of academic and vocational education—designed not only for those who are unlikely to pursue any additional postsecondary education but also for students whose aspirations include four-year college and beyond. A full-time vocational high school that merely tacks on conventional academic courses to conventional vocational offerings, aimed primarily to satisfy short-term, entry-level labor market needs, is not likely to serve any high school student well. In contrast, a full-time school that capitalizes on opportunities to use "hands on," concrete work-related experiences to increase students' understanding of more abstract academic principles and concepts holds enormous promise for improving the long-term educational and labor market prospects of all students. To help realize this promise, we make the following recommendations:

1. The state should require preparation of a formal plan for conversion to be reviewed by the Department of Public Instruction and the State Board of Education.

2. The state should establish a Planning Advisory Board to work with local personnel in Kent and Sussex counties that would be responsible for developing the conversion plans and implementation.

3. The state should require an open admissions policy at the full-time schools.

4. The state should require that a representative of special education participate fully on the local planning teams.

5. The state should review vocational education in the comprehensive high schools, assessing opportunities for better integration with the rest of the curriculum.

6. The state should review the condition of career education and counseling in the middle grades.

Enrollment Implications of Full-time Vocational-Technical High Schools

A major concern about the consequences of converting shared-time schools into full-time schools is the impact of conversion on the enrollment and finances of the comprehensive high schools. After we simulated the impact of conversion on enrollments and funding units, using a variety of assumptions about capacity of the full-time schools and growth in secondary enrollments through 1995-96, we reached the following conclusions:

1. If enrollment at each of the full-time schools were limited to 500 students, projected growth in overall secondary enrollment by 1995-96 would offset the loss in enrollment in comprehensive high schools from conversion to full-time.

2. If enrollment at each of the full-time schools were to increase to 1,000 students by 1995-96, the comprehensive high schools in Kent and Sussex counties would have decreases in secondary enrollment of approximately 10 percent.

3. If the proportion of students now attending shared-time were to equal the proportion attending full-time and if this proportion were to remain constant over time, enrollment at Kent County Vo-tech would reach approximately 741 students by 1995-96, and enrollment at Sussex Vo-Tech would reach 822. Under these assumptions, by 1995-96 enrollment in the

comprehensive high schools would be approximately 5 percent less than 1988-89 enrollment in Kent County and 7 percent less in Sussex County.

4. If enrollment at the each of the full-time schools were 1,000 students by 1995-96, the proportions of students' attending the full-time schools would increase from 12 percent in Kent County in 1988-89 to 16 percent by 1995-96, and from 14 to 17 percent in Sussex County.

Assuming enrollment at each of the full-time schools climbed to 1,000 students by 1995-96, Table 11 shows the impact on funding units for the comprehensive high schools. For example, decreases in the number of teachers in school districts would range from as few as one in Woodbridge to as many as 12 in Indian River. Three schools would each lose one assistant principal, and three would each lose one nurse. Four schools would lose one clerical position, and one school would lose two.

Table 11
Staffing Implications of Capacity Vo-tech Enrollment for School Districts in Kent and Sussex Counties, 1995-96

District (1)	Unit Difference 1988-96 (2)	Changes in number of staff: Teachers (3)	Ass't. principals (4)	Nurses (5)	Clerical (6)
Caesar Rodney	-11	-11	-1	-1	-1
Capital	-4	-4	NC	NC	NC
Lake Forest	-4	-4	NC	NC	NC
Milford	-3	-3	NC	NC	NC
Smyrna	-7	-7	-1	NC	NC
Cape Henlopen	-2	-2	NC	NC	NC
Delmar	-2	-2	NC	NC	NC
Indian River	-12	-12	-1	-1	-2
Laurel	-4	-4	NC	NC	-1
Seaford	-3	-3	NC	-1	-1
Woodbridge	-1	-1	NC	NC	-1
Kent Vo-tech	43	43	2	1	4
Sussex Vo-tech	40	40	2	1	4

NC = no change.

Conclusion

Should Delaware attempt to maintain its shared-time area vocational schools, or should these schools be converted to full-time vocational high schools? As has been demonstrated in other states, either approach offers an effective means of providing high-quality vocational education. Both have advantages and disadvantages, and neither is inherently superior. Shared-time schools are an economical way to offer more advanced, more specialized, and more capital intensive courses to the greatest number of students. When properly designed, they can provide substantial flexibility for students, who can attend for as little as a semester or for as long as four years. They can easily accommodate adults and programs that consciously mix adults and high school students in the same classrooms to better motivate students and reduce discipline problems. On the other hand, area schools significantly increase the amount of time students must spend in transit, which complicates scheduling and divides students' identities between two schools. Area schools may also impede participation in extracurricular activities.

Full-time vocational high schools increase opportunities for better integrating academic and vocational education and for improving communication among academic and vocational teachers. Opportunities for team teaching may also be fully developed. Full-time schools reduce transportation time and can generally create a stronger school culture, pedagogically as well as socially. On the other hand, they require duplication of athletic facilities, auditoriums, libraries, and other facilities that are not needed in a shared-time school. They are not as flexible in accommodating the desires of students for different levels of participation in vocational education, and they generally cannot include adults in daytime programs.

For many reasons, shared-time schools are not now working effectively in Delaware. As our recommendations indicate, there are a number of steps the state could take to make them work better. Whether or not such steps are feasible in Delaware is best determined by state and local policymakers. If these steps cannot be taken, however, we are doubtful that the quality of

shared-time schools will improve. Indeed, we doubt whether they can survive at all and believe that continued inaction is tantamount to a decision to close these schools entirely. Without forceful state action, enrollments almost certainly will continue to decline, and it will no longer be possible to offer an effective range of programs.

Conversion to full-time, however, is not a guaranteed improvement. We believe that conversion offers the state some exciting opportunities to improve both vocational and academic education for high school students. Conversion is a chance to develop model schools that can help to improve secondary education statewide. However, if these opportunities are to be realized, the state must forcefully articulate a vision that promotes integration of academics and vocational education and that encourages innovation in physical design, curriculum, and methods of teaching. Otherwise, conversion will do little more than simply move students around to eliminate transportation and scheduling inconveniences.

It is important to recognize that the decision is not much influenced by costs or even impacts on the comprehensive districts. Restoring shared-time schools to an acceptable level of effectiveness is likely to cost no less and possibly more than conversion to full-time. Similarly, enrollments must be increased if these shared-time schools are to operate efficiently and are to provide an acceptable range of programming. Hence, improving shared-time operations will produce enrollment declines in the sending districts that may not be much less than the declines produced by conversion.

In the final analysis, the choice boils down to whether or not the state is able to assume a much higher profile in solving the problems now plaguing shared-time schools or whether or not the state desires to use conversion to begin a bold new initiative to improve secondary education in Delaware. Either course promises to benefit students, but each will require strong and steady state leadership.

ACKNOWLEDGMENTS

Many people have contributed their valuable time to this report. An initial meeting with Paul Fine, President of the State Board of Education, William Keene, State Superintendent, and Thomas Welch, State Director of Vocational Education, helped to define the scope of the study and the issues to be addressed. We are especially grateful for the time each of the superintendents in Kent and Sussex counties took to share their perspectives on shared-time versus full-time schools. Many other state and local administrators also gave generously of their time. Special thanks are due to Bill Matz, for overseeing arrangements for our site visits, and to Jack Nichols, for helping us grasp the intricacies of school finance in Delaware.

Although these people have all made important contributions to this study, the authors are solely responsible for the findings, recommendations, conclusions, and any remaining errors.

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SHARED-TIME VERSUS FULL-TIME VOCATIONAL HIGH SCHOOLS IN DELAWARE: AN ASSESSMENT

In June 1989, the Delaware State Board of Education called for an independent assessment of proposals to convert Delaware's two shared-time area vocational-technical schools, one in Kent County and one in Sussex County, into full-time vocational high schools. Responding to the State Board's action, the Delaware Department of Public Instruction contracted with the National Center for Research in Vocational Education at the University of California, Berkeley, to conduct a study of shared-time versus full-time schools in Delaware.

As recently as August 1989, study staff met with the President of the Delaware State Board of Education, the State Superintendent of Education, and staff from the Department of Public Instruction to define the scope of the study. Next, in September 1989, study staff interviewed all superintendents of public schools in Kent and Sussex counties as well as the superintendents of the two shared-time schools. Additionally, study staff visited the two shared-time schools and the Newcastle Vocational Technical School District. Finally, they reviewed all documents about converting shared-time facilities produced after the recommendation was formally proposed in the December 1986 report of the Governor's Task Force on Vocational Education, *Vocational Education in Delaware.*

In conducting this study, we were asked to concentrate primarily on the implications of shared-time versus full-time facilities for improving the educational opportunities of high school students. "What is best for students?" was the primary question raised by the President of the State Board and the Superintendent of Public Instruction. This concern was also voiced by all of the local superintendents we interviewed. Other secondary, but also important, issues concern conversion costs, curriculum design, staffing, financial and programmatic impact on sending school districts, as well as the probable effects on local labor markets and community well-being. While we have addressed these other issues, in our analysis we have focused on

what will most effectively serve the interests of high school students in Kent and Sussex counties.

Our report is divided into four sections. Section I defines the problem by examining the current operating conditions of the shared-time facilities in Kent and Sussex counties. It not only describes the conditions that must be met if operation of shared-time facilities is to serve high schools students effectively; but it also identifies actions that must be taken by state and local boards to provide a successful shared-time program. Section II examines the major issues related to converting shared-time area schools into full-time vocational high schools. This conversion is intended to more effectively meet students' diverse educational needs and to maximize their long-term opportunities for sustained and increasing success in the labor market, as well as in postsecondary education or further training. Additionally, this section specifies state and local actions for successfully implementing full-time vocational high schools. Section III analyzes the potential impact of converting full-time schools on sending school districts' enrollments and finances. Finally, Section IV offers some concluding comments.

Generally, our conclusion can be stated quite simply. There is nothing inherently superior about either a shared-time or a full-time approach to vocational education. Some states have successfully implemented either one or the other; others have experienced serious difficulties with both approaches. However, it is clear that in Delaware the current approach for providing vocational education in Kent and Sussex counties through shared-time facilities is not working. As we will describe in Section II, there are many reasons why this is the case.

First of all, to make the present approach work would require some major overhauls in state and local policies, as well as changes in attitudes about vocational education and its relationship to the rest of secondary education. Whether or not such modifications can be implemented in Delaware is a question that can best be answered by individuals who know the

state's educational system far better than we do. Nevertheless, at the present time we are not optimistic that shared-time can be made to work effectively in Delaware. The problems that plague the current system have been known for some time, and in some instances, they have been largely ignored by those in the best position to do something about them. In others, however, sincere efforts to solve them have repeatedly failed.

Therefore, is conversion to full-time facilities a promising alternative? We believe it could be if conversion incorporates an understanding of the potential educational benefits of a fully integrated curriculum of academic and vocational education—designed not only for those who are unlikely to pursue any additional postsecondary education but also for students whose aspirations include four-year college and beyond. A full-time vocational high school that merely tacks on conventional academic courses to conventional vocational offerings, aimed primarily to satisfy short-term, entry-level labor market needs, is not likely to serve any high school student well. In contrast, a full-time school that capitalizes on opportunities to use "hands on," concrete work-related experiences to increase students' understanding of more abstract academic principles and concepts holds enormous promise for improving the long-term educational and labor market prospects of all students. It is essential, therefore, that if Delaware opts for conversion to full-time facilities, the state take steps to ensure that the complete potential of a full-time school is realized. In Section II, we offer some specific recommendations about how this could be best accomplished.

I. UNDERSTANDING THE PROBLEM: THE CURRENT STATUS OF SHARED-TIME OPERATIONS IN KENT AND SUSSEX COUNTIES

Sussex and Kent counties have operated shared-time area vocational schools since the early 1960s. In each county the area school operates as an independent school district, with its own school board and taxing authority, and serves secondary school students attending high

school in the other districts in the county. Students attending the area school take academic classes in their "home high school," where they also may participate in extracurricular activities, and they take vocational courses at the area school. First, all students attend their home high school. Next, they are bused to the area school for either a morning or afternoon session and then bused back to their home high school.

For many years this arrangement appears to have worked well in Delaware. Enrollment at the area schools grew steadily throughout the 1960s and early 1970s. For example, enrollment at Sussex County Vo-Tech grew from 335 in 1961-62 to 1,353 in 1977-78. Since 1980, however, enrollment in the area schools has declined precipitously. At Sussex Vo-Tech, enrollment had fallen to 789 by 1988-89, down more than 40 percent from the peak in 1977-78. Kent County Vo-Tech has experienced similar declines. At both schools, the declines have been so severe that the superintendents seriously question whether the schools can continue to run a successful program.

