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ABSTRACT

These three newsletter issues describe what pilot sites sponsored by the State Vocational Education Consortium are doing to improve the academic competencies for general and vocational students. The first issue summarizes the activities occurring in pilot sites, including establishing higher expectations for general and vocational students, reading for learning, academic and vocational teachers working together, guiding students through a program of study, and restructuring the large high school for students in vocational studies. The second issue examines three aspects of the 1990 National Assessment of Educational Progress data comparisons: black and white students, females and males, and high achieving and low achieving sites. Among the issues raised are the the following: the achievement gap between black and white students, significantly higher scores of female students in reading, significantly higher scores of male students in mathematics and science, and perceptions of students at low achieving sites that academic teachers are not interested in them. The third issue outlines the following findings about integrating academic and vocational education: (1) the quality of high school experiences had a major impact on students' achievement; (2) sites making the greatest gains in achievement had a core group of teachers who bonded together and focused their mission on the outcomes of reading, mathematics, and science, raised expectations for students, and had strong action-oriented leaders; and (3) a major effort to improve secondary schools should focus on a few outcome goals, have a focus at the school building level, and have strong state leadership. (YLB)

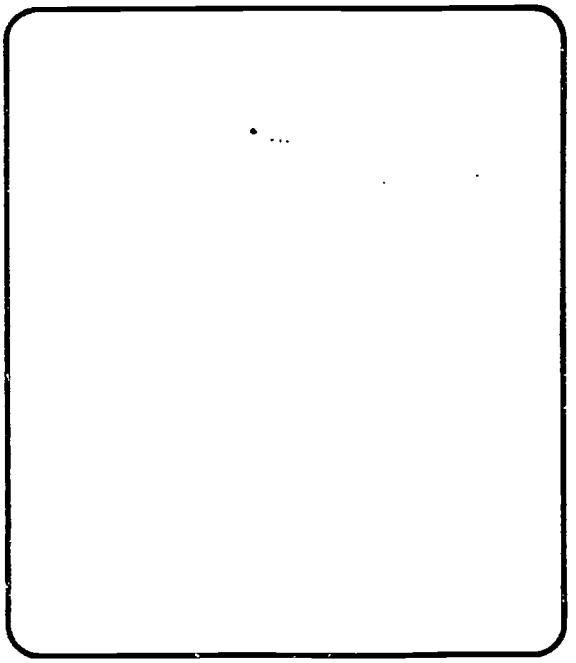
THE LINK

A NEWSLETTER ON ADVANCING THE ACADEMIC COMPETENCIES FOR GENERAL AND VOCATIONAL STUDENTS

Volume 1
Numbers 1-3

SREB-State Vocational Education Consortium

Linking Vocational and Academic Education



SREB-State Vocational Education Consortium

THE LINK

A NEWSLETTER ON ADVANCING THE ACADEMIC COMPETENCIES FOR GENERAL AND VOCATIONAL STUDENTS

Volume I, Number I *February, 1991*

Pilot Site Notes

This is the first of several newsletters that will describe what pilot sites are doing to improve the academic competencies for general and vocational students. This issue summarizes the activities occurring in pilot sites. Subsequent issues will each focus on a particular Consortium strategy being translated successfully into practices at the local level. Please share this newsletter with other teachers and administrators at your site and in your state.

Establishing Higher Expectations for General and Vocational Students

Developing and implementing a more structured and challenging program of study remains one of the primary ways pilot sites are seeking to raise expectations for students pursuing a vocational major in high school. For example, the school board in St. Mary's County, Maryland approved a Tech Prep plan in January to implement the Consortium's program of study plan. The Rockbridge, Virginia site eliminated the general track in fall 1990 and enrolled all students in either a college preparatory program or a double purpose program of study that meets Consortium requirements. The other two Virginia pilot sites are currently working on a program of study plan for fall 1991. In South Carolina, two of the pilot sites are implementing SREB's concept of a more rigorous program of study. An additional site is developing a program of study plan for implementation for fall 1991. In Alabama, the Phenix City Board of Education has adopted the notion of a double purpose Tech Prep program of study and has instructed the director of

The SREB-State Vocational Education Consortium represents an effort on the part of 15 states to strengthen the basic competencies of students enrolled in vocational education programs. Those states include Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia.

vocational education to move forward with a task force to develop proposed programs of study for each vocational area. The state of Alabama has just approved a high school diploma for students completing Tech Prep programs. The four pilot sites in Florida are in the process of developing programs of study for each job preparatory vocational program. In two sites, the district office is providing the leadership in developing programs of study for district-wide implementation. The state has developed sample programs of study to assist pilot sites with the process. A university in central Florida has been contacted to develop student, parent, and counselor materials on programs of study. Florida plans to field-test the program of study concept during the 1991-92 registration this month.

Louisiana pilot sites, Lafayette and Woodlawn, are using the SREB program of study concept as a basis for developing a Tech Prep program in cooperation with postsecondary vocational centers. The two Mississippi pilot sites, Canton and Pontotoc, are meeting this month to finalize a program of academic and vocational studies leading to both employment and postsecondary education. The four pilot sites in North Carolina, in cooperation with the state office of vocational education, have developed a position paper to assist each site in developing a four-year educational plan of study for implementation in the fall of 1991.

In Humphrey's County, Tennessee, counselors are creating a new awareness of specific course requirements for completing a vocational major. The pilot site in Randolph County, West Virginia, is using a previously developed program of study concept as a guide to help freshmen plan their high school course of study. Delaware has initiated a career program review process using a team of business representatives and instructors to assess the high standards required by industry in each career area. The curriculums have been upgraded to reflect these new, challenging standards.