What has caused these steep declines? Part of the explanation is simply demographic. Throughout the 1960s and 1970s high school enrollment grew steadily as the baby boom generation moved through their teens. During these years enrollment in the area schools grew more rapidly than high school enrollment generally. In effect, the area schools relieved some of the enrollment pressures on the sending high schools during this period of rapid growth. Sending schools, facing increasingly crowded classrooms and teacher shortages, had powerful incentives to encourage students to attend the area schools for a portion of the school day. High school enrollment, however, peaked in the late 1970s and began a period of steady decline, which has just now leveled off. Enrollment in the area schools declined faster than high school enrollment in general because, in part, sending schools now sought to protect themselves from problems of excess building capacity, teacher layoffs, and contracted program offerings. All of these factors acted as strong incentives to discourage students from attending area schools.

Demographics, although an important cause of the current difficulties, are not the only contributing factor. There are many other circumstances that play a significant role in the large declines in enrollment. These include:

- Increased graduation requirements
- Higher rates of students failing required courses
- Structure of the curriculum
- Lack of communication and integration between sending schools and area schools
- Structure of the funding system
- Transportation conflicts
- Inadequate attention to extracurricular activities
- Incompatible governance structures

We will briefly describe and comment on each of these factors.

Increased Graduation Requirements

Increased graduation requirements have reduced the number of electives that are available to students. Because vocational courses at the area schools can be taken only as electives, students have less time for these courses. Thus, either fewer students attend these schools or the same number of students attend for fewer years. Moreover, the "elective" status of these courses carries an implicit message to students and parents that vocational courses are less important than other courses required for high school graduation. Hence, a course in computer programming at the area vo-tech school, while potentially far more challenging than a general

math course that satisfies a graduation requirement, may nevertheless be perceived by students and parents as an inferior option.

Precisely how much increased graduation requirements have contributed to enrollment declines at area schools in Delaware is unclear. Recent research using nationwide data has shown that high school students on the average were taking approximately two more year-long academic courses in 1987 than in 1982.[1] However, the total number of courses taken by these students increased by almost two. Consequently, students were taking more total units, rather than substituting academic for vocational courses. Vocational course taking was down slightly, about the equivalent of one semester course, but this decline was concentrated entirely in consumer and homemaking and industrial arts, rather than in the occupationally specific courses more likely to be offered at area schools.

Whether or not this national trend is also true of Delaware was beyond the scope of this study. It is clear, however, that little research has been conducted to understand the impact of increased graduation requirements on students' opportunities to take vocational education, either at the area schools or at their home schools. Moreover, efforts to have certain vocational education courses recognized as satisfying some of the graduation requirements seem for the most part to have been resisted by the sending districts, which have final say over required curriculum.

Failing Required Courses

One consequence of increased graduation requirements is higher rates of students failing required courses. With more courses required, there are unfortunately, but inevitably, more instances of failure. As students must repeat these courses to graduate, they have even less time to take electives. Hence, their opportunities for attending area schools are further constrained.

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[1] John Tuma, Antoinette Gifford, and E. Gareth Hoachlander, *Enrollment Trends in Vocational and Academic Education in American Public High Schools, 1969 to 1987* (Report prepared for the National Assessment of Vocational Education, U.S. Department of Education, April 1989).

This is a sadly ironic situation. Students who fail required academic courses are precisely those who would benefit the most from an alternative approach to learning academic concepts. They are also the least likely to pursue postsecondary education and, therefore, most in need of acquiring skills to help them succeed in the job market. Rather than search for an alternative to success, students are forced to repeat what they have already failed—or what has failed them—and many times just fail again. It is difficult to imagine a more insidious plan for undermining students' self-esteem and confidence in their own abilities.

What impact have higher rates of failure in required courses had on enrollments at area schools? It is impossible to answer this question definitively, although all of the superintendents we interviewed cited this problem. What is a known fact, however, is that the rates of attrition at the area schools are shockingly high. In fact, many students leave after their first year of attendance, and less than one-half of those who attend the first year complete the full three-year program. While some of this attrition may be attributed to changes in student interests, it is clear that other factors are inhibiting continued attendance at the area schools.

These high rates of attrition are especially disturbing because it is doubtful that this limited exposure to vocational education only during the ninth or tenth grade has much value when students enter the labor market some three to four years later. Hence, for many students time spent attending area schools only in the early grades is wasted or, at best, of limited use.

Structure of the Curriculum

Delaware's area schools are unique because they provide a program for large numbers of ninth and tenth graders. In most states, area schools offer only the more advanced vocational education courses, and it is assumed that students will obtain the necessary academic prerequisites and introductory vocational coursework in their home high schools. Consequently, attendance at the area schools is limited mainly to students in grades eleven and

twelve. Further, students often attend these schools for only one year, either as juniors or seniors.

An advanced area school curriculum aimed primarily at juniors and seniors has several advantages over programs that assume students will attend area schools for three or four years. First, students have the opportunity to establish their identities at their home high schools as freshmen and sophomores. They are not forced to deal simultaneously with the new experience of high school generally, as well specifically with the new experience of attending an area school. Second, by limiting attendance to one or two years, instead of three or four, time spent in transit is reduced significantly, and conflicts with extracurricular activities are also reduced. Third, exposure to the area school programs occurs at a time when students are closer to entering the labor force or advanced postsecondary education and training. Area school participation is, therefore, more likely to be useful for all students attending these schools. Fourth, the decision about whether or not to attend an area school may be postponed until students are more certain about their postsecondary career and educational goals. Consequently, when the decision to attend an area school is made, students are more likely to know what they want to obtain from the area school and to be more motivated to complete the vocational program they choose.

To successfully concentrate the curriculum of an area school on eleventh and twelfth grade, however, the curriculum offered in the area school must be closely coordinated with the academic and vocational course offerings in the home high school. It also requires a strong commitment on the part of principals, teachers, and counselors at the sending school to facilitate attendance at area schools during the junior and senior years. As we will discuss in more detail below, none of these conditions currently exist in Delaware.

Communication and Integration Between Sending and Area Schools

Every superintendent we interviewed, at both the sending schools and at area schools, acknowledged that there is "little to no" communication between teachers at the area schools and those at the sending schools. Nor is there any serious attempt at the administrative levels to ensure that there is an effective relationship between what is taught at the sending schools, in either the academic or vocational curriculum, and what is offered at the area schools.

Repeated and long-standing conflicts over course scheduling between area and sending schools and the failure to achieve a uniform school calendar further demonstrate the seriousness of communication problems. Generally, staff at both area schools and sending schools have been either unable or unwilling to devise more flexible class schedules that would make it easier for students to attend the area schools. Additionally, the scheduling of school holidays and special events varies from district to district, so that there are days at the area school when large proportions of students miss certain classes.

Finally, local administrators have been unable to reach consensus about what vocational courses at the area schools to satisfy high school graduation requirements.[2] This kind of failure to communicate and to accommodate the needs of students can have absurd consequences. We were told, for example, that a student was forced to drop a three-credit health program at the area school simply to satisfy a one-quarter credit mandated health course at the home high school. Even though this is perhaps an extreme and isolated incident, it indicates a long-standing failure on the part of administrators of the area and sending schools to develop a well-coordinated, integrated, and flexible program for students wishing to pursue the kinds of vocational education offered at the area schools.

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[2]This problem may be ameliorated to some extent by the recent introduction of Principles of Technology and other applied academics courses at the shared-time schools. The state has adopted a policy that allows successful completion of these course may be used to satisfy some of the math and science requirements.

Structure of the State Funding System

The state funding system presently mandates that when students attend an area school, the home school loses money that the sending district would otherwise receive if the students remained in their home high schools. Through the so called .5 deduct, sending districts lose approximately 40 percent of one regular unit for every one-half unit of attendance at an area school. The rationale for this deduction is straightforward: Sending districts' costs are reduced because they are not required to provide staff and other resources for students during the half day that they attend the area school. Nevertheless, it is argued that this procedure creates an incentive for districts to discourage students from attending area schools. In effect, a "win/lose" atmosphere prevails, with attendance at one school being perceived as money lost from another school.

It is certain that this fiscal incentive exists; however, what is less certain is what kind of impact it has on attendance at area schools. Moreover, the incentive is probably more powerful when enrollments are declining and districts are struggling to maintain staff and program offerings than when enrollments are growing or stable. Thus, the incentive may have had more impact on sending districts' behavior between 1979 and 1989, when enrollments were declining, than it will have in the future, as high school enrollments stabilize and begin to increase. Furthermore, the incentive is probably more significant for smaller districts than for larger districts because small districts are less prepared to absorb the staff cuts caused by attendance at area schools. Additionally, small staff cuts can have large programmatic consequences in small districts, while being barely noticeable in larger ones. However, while the incentive is strong for very small districts, it probably has a much weaker impact on overall attendance at area schools because the small districts account for a relatively small percentage of total attendance at area schools.

Regardless of the impact of this fiscal policy in Delaware, other states have adopted different policies to eliminate the possibility that districts might discourage students from attending area schools purely for fiscal reasons. In California, for example, the state area schools (called regional occupational centers and regional occupational programs) are fully funded by the state. Sending students to these programs has no fiscal impact on the finances of the sending district, although the state does limit the rate by which enrollment can grow in the area schools. This "cap" is necessary to ensure that the costs to the state remain predictable and under control. Other states with area schools have similar policies, although some also follow Delaware's practice of reducing other state aid. In short, there is no standard practice to use, and either policy can be rationally defended.

The present policy governing financing for special education is less rational. Many special education students attend the area schools, representing about 20 percent of total enrollments. Area schools, however, receive no additional funding for special education students. All additional federal and state funds for special education remain in the sending district. Consequently, special education students who spend one-half of their school day in the area school receive no additional services while attending. There are no additional resources for reducing class size, hiring aides, or providing other services and resources that are routinely available to special education students in their home high schools. In effect, special education students who attend area schools are penalized, compared with their peers who choose to spend the full day in their home high schools. There is no apparent justification for this state of affairs, and without a well-conceived rationale, it would seem much more logical that funding for special education should be extended to the area schools.

In summary, none of the superintendents we interviewed indicated that they discourage attendance at area schools for fiscal reasons. All, however, understand that attendance has a fiscal impact on their district. Many also openly acknowledge that they compete with the area

schools for students. This overall atmosphere of competition, accompanied by fiscally significant outcomes, inhibits cooperation that would facilitate attendance at area schools.

Transportation Conflicts

Because students travel between their home high schools and the area schools twice each day, it is common for students attending area schools to spend an additional 40 to 60 minutes per day in transit, above and beyond the time required to travel between their residence and home high school. Time in transit is an always an inherent disadvantage of shared-time area schools, but in Delaware the problems it presents are unusually severe.

The most troublesome consequence of current travel arrangements is that in most of the sending districts time spent in travel results in a loss of one period per day. Given that the curriculum design calls for attendance over three years rather than just over one or two years, which is more typical of other states with area schools, this cumulative credit loss is especially serious. In some instances, this loss may be unpreventable, but we found little evidence that the districts have sought strategies to avoid it. The widespread unwillingness on the part of both sending and area schools to devise more flexible approaches to scheduling contributes significantly to the problem. Administrators at both the sending schools and area schools appear to have accepted credit loss from transit time as unavoidable. In other states that operate area schools, however, several alternatives have been devised. It is possible, for example, to bus students attending area schools in the morning directly to the area school. Also, midday busing can coincide with a reduced lunch period for students attending the area school. Some states schedule early morning classes for students attending area schools so that credits are not lost. None of these solutions is ideal, and all involve a certain amount of inconvenience for students and staff to make them work. Nevertheless, credit loss is minimized.

Transportation scheduling is further complicated by the lack of uniformity among districts in the structure of the school day. Because districts operate with different numbers of periods

per day—with periods beginning at different times in different districts—students arrive at or depart from the area schools at different times, disrupting the beginning and the end of the instructional time. Here again, the localized preferences of each district take precedence over finding common approaches for accommodating the needs of students who desire to attend the area schools.

Transportation scheduling is always a difficult problem in the operation of area schools. However, the widespread failure of schools in Delaware to minimize conflicts and the impact of travel on student learning are simply more indications of an overall failure to make shared-time facilities work in the state.

Extracurricular Conflict

Another manifestation of scheduling and transport problems is the inability of students in many of the sending districts to participate in extracurricular activities after school. Because this can mean exclusion for three or more years under the current curriculum design, students who attend an area school must make a considerable sacrifice. Their inability to participate in extracurricular activities undoubtedly contributes to the the high rates of attrition and probably discourages some students from attending area schools at all.

There is no evidence that this kind of exclusion is really necessary. Indeed, one of the superintendents we interviewed stressed that his district's firm policy was for no student to be excluded from extracurricular activities because of attendance at the shared-time schools. He said that scheduling has been modified to guarantee that all students can participate. As this one situation illustrates, the needs of students attending the area schools can be accommodated. Most districts, however, feel no strong compulsion to follow this policy.

Incompatible Governance Structure

Many of the problems we have described are rooted in the governance structure of the area schools and their sending districts. Each of the area schools has an autonomous board with independent taxing authority. All of the sending districts have their own independent boards that are not accountable to one another. Hence, there are few or no incentives for them to coordinate and to cooperate.

Delaware is not unique in establishing independent boards for its area schools, but most other states that have adopted this policy have also taken steps to promote coordination and cooperation. In California, for example, some of the area schools are under the the authority of county boards of education. However, because there are no negative fiscal impacts for sending districts, they are not competing with the county district for students. Consequently, a major barrier to coordination and cooperation is removed. Oklahoma has adopted a similar policy in which their area schools are operated by totally independent school boards, but sending districts do not lose local or state funding when their students attend the area school.

In other states, area schools and sending schools are administered by the same board. Not only does this structure eliminate interdistrict funding conflicts, but also it ensures uniformity in the school calendar, improves curriculum coordination, and facilitates more flexible scheduling of classes and transportation.

In other states, districts organize an area school under some form of joint powers agreement. The area school operates under an umbrella controlled by all of the participating districts, and they must reach consensus on all major issues affecting operation of the area school. Because the area school operates under the control of all of the participating districts, there are formal procedures for jointly dealing with curriculum, scheduling, transportation, and other important matters.

Can Shared-time Area Schools be Made to Work In Delaware?

A variety of factors make share-time schools increasingly unworkable in Kent and Sussex counties. Probably the most significant explanation for the current difficulties is the combination of independent governance with a "win/lose" funding system, creating an atmosphere of competition for students that greatly inhibits cooperation and coordination among districts. The deterioration of the system has been further aggravated by the three-year curriculum's incompatibility with changing graduation requirements, along with an inattentiveness to the significant role that vocational education courses could play in mastering required academic subjects. As long as general high school enrollments were growing, these structural weaknesses were less obvious and, thus, could be largely ignored. However, beginning in the late 1970s, after a decade of enrollment decline, the basic weaknesses in the system were revealed. This created a protracted period of bickering, finger pointing, and general disarray in relations between sending and shared-time area schools. The issue that we now must confront is: Can shared-time be made to work in Delaware?

If the state wishes to restore shared-time operations that effectively meet the needs of secondary schools students, we believe the following actions must be taken.

1. The current governance structure must be altered to foster better coordination and cooperation. To accomplish this, at least two options are available. First, serious consideration could be given to consolidating all secondary education under a single county board of education, responsible for all comprehensive high schools, as well as the shared-time school in each county. We recognize that such an option is politically difficult to implement, but it would, nevertheless, solve many of the major governance problems that inhibit cooperation and coordination in the present system.[3] Second, if county boards are deemed infeasible or inappropriate, then the state should consider substituting a joint powers arrangement for the

[3]It should be noted that adopting countywide governance would probably have significant cost implications, as salary schedules must be consolidated, usually using the highest schedule in the county.

present independent board. While not as unifying as a single county board, a joint powers agreement would give each of the sending districts clearer rights and responsibilities for operating shared-time area schools.

2. Barring the adoption of a single countywide school district for all secondary education, the fiscal disincentive to participate in shared-time area schools should be reduced substantially or eliminated entirely. The underlying notion that sending districts compete with area schools for students must be eliminated if an atmosphere that fosters coordination and cooperation is to be created. A competitive approach to operating area schools cannot work. By definition, area schools are intended to supplement the program of sending schools; they are not designed to provide a full secondary school program and, therefore, cannot compete on equal ground.

3. The state should consider mandating a uniform school calendar and school day. Initially, such a mandate would be incompatible with existing collective bargaining agreements, but the mandate could be phased in as these agreements expire.

4. The curriculum at the shared-time area schools should be redesigned, in combination with curriculum redesign at home high schools, so that programs at the shared-time schools may be completed in two years or less. As a rule, attendance at shared-time schools should occur only during the junior and senior years. While this will reduce the amount of vocational education taken by any one student at the area school, it should allow more students to complete the program. Hence, the net impact on enrollment should be neutral or perhaps, even positive.

5. The state should undertake a major effort to improve the integration of curriculum at area schools with academic and vocational curriculum at the home high schools. Sequences of academic and vocational courses required for completing vocational education programs should be thoroughly reviewed, and state standards for program completion should be expanded to

include academic courses. Counselors should be expected to design complete academic and vocational education plans for students opting to attend area schools.

6. The state should require in-service on integrating academic and vocational education curricula and should provide time for ongoing communication between academic and vocational teachers. Provisions for in-service and communication should be incorporated into the uniform school calendar.

7. After the vocational curriculum of area and sending schools has been thoroughly reviewed and modified, the state should designate vocational courses that may be substituted for required courses that students fail. Alternative approaches to repeating should be designed and should be available in all high schools. Districts should be required to honor the substitutes designated by the state.

8. The state should conduct a study of transportation and scheduling for shared-time schools including practices in other states. The study should explore strategies for increasing flexibility in scheduling, reducing transportation time, and eliminating the credit loss that now results from excess time in transit.

In short, making shared-time facilities work in Delaware would require the state legislature and the Department of Public Instruction to assume a much higher profile, not only in the operation of vocational education but also in the overall organization and delivery of secondary education. Greater state involvement inevitably would mean some loss of local control over school affairs—a loss that may not be politically palatable in Delaware. However, if a greater state role similar to the one we have recommended is not feasible, an alternative to shared-time area schools must be found. After nearly ten years of foundering at the local level, we are not optimistic that the problems of shared-time schools can be solved locally without strong state directives.

II. CONVERTING FROM SHARED-TIME TO FULL-TIME: AN ALTERNATIVE?

As the previous section illustrates, current operation of shared-time area schools in Kent and Sussex Counties is beset with a number of intractable problems. Moreover, even if some of the most serious problems could be rectified, a few difficulties intrinsic to any shared-time operation would remain, especially the large amount of time spent in transit and the dilemma of attending two schools. As an alternative to maintaining shared-time schools, there have been several recommendations during the past four or five years to convert these facilities to full-time vocational high schools. Such conversions have already occurred in Newcastle County, apparently with much success. However, is conversion appropriate in Kent and Sussex Counties?

To answer this question, we have focused on two major sets of issues:

- What would be the educational benefits of a full-time vocational school?
- What are the major issues surrounding implementation of full-time schools, and how might these be addressed?

Additionally, there is the very important question of the impact of conversion on the quality of programs at the comprehensive high schools, since students who have previously attended these schools part-time would now be enrolled full-time at the vocational high school. Because this issue is a very complex one, we have devoted the entire third section of this report to assessing some of the most likely consequences.

What Could Full-time Schools Accomplish: The Importance of a New Vision

Although initially ignored in the early spate of school reform that followed publication of *A Nation At Risk* in 1983, vocational education is currently receiving increasing attention as new solutions are being sought to improve the academic achievement and labor market

preparation of America's young people and adults. However, while there is a growing recognition that vocational education can play an important role in school reform, there is also a consensus that to be effective, the vocational curriculum and the academic curriculum require major revision. In the vocational curriculum, higher standards of academic achievement are necessary, along with a much clearer understanding that one significant objective of providing hands-on, concrete work experiences for high school students is to enhance students' grasp of underlying academic principles and concepts. Similarly, in the academic curriculum, there is a need to appreciate the importance of applied learning so that students can better understand and retain academic subject matter. Moreover, greater emphasis on applied learning in academics and on academic principles and concepts in vocational education must be carefully orchestrated within a school so that the two are mutually reinforcing. Such orchestration requires new sensitivities and skills among administrators and teachers. It also demands that more attention be paid to improving communication and opportunities for joint teaching among vocational and academic staff. In short, combining academic and vocational education and restructuring the high school to better achieve this integration may significantly improve what high school students learn.

In considering whether to pursue conversion of its remaining shared-time area schools to full-time, Delaware should recognize that conversion presents the opportunity to take a bold, new approach toward improving secondary education for all students. It is not only an opportunity to be at the forefront of efforts to integrate academic and vocational education, but it is also an opportunity to adopt a new attitude about vocational education and the importance of applied learning for all students—regardless of their postsecondary aspirations. A concrete example will help to illustrate the kind of opportunity we propose.

It is conventional to think that the building trades—carpentry, electricity, plumbing, masonry, and sheet metal, for example—are vocational, requiring a modicum of reading, math, and science skills, but generally lacking much of the conceptual content found in more rigorous

academic offerings. It is also conventional to assume that these trades do not require much in the way of postsecondary education. On the basis of such thinking, it has been traditional to separate the building trades from the academic curriculum, to encourage non-college bound students to enroll in these programs, and generally to isolate these students (at least in the classroom) from their more academically inclined peers.

As long as one remains narrowly focused on the need for a building trades curriculum primarily for the non-college bound, it is difficult to break out of the old ways of teaching. At best, one can strive to beef up the academic content of some of the trades curriculum, adding a little trigonometry to carpentry, some physics to electricity, and perhaps introduce some instruction in principles of technology into all of these subjects. There is nothing particularly wrong with these kinds of changes; indeed, they are probably beneficial and certainly superior to a more rote approach to teaching trades skills. The problem is that these changes may be falling far short of what might be accomplished if we adopted a new paradigm.

Suppose, for example, that instead of trying simply to improve the construction trades curriculum, we sought instead to design a curriculum aimed at teaching students how to better understand and shape the built environment, broadly conceived. Suppose we further committed ourselves to the principle that in designing such a curriculum, participation in the curriculum would not prevent a student from pursuing postsecondary education to the bachelor's degree and beyond. Suddenly, we are no longer constrained to design curriculum only around the conventional building trades. Rather we can embrace a broad range of occupations including architecture, interior design, a wide range of engineering fields, materials science, and a host of others requiring varying degrees of academic and occupational skills preparation. Our goal now becomes teaching prospective carpenters some architecture and principles of design—not as a separate unrelated art history course—but rather as an integral part of a curriculum that places carpentry in a larger context of shaping the built environment. Similarly, this curriculum introduces prospective architects or engineers to the trade skills that they will need to implement

their more abstract ideas and designs. All students interested in this related cluster of occupations learn "the academics"—English, mathematics, science, history, and social studies—in the context of this field. This kind of "cross training," not only will improve communication between the various related professions, but also will increase the understanding of what people in other fields do, which will create opportunities for innovation and promote productivity. Students can learn together in much the same way as they will work together later on the job.

In this model, accumulating trades skills is but one step toward further education, should students' aptitudes and aspirations lead them in that direction. It is not a choice that precludes other options. Moreover, in this model, academic content is not watered down to make it accessible to students who are less inclined toward abstract learning. Rather alternative, applied methods are used to deliver the same rigorous subject matter in ways that can be more easily grasped.

It should be noted that this emphasis on integration does not necessarily mean that the traditional academic disciplines are eliminated or that all students interested in the same general field—the built environment or health, for example—take the same courses. Instead it means that academic courses may no longer be taught out of context. For example, rather than teach European history or ancient civilization simply for sake of acquiring historical knowledge, efforts are made to build the history curriculum around students' general occupational interests. To continue with our built environment example, in History I, students might study the evolution of building tools and methods, their influence on architecture and use of space, and their interaction with advances in science and technology. These trends might be examined cross-culturally, with vocational students experimenting with manufacturing and using primitive tools to actually build primitive structures—pyramids, thatched roofs, or tepees. In their classes, students would study the basic principles in these structures that are used in modern building today.

Teaching takes on a different meaning in this kind of applied learning environment. It is unlikely that a typical high school history teacher, for example, knows much about the evolution of building. This is not important, as long as the teacher knows how to find out more about the subject and how to involve students in this mutual process of learning and discovery. Indeed, rather than merely transferring already acquired knowledge and having this become the primary objective of teaching, what is consistently being taught in every class is how to acquire the knowledge one needs, as well as when it is relevant to the interests or problems of students.

Furthermore, it is not necessary for all students to take the same courses. We believe that such an approach encourages much higher expectations for most students. For example, we believe that applied learning makes algebra accessible to far more students than traditionally thought and would predict that most students interested in a built environment curriculum would be expected and would be able, even with diverse aptitudes and abilities, to master Algebra I and the basics of trigonometry. Probably not all students would tackle calculus, but probably more would attempt it than ever before. Moreover, although calculus would be more likely to interest only the more mathematically inclined, it would nevertheless use applied learning techniques as its central methodology.

It will be argued by some that such a model is hopelessly naive and that large numbers of high school students are either not interested in or do not have the ability to learn the more rigorous subject matter that traditionally has been the exclusive domain of the academic student. Certainly, such a view has dominated American education throughout the twentieth century, producing a system of pernicious tracking and shockingly low expectations for more than one-half of all high school students.

There is, however, important and growing evidence that the "common wisdom" is wrong and that many more students are capable of understanding complicated, advanced academic

material if we adopt more concrete, applied methods to teach it. There are a small, but significant, number of schools nationwide that have known this for some time. Aviation High School in New York City, for example, has used the aviation industry as a base for building an integrated academic and vocational curriculum serving a diverse group of students, at least one-half of whom choose to go on to four-year college or university after graduation. Similarly, Murry Bertraum High School also in New York City has built a rigorous curriculum around business and commerce. Chicago's High School of Agricultural Science and Technology, its predecessor in Philadelphia, and a handful of other specialized high schools, such as the Thomas Jefferson High School of Science and Technology in Fairfax, Virginia, have all successfully adopted integrated applied learning as the cornerstone of the their curricula.

Integrated cross training is also the core of the German apprenticeship model and the Germans' approach to training high level engineers. German engineers are expected to have apprenticed as tradesmen before going on to more advanced education in engineering. The Japanese routinely insist on cross training their work force, not only in Japan but also in the customized training programs they have jointly developed with community colleges for staffing Japanese-owned and managed operations in the United States.

Research also supports the validity of these methods, as well as the shortcomings of the traditional American way of educating high school students. A growing body of work in cognitive science, the study of how people learn, underscores the power of applied learning for students from a wide range of backgrounds with diverse abilities. One such study analyzes the highly sophisticated mathematical skill of Brazilian street children, who are unable to score well on standard academically formulated tests of mathematics ability, but are able to rapidly perform complex calculations in their street transactions.[4] Therefore, these children are not

[4]Terezinha Nunes Carraher, David William Carraher, and Analucia Dias Schliemann, "Mathematics in the Streets and in the Schools," *British Journal of Developmental Psychology*, vol. ., no. 1 (1985), 21-29.

incapable of learning sophisticated mathematics; rather, they learn the subject best and retain it well when they can use it a context that has meaning to them.

In suggesting that the state consider a similar model for full-time vocational high schools in Delaware, we emphasize that we are not suggesting that these schools be specialized vocational high schools. Schools offering curricula organized according to a variety of career clusters are compatible with the approach we have outlined. It is important, however, that these clusters be more broadly defined than is the case in more traditional conceptions of what constitutes vocational programs. Thus, a health curriculum must be more broadly conceived than the traditional allied health occupations; and automotive and diesel mechanics curricula must be designed according to the larger context of transportation careers.

In short, Delaware faces an important choice if it decides to convert the shared-time facilities to full-time vocational high schools. On the one-hand, it can simply choose to provide conventional academic (and general) courses at the same sites where traditional vocational education programs are offered. Such an approach will address the more mundane problems associated with shared-time schools: Time in transit will be reduced. Students will be better able to identify with only one school. There will even be some opportunities for strengthening the academic content of some of the vocational courses. Nevertheless, students are not likely to be a great deal better off than they are now. Very little will have changed other than where they go to school.

On the other hand, Delaware can seek to take advantage of the opportunity presented by converting to full-time. Conversion can represent a fresh start, a one-time chance to chart some new directions for secondary education in Delaware. It is an opportunity to build a new staff based on an expanded vision of integrated academic and vocational education—dedicated to emphasizing applied learning, making the abstract concrete, and having high expectations for all students. It is essential that if such a direction is selected, it be implemented at the

beginning. Conversion that initially adopts the more conventional approach with the intention of later phasing in some of these bolder steps is much less likely to succeed. The style initially implemented will tend to become more and more entrenched as time goes on, making deviations from the conventional paths more difficult.

Adopting the bolder view is risky, however. There is no ironclad formula for success. Much work will need to be done in curriculum and staff development to ensure that the new full-time schools succeed. We will have more to say in the following section about how this might be best accomplished. However, to simply settle for a traditional marriage of vocational and academic courses at a single site is also a high-risk proposition—a risk that the students attending full-time schools might be relegated to less promising futures by an approach to education that is increasingly outdated and unable to prepare them to participate successfully in the labor market over the long term.

Implementation Issues

There are a number of implementation issues that need to be addressed if conversion to full-time schools is to be achieved successfully. At the most general level, a strategic plan for converting each of the schools is required, a plan that clearly articulates the vision that the school is seeking to create, the steps it will take to get there, and what these steps are likely to cost. Much of this work has already been done. Both Sussex and Kent Vo-Tech have developed proposals for full-time schools that contain some innovative ideas. However, we believe that both proposals should be developed more and that some of their implicit, but critical, assumptions must be challenged and thought out more carefully.

For example, both proposals assume that the physical design of the full-time school should call for an academic wing for academic instruction to be built onto the existing vocational school structure. This is, of course, the way most high schools have been built. But is it the best way, especially if the state opts to promote more integrated instruction? For

example, might it not be more effective to develop a design that allows for physically pairing academic and vocational classrooms, so that access to a vocational laboratory, as well as team teaching and better communication between academic and vocational teachers, are more easily accomplished? The answer to this question is not likely to have major cost implications, but it does radically affect the design of new construction. In these days of declining and stable enrollments, one does not often have the opportunity to consider new approaches to school design and construction—for example, are there opportunities for students themselves to be involved in the design and construction of schools? Indeed conventional design may still be the best approach, but should not other alternatives be considered before the layout of the new schools is literally set in concrete?

We do not intend to belabor the importance of vision, but it is apparent that different visions can have very different implications for various aspects of conversion—from the physical design, to the characteristics of students who are recruited and admitted, to staffing and development. We believe that plans to convert to full-time schools would benefit from more attention to this general issue.

In the rest of this section, we will address some of the other major issues affecting implementation. These include costs of conversion, admissions policies, inclusion of special education students, new staffing, curriculum development, distribution of state aid, and transportation. Although we have not conducted an exhaustive treatment of these topics, we have concentrated on identifying key issues and questions that ongoing plans for conversion must address.

Costs of Conversion

Total capital costs for converting Sussex Vo-Tech and Kent County Vo-Tech to full-time high schools have been estimated at approximately $11 million, $5.3 million for Sussex County and $5.7 million for Kent County. These represent costs for constructing new facilities

to accommodate approximately 1,000 students at each site and include additional classroom facilities, science labs, libraries, auditoriums, gyms, playing fields, and expanded cafeterias. It is beyond the scope of this study to validate these estimates.

Whatever the costs of conversion, they should be evaluated against the costs of maintaining shared-time facilities. As we noted in Section II, in our judgment, eliminating most or all of the "5 deduct" is essential to maintaining the shared-time schools and to restoring enrollment to a level that will allow these schools to run effective programs. We estimate the cost of eliminating the deduct for current levels of enrollment to be about $1,194,510 annually (30 units times $39,817 per unit in 1990-91). Assuming that elimination of the deduct resulted in an increase in enrollment in the area schools of no less than 20 percent, the annual cost of the deduct would rise to $1,433,412. Using a discount rate of 5 percent (the real interest rate net of inflation), this annual expenditure of $1,433,412 has a discounted present value of $28,668,240.[5] In other words, if the state were simply to invest $28.7 million at 5 percent per year (net of inflation), this would yield interest of just over $1.4 million per year, sufficient to pay the cost of the deduct in perpetuity. This estimate of $28.7 million is the figure that should be used to compare the one-time costs of conversion to full-time (plus the net present value of any operating costs above and beyond those necessary to continue to educate students in their home high schools).

It is probably warranted to do a more detailed cost comparison as plans for constructing and operating the full-time schools become more defined. However, as long as one assumes that elimination of the deduct will be necessary to ensure continuation of shared-time facilities, we are confident that it is unlikely that conversion is a more costly alternative—and it could well be less costly.

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[5]Calculating the discounted present value of an annual expense is the method used to compare this figure directly with a one-time capital outlay. The estimate of present value is sensitive to the choice of the interest rate, which is a matter of some debate among economists. Most economists agree that the real interest rate (that is, the rate net of the impact of inflation) probably lies somewhere between 3 and 6 percent in today's markets. The higher the interest rate, the lower is the net present value.

Admissions Policy

Who will be allowed to enroll in the full-time high schools, and what procedures will be used to admit students if the schools are over subscribed? Will students be allowed to leave their present school and transfer to the comprehensive high school in the district where they reside? Will transfers be constrained in any way? These are some of the questions that have not yet been adequately answered, and the state may well want to establish some firm guidelines. Presumably any high school student may apply for admission to the high school in the county of residence. The critical question is: Will admissions be selective or completely open?

Many full-time vocational high schools have traditionally adopted selective admissions practices. For years, New York City's vocational high schools carefully screened prospective students and turned away tens of thousands of applicants each year. Although these high schools were widely recognized as superb schools, nevertheless critics charged that one reason that these schools were so excellent was that they admitted only the very best students. However, good students will learn in spite of poor schools or poor teachers; consequently, outstanding school performance may simply be the result of outstanding students, rather than any intrinsically more effective approach to education.

We subscribe strongly to the principle of open admissions, and in schools in which applicants exceed the number of places, admission should be conducted by lot. If one of the advantages of converting to full-time schools is stimulating healthy, fair competition between the full-time vocational schools and the other high schools, then it is important that both parties play by the same rules. The home high schools cannot be selective about whom they admit. Neither should the full-time vocational high schools.

We can see no reason why transfers between the vocational high school and the comprehensive high schools should not be allowed, although we recommend that the frequency and timing of transfers be controlled. Students should be expected to remain at their

school of first choice for at least one year because this requirement makes funding and staffing much easier to predict and manage. Transfers for unusually extenuating circumstances could be permitted at the end of each first semester. Students probably should not be allowed to transfer more than twice, and there should be a procedure for requesting exceptions for unusual circumstances.

Inclusion of Special Education Students

Special education students constitute about 20 percent of enrollment at the shared-time facilities, although they represent only approximately 10 percent of the overall high school population. This higher concentration at the shared-time schools reflects a recognition that special education students are less likely to pursue postsecondary education and training and, therefore, should leave high school well-prepared to succeed in the labor market. These needs will certainly continue if conversion is pursued, and precisely how these needs will be met by full-time schools requires additional study.

Unfortunately, participation is more complicated than simply objectively assessing student needs and designing appropriate programs to meet them. Many special education students are more difficult to teach than other students and can also be more disruptive in classrooms. Consequently, there have been charges and counter-charges that the existing shared-time schools and the sending schools use each other as dumping grounds for difficult students, with each one supposedly trying to relegate its more difficult problems to the other. Documenting the actual extent of this problem was beyond the scope of the study, although we did hear complaints from many parties about this problem.

Suffice it to say, representatives of special education should be included in all aspects of the conversion planning process. Additionally, the state may want to adopt as a guideline the principle that program planning for full-time schools will strive to ensure that any special

education student should have the opportunity to attend the full-time school and to participate in a fully integrated program of instruction.

Staffing

Conversion to full-time schools will require the addition of at least one-half more teachers than the present number at the shared-time schools. Moreover, assuming enrollment growth is not sufficient to offset the increased attendance at the full-time schools (see Section III below), the teaching force at the other comprehensive high schools will also need to be reduced. Reductions in units at the comprehensive high schools will also accompany reductions in other personnel (see Section III for estimates of these staffing changes).

Should the full-time schools be required to hire first those personnel who leave the comprehensive high schools? We recommend that they *not* be required to do so. The full-time schools should be free to hire teachers just as any other district would. Moreover, if the full-time schools aggressively seek to integrate academic and vocational education, they should have the freedom to recruit staff fully committed to this particular approach.

Curriculum Development

If the state chooses to accomplish integration and restructuring through the full-time schools, more attention will need to be paid to curriculum development, not only in the full-time schools but also in the earlier grades that prepare students for high school. The present proposals for converting Sussex and Kent counties to full-time, while including some provisions for applied academics and integration, must be more fully developed. Additionally, the status of career education in the middle grades and its communication with the curriculum of the full-time high schools needs careful review.

Tech Prep

Encouraging more development of "tech prep", or "2+2" programs, is a major objective of new federal vocational education legislation now before Congress, and tech prep should figure prominently in the development of curriculum for the full-time schools. Attention should also be paid to articulation with programs in four-year colleges and universities, so called 2+2+2 programs that include transfer from community colleges to four-year colleges. This emphasis is consistent with our view that vocational education must be conceived more broadly so that it is considered appropriate for students aspiring to postsecondary education.

Opportunities for tech prep would seem especially promising if the Kent County vocational high school were to be located at the present north campus site next to the community college. Because we were unable to study this possibility in-depth, we have had to rely on other assessments. As we understand the issues, locating the full-time school at the present north campus site would double the construction costs from approximately $6 million to $12 million. On the positive side, the site is adjacent to Delaware Community College, making articulation easier. Additionally, it is closer to population growth areas and is more accessible to existing population centers. On the negative side, in addition to costing more to convert, the facility would be landlocked and would require that exceptions be made to state standards governing square footage. Furthermore, it is apparently easier to reconfigure space at the Woodside site. Finally, it is more likely that there is an immediate alternative use for the north campus site if Woodside becomes the site of the full-time school. However, what would become of the Woodside facility if the north campus were to be converted is less clear.

In short, we are unable to add to the analysis that was previously conducted. There seems to be a consensus that the north campus site is in many ways superior, but it is difficult to justify in light of the additional construction costs, the costs of closing the Woodside site, and

some of physical constraints imposed by the lack of additional land at the north campus location.

Distribution of State Aid

If the shared-time schools are converted to full-time, we see no reason why they should be treated any differently from those in other districts for purposes of distributing state and federal aid. The state aid formulas would continue to operate as they presently do. Eligibility for federal aid should be the same for the vocational high schools and the comprehensive high schools. Categorical aid for special education should meet the needs of the students, and the vocational high schools should be expected to provide the full array of support services for special education presently expected of the comprehensive high school districts.

Transportation

We have not been able to examine transportation in any depth. We assume that with conversion, students would be transported directly to the full-time high schools. The Department of Public Instruction has estimated that conversion will require an additional annual expenditure of at least $200,000 for transportation. The discounted present value of this annual expenditure is $4 million and should be included in the estimate of the cost of converting from shared-time to full-time schools.

What Actions Should Be Taken to Make Conversion Successful?

To ensure that Delaware maximizes the educational benefits of converting from shared-time to full-time, there are a number of actions that should be taken. If the state decides to pursue conversion to full-time schools, we recommend the following:

1. The state should require preparation of a formal plan for conversion to be reviewed by the Department of Public Instruction and the State Board of Education. At a minimum, the plan

should be required to address the following issues: (1) How will integration of academic and vocational education be achieved; (2) How many special education students will be accommodated, and how will they participate in the school; (3) How will the physical design of the school facilitate integration, special education, and other major objectives of the school; (4) What will be the school's policy on admissions and transfers; (5) What kinds of vocational education programs are envisioned, and what is the rationale for selecting these programs; (6) What are the staffing requirements, including the kinds of qualifications and experience sought, and how will recruiting be conducted; (7) How will the programs be articulated with postsecondary education at both the two-year and four-year levels; (8) How will the full-time schools interact with the middle grades with respect to career education, articulation, and student recruitment; and (9) What is the timeline for implementation?

2. The state should establish a Planning Advisory Board to work with local personnel in Kent and Sussex counties that would be responsible for developing the conversion plans and implementation. This advisory board should include individuals who are knowledgeable about new directions in integrating academic and vocational education and about innovations that have been effectively implemented elsewhere in the country. At least one member of the local planning team for each site should be expected to visit at least three exemplary full-time vocational high schools in other areas to gather first-hand information on integrated curriculum, staffing, physical design, and school organization.

3. The state should require an open admissions policy at the full-time schools. Generally, the full-time schools should operate in the same way as any other district in the state, subject to the same rights and responsibilities as the comprehensive high schools.

4. The state should require that a representative of special education participate fully on the local planning teams. Additionally, special education should be represented on the Planning Advisory Board.

5. The state should review vocational education in the comprehensive high schools. This review should examine opportunities for integrating academic and vocational education in the comprehensive high schools.

6. The state should review the condition of career education and counseling in the middle grades. The state should consider in-service for counselors on potentially integrating and applying learning for all students, as well as provide counselors with a better understanding of the different sequences of academic and vocational education courses that are most likely to lead to successful employment or further education.

III. ENROLLMENT IMPLICATIONS OF FULL-TIME VOCATIONAL-TECHNICAL HIGH SCHOOLS

A major concern about the consequences of converting shared-time schools into full-time schools is the impact of conversion on the enrollment and finances of the comprehensive high schools. In this section, we examine in detail some of the major implications of conversion on unit funding for the full-time and comprehensive high schools in Kent and Sussex counties. This analysis is based on a series of enrollment simulations using a simplified version of the unit funding system in Delaware. First, in this section, we explain the assumptions behind the simulations; secondly, we report the results of the simulations and the changes in the distribution of secondary units among school districts in Kent and Sussex counties; and, finally, we analyze the implications of these changes for the various school districts.

We began by calculating the distribution of funding units for the base year 1988-89. These base-year calculations were used for assessing how conversion to full-time vo-tech would affect the distribution of funding units, based on actual enrollment in 1988-89 and the shared-time vo-tech format. Three related simulations analyzed how the conversion from shared- to full-time vo-tech might affect the distribution of funding units. The first simulation

examines the impact on the distribution of funding units if enrollment at each of the full-time schools is either as low as 500 or as high as 1,000 students. The second simulation assumes that the same proportion of students now attending the shared-time facilities would attend full-time. In combination with enrollment growth projections, it uses this assumption to estimate the enrollment in the full-time schools and the resulting consequences for funding units at the comprehensive high schools. Finally, the third simulation assumes that each of the full-time schools would operate at a capacity of 1,000 students and calculates the proportion of students from each of the comprehensive schools that would be necessary to operate at this level. [6]

General Assumptions and Characteristics of the Simulations

Separate simulations were done for Kent and Sussex counties. These simulations were based on a simplified unit funding model that included only regular and vocational Division I units.[7] While a more complex model could be simulated, this simplified model adequately describes the implications for distributing funding units that result from converting a shared-time into a full-time vocational delivery system. To estimate the number of vocational units offered in each comprehensive high school district, vocational enrollment in the home school in each sending district was assumed to be 15 percent of the total enrollment.

The rate of growth (or decline) of the secondary population was an important parameter for estimating the impact of converting from shared-time to full-time vocational education in Kent and Sussex counties. Student population projections were made through academic year 2000-01, although the simulations only project through the year 1995-96. The base-year simulation used actual student enrollment in 1988-89 in each district.[8]

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[6] For complete simulation results, see Appendix 1.

[7] Division I units provide funding for salaries and staff positions.

[8] The enrollment numbers for districts in Kent County were taken from *Issues and Answers: A Full-Time Vocational Facility in Kent County*, prepared for Paul Fine, President of the State Board of Education. Enrollment numbers for districts in Sussex County were taken from the *Feasibility Study for Conversion from Shared-Time to Full-Time* (Sussex County Vocational Technical School District, May 1989). Note that the enrollment numbers for the Milford district, which straddles county lines and sends students to both vo-techs, are

Two assumptions were made in projecting changes in the secondary student population. First, the proportion of persons in the 15 to 19-year-old cohort enrolled in secondary education was assumed to be constant from year to year. This proportion was calculated by dividing the total 1988-89 secondary enrollment by the population of persons between 15 and 19 years in each county. Thus, 72 percent of the 15 to 19-year-olds in Kent County, and 65 percent of those in a similar age group in Sussex County were assumed to be enrolled in secondary education.[9] Second, growth was assumed to be constant districtwide in each county (although this condition was relaxed in several of the later simulations). The population projection for the Milford School District, which straddles the county line, was based on the average growth rate in both counties. Table 1 shows the population projections that were used for the simulations.

Table 1
Secondary Student Population Projections for Kent and Sussex Counties by School District, 1988 to 2001

County/ District	Actual enrollment 1988-89	Projected secondary enrollment 1989-90	1990-91	1995-96	2000-01
Kent (total)	5,940	5,879	5,879	6,156	6,632
Caesar Rodney	1,646	1,626	1,626	1,705	1,833
Capital	1,685	1,665	1,665	1,746	1,877
Lake Forest	901	890	890	933	1,004
Milford	940	939	939	976	1,063
Smyrna	768	759	759	796	855
Cape Henlopen	834	844	844	869	959
Delmar	360	364	364	375	414
Indian River	1,642	1,662	1,662	1,711	1,888
Laurel	458	463	463	477	527
Milford	940	939	939	976	1,063
Seaford	841	851	851	876	967
Woodbridge	403	408	408	420	463

* Includes students attending the vo-techs part-time.

different in these two sources. We have taken the enrollment numbers as they were specified in the source materials.

[9] Population estimates were taken from the Delaware Population Consortium, *Population Projections: 1988 Version* (Dover, Delaware, January 1989).

The Base-year Calculations: Enrollments and Unit Distributions in 1988-89

The base-year calculations provide comparisons for the simulations that follow. The results of those simulations will be compared with the base-year results to evaluate how the conversion from shared-time to full-time delivery of vocational education at the vo-techs will affect the distribution of funding units among the various school districts. Table 2 shows the actual district and vo-tech enrollments for 1988-89, along with the units these enrollments generate. Because these unit counts include only regular and vocational funding units, they will differ from the actual units that were allocated to the districts for secondary and vocational education in 1988-89.

Table 2
Base-year Enrollment and Estimates of Units Generated

County/ District (1)	Actual 1988-89 enrollment* (2)	Actual vo-tech enrollment (3)	Net units in sending districts† (4)	Units in vocational districts (5)
Kent (total)	5,940	715	299	24
Caesar Rodney	1,646	274	82	–
Capital	1,685	130	86	–
Lake Forest	901	103	46	–
Milford**	940	41	48	–
Smyrna	768	167	38	–
Sussex (total)	5,478	789	274	26
Cape Henlopen	834	86	42	–
Delmar	360	55	18	–
Indian River	[illegible],642	337	81	–
Laurel	458	100	22	–
Milford**	940	51	48	–
Seaford	841	110	42	–
Woodbridge	403	50	20	–

* Includes students attending the vo-techs part-time.
† District numbers may not sum to the county total due to rounding.
** Net units in Milford reflect total number of students attending both vo-techs.

The base-year calculations show that enrollment in the home districts in Kent County generated 299 funding units, while enrollment in Sussex County generated 274 funding units.

Three districts, Caesar Rodney and Capital districts in Kent County and Indian River district in Sussex County, each were entitled to 80 or more funding units; and two districts, Delmar and Woodbridge districts in Sussex County, each were entitled to 20 units or less. Kent Vo-tech was entitled to 24 vocational units, while Sussex Vo-tech was entitled to 26 vocational funding units.[10]

Simulation 1: Effect of Full-time Vo-tech Enrollment on Sending Districts' Enrollment

The first simulation was designed to evaluate how local district enrollments would be affected as enrollments at the full-time vocational high schools increased. This model was run using student population estimates for the both the years 1990-91 and 1995-96 to see what impact enrollment growth at the secondary level would have on the distribution of units. For this model, full-time enrollment at each vo-tech facility was assumed to be 500 students in 1990-91, and alternately 500 and 1,000 students in 1995-96. Enrollment in the sending districts fluctuated according to the assumed enrollment at the vo-techs.

Table 3
Percentage of Vo-tech Enrollments from Each of the Sending Districts*

Kent Vo-tech	100%	Sussex Vo-tech	100%
Caesar Rodney	38	Cape Henlopen	11
Capital	18	Delmar	7
Lake Forest	14	Indian River	43
Milford	6	Laurel	13
Smyrna	23	Milford	6
		Seaford	14
		Woodbridge	6

* Percentages may not sum to 100 due to rounding.

[10] The distinction between vocational and regular funding units is important because they are reimbursed at different rates. A district receives one unit of funding for each 20 students it enrolls at the secondary level. In contrast, a district receives one vocational unit for each 15 FTE students it enrolls in a secondary vocational program.

To determine how a specified level of enrollment would be allocated among the several districts in each county, the percentage of vo-tech enrollments from each sending district was assumed to be constant over time. For example, students from the Caesar Rodney School District accounted for 38 percent of total Kent Vo-tech enrollments in 1988-89. Regardless of the total number of students assumed to be enrolled in Kent Vo-tech, Caesar Rodney district accounted for 38 percent of that enrollment. Table 3 shows the percentage of vo-tech students from each of the sending districts in 1988-89.

Table 4 summarizes the impact of full-time vo-tech enrollment on unit counts in the sending and in the vo-tech districts if enrollment were 500 FTE students in 1990-91, with Column 2 showing the total number of units generated by enrollments in the home districts. The unit count in the Milford district reflects the number of students in both vo-techs. Column 3 shows the difference between the simulated unit count and the base-year unit count. In Kent County, the total number of units generated in the home districts is 284, which is 16 fewer units (5 percent less) than that generated in the base-year count. Kent Vo-tech sees an increase of 10 units (42 percent more) than its base-year allocation, from 24 to 33 units.[11] In Sussex County, conversion from shared-time to full-time vo-tech with 500 students enrolled results in a 10 unit decline (4 percent less) in the number of units allocated to the local districts, from 274 in 1988-89 to 264 units in 1990-91. The number of units generated at Sussex vo-tech increases by 7 (27 percent more), from 26 to 33 units.

The following two reasons explain why the increase in the number of units allocated to the vo-techs does not fully offset the decline in units generated in the local districts. Secondary enrollment declined by approximately 61 students in Kent County between 1988-89 and 1990-91; at an average rate of one funding unit per 20 students, representing a decline of three units. In addition, vocational units are funded at a higher rate than regular units (15 to one rather than 20 to one). The enrollment of only 500 students in each vo-tech is equivalent to a decline of

[11] Unit counts in Kent Vo-tech do not sum because of rounding.

215 vocational students in Kent County and of 289 vocational students in Sussex County. The decline in vocational enrollments represents a net savings to the state of four units in Kent County and five units in Sussex County (although some of these savings are offset in Sussex County by a slight increase in secondary enrollment).

Table 4
Units Generated in the Local and the Vo-tech Districts After Conversion to Full-time Vo-tech, 1990-91 (Simulation 1)

	1990-91 full-time vo-tech enrollment = 500			
County/ District (1)	Total units in sending districts (2)	Unit difference 1988-91 (3)	Units in vo-tech districts (4)	VT unit difference 1988-91 (5)
Kent (total)	282	-16	33	10
Caesar Rodney	76	-6	–	–
Capital	83	-3	–	–
Lake Forest	43	-2	–	–
Milford	46	-2	–	–
Smyrna	34	-4	–	–
Sussex (total)	264	-10	33	7
Cape Henlopen	42	-1	–	–
Delmar	17	-1	–	–
Indian River	77	-4	–	–
Laurel	21	-1	–	–
Milford	46	-2	–	–
Seaford	41	-1	–	–
Woodbridge	20	*	–	–

* Less than 1 unit.

Table 5 shows how the distribution of units in the local and vocational districts would be affected if full-time enrollment in the vocational districts were 500 or 1,000 students in 1995-96. Columns 2 through 5 show: (1) the units generated in the local districts if full-time vo-tech enrollment were 500 in each facility, (2) the difference between total units in 1988-89 and in 1995-96, (3) the total units generated in the vocational districts, and (4) the change this represents from 1988-89. Columns 2 and 3 show that if enrollment at full-time vo-tech schools were no more than 500 at each school, the growth of population between 1990-91 and 1995-96

mitigates most of the impact of converting from shared-time to full-time vo-tech in terms of unit distributions in the local districts. Three districts—Caesar Rodney and Smyrna districts in Kent County and Indian River district in Sussex County—lose one or more units as a result of the conversion to full-time, but the remaining districts either hold steady or gain slightly over their base-year unit allocations.

Table 5
Units Generated in the Local and Vo-tech Districts After Conversion to Full-time Vo-tech, 1995-96 (Simulation 1)

	1995-96 full-time vo-tech enrollment = 500				1995-96 full-time vo-tech enrollment = 1,000			
County/ District (1)	Total units in sending districts† (2)	Unit difference 1988-91† (3)	Units in vo-tech districts (4)	VT unit difference 1988-91 (5)	Total units in sending districts† (6)	Unit difference 1988-91† (7)	Units in vo-tech districts (8)	VT unit difference 1988-91 (9)
Kent (total)	297	-3	33	10	270	-29	67	43
Caesar Rodney	80	-2	–	–	70	-11	–	–
Capital	87	1	–	–	83	-4	–	–
Lake Forest	45	*	–	–	42	-4	–	–
Milford	48	*	–	–	45	-3	–	–
Smyrna	36	-2	–	–	30	-7	–	–
Sussex (total)	273	-1	33	7	247	-27	67	40
Cape Henlopen	43	1	–	–	40	-2	–	–
Delmar	18	*	–	–	16	-2	–	–
Indian River	79	-1	–	–	68	-12	–	–
Laurel	22	*	–	–	19	-4	–	–
Milford	48	*	–	–	45	-3	–	–
Seaford	43	*	–	–	39	-3	–	–
Woodbridge	20	*	–	–	19	-1	–	–

* Less than 1 unit.
† District unit counts may not sum to the county total due to rounding.

In contrast, an increase in vocational enrollment at the vo-techs from 500 to 1,000 students in 1995-96 produces not only more units overall (because of the higher rate of funding for vocational education) but also produces a substantial redistribution of units from the local to the vocational districts (Table 5). In the aggregate, the local districts in Kent County would lose 29 units (10 percent decrease), and the local districts in Sussex County would lose 27 units (10

percent decrease). If 1,000 full-time students were enrolled in each vo-tech facility, the increase in the number of units at the vo-tech would more than offset the decline in total number of units in the local districts: Kent Vo-tech would gain 43 units (179 percent increase) totaling 67, and Sussex Vo-tech would gain 40 units (154 percent increase) totaling 67. Capacity enrollment in the vo-techs, provided the same proportion of vo-tech enrollment were derived from each district as in the base-year, means that the enrollments in three of the local districts in Sussex County generate less than 20 units and that Delmar—the smallest district—would be allocated only 16 units. Thus, with 1,000 students enrolled at each full-time school, population growth in Kent and in Sussex counties would not be sufficient to compensate the local districts for their enrollment losses to the full-time vo-tech facility.

Simulation 2: Impact of Population Growth on the Size of Vo-tech Enrollments

The second simulation of full-time vo-tech examines how enrollments in the vocational high schools shift as the population of the counties change. For this model, the percentage of students from each home school attending the vo-tech was held constant. For example, approximately 15 percent of the secondary students in Delmar district attended the Sussex Vo-tech in 1988-89. This same proportion of Delmar students was assumed to be attending the Sussex Vo-tech in 1990-91 and in 1995-96. Table 6 shows the percentage of students from each local district attending the county vo-tech school.

Table 6
Percentage of Students from Each
Sending District Attending the Vo-tech

Kent County (average)	12%	Sussex County (average)	14%
Caesar Rodney	17	Cape Henlopen	10
Capital	8	Delmar	15
Lake Forest	11	Indian River	21
Milford	4	Laurel	22
Smyrna	22	Milford	5
		Seaford	13
		Woodbridge	12

Two variants of this model—differing in their assumptions about population growth—were run. In Simulation 2a, changes in student population occurred districtwide and were proportionate to each district's share of total enrollment. In Simulation 2b, growth in the student population between 1990-91 and 1995-96 was concentrated in specific districts, with no changes occurring in other districts' enrollments. Thus, in Simulation 2b, all growth in the student population was assumed to be in the Caesar Rodney and Capital districts in Kent County, and in the Indian River and Cape Henlopen districts in Sussex County. Increases in the population of these districts were in proportion to the enrollment in each district. Simulation 2a was run for 1990-91 and for 1995-96; Simulation 2b was only run for 1995-96.

Table 7 shows the actual 1988-89 vo-tech enrollment, the projected enrollment for 1990-91 and 1995-96 due to increases in the population, and the percentage change these projections represent over the base year. Based on trends in the population projections, the vo-tech enrollments in Kent County initially decline between 1988-89 and 1990-91 by approximately 1 percent, and then they grow at a moderate rate of approximately 5 percent between 1990-91 and 1995-96. Thus, overall growth in the population of vo-tech students is approximately 4 percent during this period. The overall rate of growth is similar in Sussex County, although growth between 1990-91 and 1995-96 is slower in Sussex than in Kent County.

Table 7
Vo-tech Enrollment in 1990-91 and 1995-96
and Percentage Change Over Time

County/ District (1)	Actual 1988-89 VT enroll (2)	Projected 1990-91 VT enroll (3)	% change vocational enroll (4)	Projected 1995-96 VT enroll (5)	% change vocational enroll (6)
Kent (total)	715	707	-1%	741	4%
Caesar Rodney	274	271	-1	284	4
Capital	130	128	-2	135	4
Lake Forest	103	102	-1	107	4
Milford	41	41	NC	43	5
Smyrna	167	165	-1	173	4
Sussex (total)	789	798	1	822	4
Cape Henlopen	86	87	1	90	4
Delmar	55	56	2	57	4
Indian River	337	341	1	351	4
Laurel	100	101	1	104	4
Milford	51	51	NC	53	5
Seaford	110	111	1	115	5
Woodbridge	50	51	2	52	4

NC = no change.

Assuming that the rate of growth (or decline) in the secondary population is the only factor causing changes in the level of enrollment, the effect of converting from shared-time to full-time vo-tech drives the redistribution of funding units (Table 8). The population change is too small to have a very powerful impact. If all students enrolled in the vo-techs in 1990-91 were enrolled full-time, the local districts in Kent County would lose 28 funding units (9 percent decrease), and the local districts in Sussex County would lose 25 funding units (9 percent decrease). These losses are concentrated in the Caesar Rodney (–10 units or 12 percent less) and Smyrna districts (–6 units or 16 percent less) in Kent County and in the Indian River district (–10 units or 12 percent less) in Sussex County. In contrast, the vo-techs would approximately double their unit count because their enrollment would increase from half-time to full-time (Columns 4 and 5).

Table 8
Effect of Population Growth on Enrollment in the Full-time Vo-techs, 1990-91 and 1995-96 (Simulation 2a)

County/ District (1)	FT vo-tech 1990-91				FT vo-tech 1995-96			
	Total units in sending districts† (2)	Unit difference 1988-91† (3)	Units in vo-tech districts (4)	VT unit difference 1988-91 (5)	Total units in sending districts† (6)	Unit difference 1988-96† (7)	Units in vo-tech districts (8)	VT unit difference 1988-96 (9)
Kent (total)	271	-28	47	23	283	-16	49	26
Caesar Rodney	72	-10	–	–	75	-7	–	–
Capital	81	-5	–	–	85	-1	–	–
Lake Forest	42	-4	–	–	44	-2	–	–
Milford	45	-3	–	–	46	-1	–	–
Smyrna	32	-6	–	–	33	-4	–	–
Sussex (total)	248	-25	53	27	256	-18	55	28
Cape Henlopen	40	-2	–	–	41	-1	–	–
Delmar	16	-2	–	–	17	-1	–	–
Indian River	70	-10	–	–	72	-8	–	–
Laurel	19	-3	–	–	20	-3	–	–
Milford	45	-3	–	–	46	-1	–	–
Seaford	39	-3	–	–	40	-2	–	–
Woodbridge	19	-1	–	–	19	-1	–	–

† District unit counts may not sum to county totals due to rounding.

Projecting to 1995-96, the increase in the secondary population would mitigate somewhat the effects of conversion from shared- to full-time vo-tech on the home school districts: local districts in Kent County would lose a total of 16 units (5 percent less), and local districts in Sussex County would lose a total of 18 units (7 percent less). Again, these losses are concentrated in a small number of districts, but the effects are proportionally smaller. The vo-tech districts realize slightly larger total unit allocations due to the growth in the secondary population. Growth in the vo-tech districts substantially offsets the total decline in units in the home districts.

Although the projected change in the population of secondary students in Kent and Sussex counties is small, the effect of these changes could be quite significant if they are concentrated in only a few districts. Simulation 2b is based on the assumption that all growth in

Kent County is concentrated in the Caesar Rodney and Capital school districts and that all growth in Sussex County is concentrated in the eastern districts—Cape Henlopen and Indian River. Column 2 in Table 9 shows how this assumption affects the distribution of the secondary population in Kent and Sussex counties in 1995-96. For that year, total enrollment was held constant. Column 3 shows the effect of this concentrated population growth on enrollment in the vo-techs: Kent Vo-tech would enroll one less student and Sussex Vo-tech would enroll five more students—a difference too small to have much of an effect on the number of units allocated to the vo-techs. Likewise, the lack of growth in most districts, given the assumptions about population and the proportion of students attending the vo-techs from each district, does not significantly alter the impact of full-time enrollment on those districts. The real impact, as one would expect, is on the growing districts, which lose substantially fewer units than when growth was spread districtwide. In fact, two districts—Capital and Cape Henlopen—would actually be allocated more units in 1995-96 than in the base year because these districts would see substantial growth in enrollments. However, they have a relatively small proportion of their students attending the vo-techs. Both the Caesar Rodney and Indian River school districts have many students attending the vo-techs; as a result, they would still lose enrollment relative to the base year. However, the unit impact of conversion from shared- to full-time vo-tech is relatively small: –4 units (5 percent less) in the Caesar Rodney district and –6 units (7 percent less) in the Indian River district (two units less than each district would lose if the population growth were spread districtwide).

Table 9
Effect of Population Growth on Enrollment in the Full-time Vo-techs if Growth is Concentrated in Few Districts (Simulation 2b)

County/ District (1)	Projected sending dist. enroll 1995-96† (2)	Projected vo-tech enroll 1995-96 (3)	Net units in sending districts 1995-96†† (4)	Net unit difference 1988-96†† (5)	Units in vo-tech districts 1995-96 (6)	VT unit difference 1988-96 (7)
Kent (total)	5,416	740	284	-15	49	26
Caesar Rodney	1,465	293	78	-4	–	–
Capital	1,670	140	88	2	–	–
Lake Forest	788	102	42	-4	–	–
Milford	847	41	45	-3	–	–
Smyrna	594	165	32	-6	–	–
Sussex (total)	4,877	827	256	-18	55	29
Cape Henlopen	808	93	43	*	–	–
Delmar	308	56	16	-2	–	–
Indian River	1,412	365	75	-6	–	–
Laurel	362	101	19	-3	–	–
Milford	847	51	45	-3	–	–
Seaford	740	111	39	-3	–	–
Woodbridge	357	51	19	-1	–	–

* Less than 1 unit.
† Excludes students enrolled in the vo-tech districts.
†† District unit counts may not sum to county totals due to rounding.

Simulation 3: Projection of the Proportion of Home District Enrollment Necessary to Produce Capacity Enrollment in the Vo-techs

The third and final simulation, Simulation 3, which examines how the proportion of students from each sending district attending the vo-tech would have to change to produce capacity enrollments at each vo-tech, is a modification of Simulation 2. Simulation 3 was run using only 1995-96 student population estimates.

The proportion of students attending the vo-tech from each district was increased in this model to produce an approximate enrollment of 1,000 students in each vo-tech in 1995-96 (Column 2, Table 10). In general, the proportion of students attending the vo-tech from each district was increased compared with the proportion of students attending the vo-tech in 1988-89. However, none of the sending districts was allowed to lose more than 22 percent of its

total enrollment to the vo-tech (the highest percentage of home district enrollment actually enrolled in the vo-tech in 1988-89). This constraint meant that some of the districts (primarily Cape Henlopen and Milford) had to show greater than proportional increases to produce capacity enrollment in the Sussex Vo-tech.

At projected 1995-96 enrollment levels of 1,000 students, Kent Vo-tech would have to enroll 16 percent of the all secondary students in the county and Sussex Vo-tech would have to enroll 17 percent of these students to generate capacity enrollments. This level of enrollment would generate an additional 43 units (179 percent more) for Kent Vo-tech over the base-year allocation, and would result in an aggregate loss of 32 units (11 percent less) to the local districts in Kent County. Sussex Vo-tech would gain 40 units (154 percent more) over the base year, and the local districts in Sussex County would lose 27 units (10 percent less). Given the existing pattern of attendance at the vo-tech by students in the districts and the assumed limit on local district enrollment losses to the vo-techs (22 percent), the unit losses would be spread relatively evenly across the local districts.

Table 10
Percentage of Local District Enrollment Required to Produce Capacity Enrollment in the Vo-techs, Given 1995-96 Enrollment (Simulation 3)

County/ District (1)	Percent of district enroll 1995-96 (2)	Projected vo-tech enroll 1995-96 (3)	Net units in sending districts 1995-96 (4)	Net unit difference 1988-96 (5)	Units in vo-tech districts 1995-96 (6)	VT unit difference 1988-96 (7)
Total	16%	999	267	-32	67	43
Caesar Rodney	21	358	72	-10	–	–
Capital	15	262	79	-8	–	–
Lake Forest	18	163	41	-5	–	–
Milford	5	49	43	-5	–	–
Smyrna	21	167	33	-4	–	–
Total	17%	1,000	247	-27	67	40
Cape Henlopen	16	139	39	-4	–	–
Delmar	18	68	16	-2	–	–
Indian River	21	359	72	-9	–	–
Laurel	22	105	20	-3	–	–
Milford	12	117	43	-5	–	–
Seaford	17	149	39	-4	–	–
Woodbridge	15	63	19	-1	–	–

Summary of Simulations

The preceding simulations show that conversion from a shared-time to a full-time service delivery model for the vocational districts could have a significant impact on the number of regular funding units allocated to the local school districts. If the vocational high schools were to convert from shared-time to full-time in 1990-91 and were to enroll 500 students each, the local districts in Sussex County would lose a total of ten units. In addition, the local districts in Kent County would lose 16 units relative to the base-year allocation, with some of this loss caused by a decline in the size of the secondary student population in Kent County. Kent Vo-tech would realize a ten unit funding increase, and Sussex Vo-tech would gain seven units over their base-year allocation.

If the full-time vo-techs were still enrolling only 500 students in 1995-96, the growth of the secondary student population would largely offset the unit losses experienced by the local districts. Local districts in Kent County would lose a total of three units and in Sussex County a total of one unit over their base-year allocation. Kent Vo-tech would realize a ten unit funding increase, and Sussex Vo-tech would gain seven units over their base-year allocation. However, if the vo-techs were to achieve their estimated capacity enrollment of 1,000 students by 1995-96, the unit gains for the vo-techs and the unit losses to the home districts would be more dramatic. The local districts in Kent County would lose a total of 29 units from their base-year allocation, while those in Sussex County would lose 27 units. Both the Kent and the Sussex vo-techs would receive 67 funding units—a 43 unit increase over their base-year allocation in Kent County and a 40 unit increase in Sussex County.

Simulation 2 shows that even with projected population increases through 1995-96, the current proportion of students in each district opting to attend the county vo-tech would not produce capacity enrollment in the vo-techs. Given the existing patterns of participation in the vocational high schools and assuming that the current proportion of students from each local district chose the full-time alternative, Kent Vo-tech would enroll 707 students in 1990-91 and 741 students in 1995-96. Sussex Vo-tech would enroll 798 students in 1990-91 and 822 students in 1995-96.

Currently, Kent Vo-tech serves 12 percent of the secondary students, and Sussex serves 14 percent in their respective counties. Given the population projections for Kent and Sussex counties, the proportion of students attending the vo-tech in Kent County would have to increase to 16 percent of all secondary students and the proportion of students attending the vo-tech in Sussex County would have to increase to 17 percent if these facilities are to be filled to their estimated capacity in 1995-96.

Implications of Shifts in Unit Funding

The unit funding system in Delaware provides resources to school districts based on the number of units their enrollment generates. Because the simulations focus only on secondary students, the implications of shifts in the distribution of units for districts is difficult to specify. Moreover, while these simulations are suggestive of the funding implications for all secondary schools, districts can protect a school from the full repercussion of an enrollment loss at that educational level. With that caveat, we review the possible implications of the shifts in the distribution of funding units for the different school districts based on capacity enrollment in the vo-tech in 1995-96 (Simulation 1).

The funding formula provides one teacher for each funding unit; therefore, a school loses one teacher for each funding unit that is lost. This part of the formula will affect every local district in Kent and Sussex counties. Every district loses at least one unit when enrollment in the full-time vo-techs approaches capacity. In fiscal year 1989, each Division I funding unit is worth $21,832 for the state share of teacher salaries, plus an additional $7,550 for insurance and benefits.

In addition to the funding for teachers, districts receive funding for other staff at specified unit levels over and above the teacher allocation. Each school with 15 or more units is entitled to a principal. None of the districts drops below this unit level with only its secondary enrollment considered, although the Delmar district is close (16 units in 1995-96). Districts are entitled to an assistant principal for each of the additional 20 units over the first 15. Several districts could be affected by this formula—Caesar Rodney, Smyrna, and Indian River—because a school would lose an assistant principal if their unit count fell below 35, 55, or 75 due to the transition from shared- to full-time vo-tech.

School districts are entitled to a nurse for each of the 40 funding units, and the Caesar Rodney, Indian River, and Seaford districts could fall below the 40 or 80 unit levels as a result

of conversion to full-time vo-tech. In addition, a district is entitled to one clerical staff per ten units for the first 100 units, and one clerical staff for each 12 units thereafter. Several schools—Caesar Rodney, Indian River, Laurel, Seaford, and Woodbridge—could lose clerical positions if the vo-tech facilities convert to full-time and enroll their full capacity of students. Finally, because both basic skills and gifted and talented units are allocated on a fractional unit basis, schools could lose these units in proportion to the number of students lost. Table 11 summarizes the staffing implications of changes in the distribution of units caused by conversion from shared- to full-time vo-tech.

While many of the local school districts in Kent and Sussex counties could lose staff positions, the vo-tech facilities would gain staff positions (Table 11). Furthermore, because of the way the funding system treats vocational and regular funding units, the total number of staff positions available in the counties increases as the proportion of vocational units to regular units rises. Thus, if converting from shared-time to full-time vocational education increases total vocational enrollment, the total number of staff positions will be higher for the same aggregate level of enrollment in each county. Assuming that the vocational districts reach their projected capacity enrollment of 1,000 students, each vo-tech would gain two assistant principals, a full-time nurse, four more clerical positions, and approximately 40 teachers.

Table 11
Staffing Implications of Capacity Vo-tech Enrollment for School Districts in Kent and Sussex Counties, 1995-96

District (1)	Unit Difference 1988-96 (2)	Changes in number of staff: Teachers (3)	Ass't. principals (4)	Nurses (5)	Clerical (6)
Caesar Rodney	-11	-11	-1	-1	-1
Capital	-4	-4	NC	NC	NC
Lake Forest	-4	-4	NC	NC	NC
Milford	-3	-3	NC	NC	NC
Smyrna	-7	-7	-1	NC	NC
Cape Henlopen	-2	-2	NC	NC	NC
Delmar	-2	-2	NC	NC	NC
Indian River	-12	-12	-1	-1	-2
Laurel	-4	-4	NC	NC	-1
Seaford	-3	-3	NC	-1	-1
Woodbridge	-1	-1	NC	NC	-1
Kent Vo-tech	43	43	2	1	4
Sussex Vo-tech	40	40	2	1	4

NC = no change.

IV. CONCLUSION

Should Delaware attempt to maintain its shared-time area vocational schools, or should these schools be converted to full-time vocational high schools? As has been demonstrated in other states, either approach offers an effective means of providing high-quality vocational education. Both have advantages and disadvantages, and neither is inherently superior. Shared-time schools are an economical way to offer more advanced, more specialized, and more capital intensive courses to the greatest number of students. When properly designed, they can provide substantial flexibility for students, who can attend for as little as a semester or for as long as four years. They can easily accommodate adults and programs that consciously mix adults and high school students in the same classrooms to better motivate students and reduce discipline problems. On the other hand, area schools significantly increase the amount of time

students must spend in transit, which complicates scheduling and divides students' identities between two schools. They may also impede participation in extracurricular activities.

Full-time vocational high schools increase opportunities for better integrating academic and vocational education and for improving communication among academic and vocational teachers. Opportunities for team teaching may also be fully developed. Full-time schools reduce transportation time and can generally create a stronger school culture, pedagogically as well as socially. On the other hand, they require duplication of athletic facilities, auditoriums, libraries, and other facilities that are not needed in a shared-time school. They are not as flexible in accommodating the desires of students for different levels of participation in vocational education, and they generally cannot include adults in daytime programs.

For many reasons, shared-time schools are not now working effectively in Delaware. As we described in Section II, there are a number of steps the state could take to make them work better. Whether or not such steps are feasible in Delaware is best determined by state and local policymakers. If these steps cannot be taken, however, we are doubtful that the quality of shared-time schools will improve. Indeed, we doubt whether they can survive at all and believe that continued inaction is tantamount to a decision to close these schools entirely. Without forceful state action, enrollments almost certainly will continue to decline, and it will no longer be possible to offer an effective range of programs.

Conversion to full-time, however, is not a guaranteed improvement. We believe that conversion offers the state some exciting opportunities to improve both vocational and academic education for high school students. Conversion is a chance to develop model schools that can help to improve secondary education statewide. However, if these opportunities are to be realized, the state must forcefully articulate a vision that promotes integration of academics and vocational education and that encourages innovation in physical design, curriculum, and

methods of teaching. Otherwise, conversion will do little more than simply move students around to eliminate transportation and scheduling inconveniences.

It is important to recognize that the decision is not much influenced by costs or even impacts on the comprehensive districts. Restoring shared-time schools to an acceptable level of effectiveness is likely to cost no less and possibly more than conversion to full-time. Similarly, enrollments must be increased if these shared-time schools are to operate efficiently and are to provide an acceptable range of programming. Hence, improving shared-time operations will produce enrollment declines in the sending districts that may not be much less than the declines produced by conversion.

In the final analysis, the choice boils down to whether or not the state is able to assume a much higher profile in solving the problems now plaguing shared-time schools or whether or not the state desires to use conversion to begin a bold new initiative to improve secondary education in Delaware. Either course promises to benefit students, but each will require strong and steady state leadership.

APPENDIX

District Name	1989 Enrollment	Regular Funding	Vocational Units Home School	0.5 Vocational Deduct	Total Units in Home Districts	Vocational Units Kent Vo-Tech	1989 Vo-tech Enrollment
Caesar Rodney	1,646	82	8	9	82	9	274
Capital	1,685	84	8	6	86	4	130
Lake Forest	901	45	5	4	46	3	103
Milford	940	47	5	4	48	1	41
Smyrna	768	38	4	5	38	6	167
Total	5,940	297	30	28	299	24	715

District Name	1989 Enrollment	Regular Funding	Vocational Units Home School	0.5 Vocational Deduct	Total Units in Home Districts	Vocational Units Kent Vo-Tech	1989 Vo-tech Enrollment
Cape Henlopen	834	42	4	4	42	3	86
Delmar	360	18	2	2	18	2	55
Indian River	1,642	82	8	10	81	11	337
Laurel	458	23	2	3	22	3	100
Milford	940	47	5	4	48	2	51
Seaford	841	42	4	4	42	4	110
Woodbridge	403	20	2	2	20	2	50
Total	5,478	274	27	28	274	26	789

KENT COUNTY SIMULATIONS

Enrollment Projections for Kent County

District Name	1988-89*	1989-90†	1990-91†	1995-96†	2000-01†
Caesar Rodney	1,646	1,626	1,626	1,705	1,833
Capital	1,685	1,665	1,665	1,746	1,877
Lake Forest	901	890	890	933	1,004
Milford	940	939	939	976	1,063
Smyrna	768	759	759	796	855
Total	5,940	5,879	5,879	6,156	6,632

* Actual
† Projected

SIMULATION 1

Simulation 1 is based on the assumption that the proportion of vo-tech enrollment from each district is unchanged. Total vo-tech enrollment is set.

District Name	Percentage of vo-tech enrollment from each district	Model 1: 1990-91 vo-tech enrollment = 500				Model 1: 1990-91 vo-tech enrollment = 1,000			
		Shared time vo-tech		Full-time vo-tech		Shared time vo-tech		Full-time vo-tech	
		Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	38.32%	82.19	6.39	76.18	12.77	78.99	12.77	66.22	25.55
Capital	18.18%	85.89	3.03	82.86	6.06	84.37	6.06	78.31	12.12
Lake Forest	14.41%	45.54	2.40	43.13	4.80	44.34	4.80	39.53	9.60
Milford	5.73%	48.28	0.96	46.25	1.91	47.26	1.91	43.20	3.82
Smyrna	23.36%	37.89	3.89	34.00	7.79	35.94	7.79	28.16	15.57
Total	100.00%	299.78	16.67	282.04	33.33	290.91	33.33	255.42	66.67

District Name	Percentage of vo-tech enrollment from each district	Model 1: 1995-96 vo-tech enrollment = 500				Model 1: 1995-96 vo-tech enrollment = 1,000			
		Shared Time Vo-tech		Full-time vo-tech		Shared Time Vo-tech		Full-time vo-tech	
		Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	38.32%	86.33	6.39	79.94	12.77	83.13	12.77	70.36	25.55
Capital	18.18%	90.13	3.03	87.10	6.06	88.61	6.06	82.55	12.12
Lake Forest	14.41%	47.80	2.40	45.40	4.80	46.60	4.80	41.80	9.60
Milford	5.73%	50.22	0.96	48.19	1.91	49.21	1.91	45.14	3.82
Smyrna	23.36%	39.82	3.89	35.93	7.79	37.80	7.79	30.09	15.57
Total	100.00%	314.30	16.67	296.56	33.33	305.45	33.33	269.94	66.67

SIMULATION 2

Simulation 2a is based on the assumption that the proportion of district enrollments attending the vo-tech is unchanged. Change is a result of population growth. Simulation 2b is a variation on the population growth assumptions: all growth takes place in the Caesar Rodney and Capital school districts.

District Name	Percentage of district enrollment in Kent Vo-tech	Model 2a: Same % 1990-91 district enrollment in VT as current					Model 2a: Same % 1995-96 district enrollment in VT as current				
		Kent Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech		Kent Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
			Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT		Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	17%	271	80.87	9.02	71.84	18.05	284	84.79	9.46	75.33	18.92
Capital	8%	128	85.26	4.28	80.98	8.56	135	89.40	4.49	84.91	8.98
Lake Forest	11%	102	45.04	3.39	41.65	6.78	107	47.22	3.56	43.67	7.11
Milford	4%	41	47.77	1.37	44.70	2.73	43	49.65	1.42	46.41	2.84
Smyrna	22%	165	37.09	5.50	31.59	11.00	173	38.89	5.77	33.12	11.53
Total	12%	707	296.02	23.56	270.76	47.13	741	309.94	24.69	283.48	49.39

District Name	1995-96 District Enrollment Assumptions	Model 2b: % of 1995-96 district enrollment in VT is same as current					
		% District Enrollment in Vo-Tech	Kent Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	1,758	17%	293	87.42	9.75	77.66	19.51
Capital	1,810	8%	140	92.70	4.65	88.04	9.31
Lake Forest	890	11%	102	45.03	3.39	41.64	6.78
Milford	939	4%	41	47.77	1.37	44.70	2.73
Smyrna	759	22%	165	37.10	5.50	31.60	11.00
Total	6,156	12%	740	310.01	24.67	283.64	49.34

SIMULATION 3

Simulation 3 is based on Simulation 2—the level of enrollment is not assumed but fluctuates with population and with the percentage of students from the home districts attending the vo-tech—but the percentage of students from each of the home districts attending the vo-tech is adjusted to produce capacity enrollment in Kent Vo-tech.

District Name	1995-96 District Enrollment Assumptions	Model 3a: 1995-96 district enrollment adjusted to produce capacity in vo-tech					
		% District Enrollment in Vo-Tech	Kent Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	1,705	21.00%	358	83.55	11.94	71.62	23.87
Capital	1,746	15.00%	262	87.28	8.73	78.55	17.46
Lake Forest	933	17.50%	163	46.28	5.44	40.83	10.89
Milford	976	5.00%	49	48.47	1.63	42.94	3.25
Smyrna	796	21.00%	167	38.98	5.57	33.41	11.14
Total	6,156	16.23%	999	304.57	33.30	267.36	66.61

Simulation 3b differs from Simulation 3a because all growth is assumed to be in the Caeser Rodney and Capital school districts.

District Name	1995-96 District Enrollment Assumptions	Model 3b: 1995-96 district enrollment adjusted to produce capacity in vo-tech					
		% District Enrollment in Vo-Tech	Kent Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Caesar Rodney	1,758	21.00%	369	86.14	12.31	73.84	24.61
Capital	1,810	15.00%	272	90.50	9.05	81.45	18.10
Lake Forest	890	17.00%	151	44.20	5.04	39.16	10.09
Milford	939	5.00%	47	46.64	1.57	41.32	3.13
Smyrna	759	21.00%	159	37.19	5.31	31.88	10.63
Total	6,156	16.23%	998	304.67	33.28	267.64	66.55

SUSSEX COUNTY SIMULATIONS

	1988*	1989†	1990†	1995†	2000†
Cape Henlopen	834	844	844	869	959
Delmar	360	364	364	375	414
Indian River	1,642	1,662	1,662	1,711	1,888
Laurel	458	463	463	477	527
Milford	940	939	939	976	1,063
Seaford	841	851	851	876	967
Woodbridge	403	408	408	420	463
Total	5,478	5,531	5,531	5,704	6,280

*Actual. † Projected.

SIMULATION 1

Simulation 1 is based on the assumption that the proportion of vo-tech enrollment from each district is unchanged. Total vo-tech enrollment is set.

District Name	Percentage of vo-tech enrollment from each district	Model 1: 1990-91 Vo-Tech Enrollment = 500				Model 1: 1990-91 Vo-Tech Enrollment = 1,000			
		Shared time vo-tech		Full-time vo-tech		Shared time vo-tech		Full-time vo-tech	
		Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT
Cape Henlopen	10.90%	43.40	1.82	41.58	3.63	42.49	3.63	38.86	7.27
Delmar	6.97%	18.55	1.16	17.38	2.32	17.96	2.32	15.64	4.65
Indian River	42.71%	83.68	7.12	76.56	14.24	80.12	14.24	65.88	28.47
Laurel	12.67%	23.28	2.11	21.16	4.22	22.22	4.22	18.00	8.45
Milford	6.46%	48.28	1.08	46.25	2.15	47.26	2.15	43.20	4.31
Seaford	13.94%	43.52	2.32	41.20	4.65	42.36	4.65	37.71	9.29
Woodbridge	6.34%	20.88	1.06	19.83	2.11	20.35	2.11	18.24	4.22
Total	100.00%	281.58	16.67	263.96	33.33	272.77	33.33	237.53	66.67

District Name	Percentage of vo-tech enrollment from each district	Model 1: 1995-96 Vo-Tech Enrollment = 500				Model 1: 1995-96 Vo-Tech Enrollment = 1,000			
		Shared time vo-tech		Full-time vo-tech		Shared time vo-tech		Full-time vo-tech	
		Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT
Cape Henlopen	10.90%	44.71	1.82	42.90	3.63	43.80	3.63	40.17	7.27
Delmar	6.97%	19.11	1.16	17.95	2.32	18.53	2.32	16.21	4.65
Indian River	42.71%	86.26	7.12	79.14	14.24	82.70	14.24	68.46	28.47
Laurel	12.67%	24.00	2.11	21.88	4.22	22.94	4.22	18.72	8.45
Milford	6.46%	50.22	1.08	48.19	2.15	49.21	2.15	45.14	4.31
Seaford	13.94%	44.84	2.32	42.52	4.65	43.68	4.65	39.03	9.29
Woodbridge	6.34%	21.52	1.06	20.46	2.11	20.99	2.11	18.88	4.22
Total	100.00%	290.66	16.67	273.04	33.33	281.85	33.33	246.60	66.67

SIMULATION 2

Simulation 2a is based on the assumption that the proportion of district enrollments attending the vo-tech is unchanged. Change is a result of population growth. Simulation 2b is a variation on the population growth assumptions: all growth takes place in the Indian River and Cape Henlopen school districts.

District Name	Percentage of district enrollment in Sussex Vo-tech	Model 2a: Same % 1990-91 district enrollment in VT as current					Model 2a: Same % 1995-96 district enrollment in VT as current				
		Sussex Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech		Sussex Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
			Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT		Total Units Home School	Voc. Units Sussex VT	Total Units Home School	Voc. Units Sussex VT
Cape Henlopen	10.31%	87	42.86	2.90	39.96	5.80	90	44.13	2.99	41.14	5.97
Delmar	15.28%	56	18.20	1.86	16.34	3.71	57	18.74	1.91	16.83	3.82
Indian River	20.52%	341	81.55	11.37	70.19	22.74	351	83.97	11.70	72.26	23.41
Laurel	21.83%	101	22.65	3.37	19.27	6.75	104	23.32	3.47	19.84	6.95
Milford	5.43%	51	47.77	1.70	44.70	3.40	53	49.65	1.77	46.46	3.53
Seaford	13.08%	111	42.83	3.71	39.12	7.42	115	44.09	3.82	40.27	7.64
Woodbridge	12.41%	51	20.57	1.69	18.88	3.37	52	21.18	1.74	19.44	3.47
Total	14.40%	798	276.42	26.59	248.46	53.19	822	285.06	27.40	256.25	54.79

District Name	1995-96 District Enrollment Assumptions	Model 2b: Same % 1995-96 district enrollment in VT as current					
		% District Enrollment in Vo-tech	Sussex Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Cape Henlopen	901	10.31%	93	43.75	3.10	42.66	6.19
Delmar	364	15.28%	56	18.20	1.86	16.34	3.71
Indian River	1,777	20.52%	365	87.21	12.16	75.06	24.31
Laurel	463	21.83%	101	22.65	3.37	19.27	6.75
Milford	939	5.43%	51	47.77	1.70	44.70	3.40
Seaford	851	13.08%	111	42.83	3.71	39.12	7.42
Woodbridge	408	12.41%	51	20.57	1.69	18.88	3.37
Total	5,704	14.40%	827	284.94	27.58	256.00	55.16

SIMULATION 3

Simulation 3 is based on Simulation 2—the level of enrollment is not assumed but fluctuates with population and with the percentage of students from the home districts attending the vo-tech—but the percentage of students from each of the home districts attending the vo-tech is adjusted to produce capacity enrollment in Sussex Vo-tech.

District Name	1995-96 District Enrollment Assumptions	Model 3a: 1995-96 district enrollment adjusted to produce capacity in vo-tech					
		% District Enrollment in Vo-tech	Sussex Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Cape Henlopen	869	16.00%	139	43.30	4.63	38.67	9.27
Delmar	375	18.00%	68	18.57	2.25	16.32	4.50
Indian River	1,711	21.00%	359	83.83	11.98	71.85	23.95
Laurel	477	22.00%	105	23.30	3.50	19.80	7.00
Milford	976	12.00%	117	48.47	3.90	42.94	7.81
Seaford	876	17.00%	149	43.52	4.97	38.56	9.93
Woodbridge	420	15.00%	63	20.99	2.10	18.90	4.20
Total	5,704	17.29%	1,000	281.99	33.33	247.04	66.66

Simulation 3b differs from Simulation 3a because all growth is assumed to be in the Indian River and Cape Henlopen school districts.

District Name	1995-96 District Enrollment Assumptions	Model 3b: 1995-96 district enrollment adjusted to produce capacity in vo-tech					
		% District Enrollment in Vo-tech	Sussex Vo-Tech Enrollment	Shared time vo-tech		Full-time vo-tech	
				Total Units Home School	Voc. Units Kent VT	Total Units Home School	Voc. Units Kent VT
Cape Henlopen	901	16.00%	144	44.90	4.81	40.09	9.61
Delmar	364	18.00%	66	18.03	2.19	15.85	4.37
Indian River	1,777	21.00%	373	87.07	12.44	74.63	24.88
Laurel	463	21.00%	97	22.71	3.24	19.47	6.49
Milford	939	12.00%	113	46.64	3.76	41.32	7.51
Seaford	851	17.00%	145	42.27	4.82	37.45	9.65
Woodbridge	408	15.00%	61	20.39	2.04	18.35	4.08
Total	5,704	17.14%	999	281.98	33.29	247.13	66.58