SREB sites are also raising expectations by eliminating access to low level mathematics, science, and language arts courses and replacing them with courses designed to present higher level academic content through an applied process. The Muscle Shoals site in Alabama is continuing to reduce the number of low level courses offered, replacing them with Principles of Technology and Applied Mathematics. That system has eliminated all low level English classes and is considering adding a third mathematics requirement for graduation, beginning with the 1991 freshman class. The Phenix City, Alabama, site has also expanded sections of Principles of Technology. Florida reports that all their pilot sites reduced the number of low level mathematics and science classes in 1990-91. All sites reported reducing or eliminating General Mathematics II and III for eleventh and twelfth graders. One pilot site has also eliminated the general science offering for eleventh and twelfth graders. Principles of Technology is being introduced at the both sites in Louisiana. The Pontotoc pilot site in Mississippi put into place two applied mathematics classes in January to replace two general mathematics classes. Oklahoma sites have replaced general

math and science with applied academic courses. Comanche High School, part of the Red River pilot site, is increasing graduations requirements in mathematics and science and is making a special effort to enroll more vocational students in applied mathematics and principles of technology. It is also adding a semester course in applied communication. Memphis, Tennessee, has implemented mathematics for technology in eight high schools and applied communications in four schools. Applied mathematics has been implemented as an academic credit at Wheeling Park High School, West Virginia.

This year, several of the pilot sites including two feeder high schools in Memphis, Tennessee, and Cedartown High School, Georgia, are implementing applied biology and chemistry.

Some sites are articulating programs of study with postsecondary institutions. In some instances, such as in Humphrey's County, Tennessee, students are earning high school credits that will be applied to the postsecondary level. Other articulated programs of study are being developed in Oconee County, South Carolina; Hickman County, Tennessee; West Palm Beach, Florida; and in Lafayette and Woodlawn in Louisiana. These programs serve to encourage students to look ahead to postsecondary study. It may be time for all pilot sites to link programs of study to efforts at community colleges, postsecondary vo-tech schools, and/or technical institutes.

Wheeling Park High School in West Virginia is trying to raise student expectations by providing a study skills class to students pursuing a vocational major and having achieved below grade level. Vocational and academic instructors planned to use this class to help students develop strategies for becoming more successful in both academic and vocational studies.

Reading for Learning

Several sites are making special efforts to integrate instructional practices designed to advance students' reading for learning in both academic and vocational fields. most pilot sites are providing academic and vocational teachers with the necessary staff development to help them in this area.

The site in Muscle Shoals, Alabama, has established reading for learning as the staff development priority for this year and has planned an introductory workshop for January 1991. In Florida, three pilot sites are adapting the in-service model that has proven to be very effective at Apopka High School in assisting both academic and vocational teachers in reading and writing for learning in the content field. The Woodlawn site in Louisiana and one of the pilot sites in South Carolina are each providing a staff development program in this for academic and vocational teachers. In Claiborne County, Tennessee, Lincoln Memorial University offered academic and vocational teachers a class on reading in the content area in January. In the class, vocational teachers utilized an occupationally oriented text entitled, "Practicing Occupational Reading Skills

with Students in Their Classes." All students participated in reading activities that call attention to reading as it relates to success in the classroom and vocational area of study. Virginia pilot sites have already gone through a staff development program focusing on reading to learn. The program has helped teachers and students experience success in the classroom. The United Career Center in West Virginia provided a summer workshop focusing on teaching reading in the content area. A professor from VPI conducted that workshop for the entire vocational staff from the center and utilized examples of materials from vocational teachers' classes and strategies to get students to read and interpret technical materials.

Pilot sites are doing other things as well to advance students' reading and writing for learning. These include the following:

- Three teachers from Trigg County, Kentucky, are attending a writing workshop on integrating writing skills.

- In High Plains, Oklahoma, vocational teachers are being assisted in an effort to increase students' reading and comprehension of technical manuals by incorporating a reading anticipation guide and vocabulary emphasis into their instruction.

- The site in Hickman County, Tennessee, is making a special effort to emphasize reading in the vocational area by encouraging vocational teachers to increase homework assignments. Special computer software has been purchased and made available to help increase reading comprehension.

- English teachers in Pontotoc, Mississippi, are working with the health instructor to advance students' learning in their occupational field.

Academic and Vocational Teachers Working Together

Pilot sites are undertaking an array of activities which promote academic and vocational teachers working together to integrate their instruction. Several sites are making it possible for academic and vocational teachers to work in teams to prepare curriculum materials, to meet frequently for preparing joint lesson plans, to do tandem teaching, and to coordinate further the teaching of academic and vocational content. One of the Florida sites had 11 academic and vocational teachers participating in a two-week writing team project. For example, the materials they developed included mathematics labs relating to different vocational fields, activities incorporating reading strategies for vocational teachers, writing activities for all classrooms, general problem solving posters for all classrooms, lists of math and science words assisting teachers in using the same terminology, and research paper formats to be used school-wide. Another Florida pilot site had two teacher teams work in industry for two weeks. These teams then spent one week developing interdisciplinary curriculum activities based on that experience. In Gwinnett County, Georgia, a team of academic and vocational teachers met to adjust curriculums to meet the needs of potential vocational completers. In Trigg County, Kentucky, science and vocational teachers worked collaboratively to develop a handbook to assist students in writing reports related to

science. Three pilot sites in North Carolina are using special teacher teams to coordinate academic and vocational instruction--a horticulture and a science teacher in Hoke County; math and vocational teachers in Hoke, Greene, and Swain Counties; English and vocational teachers in Greene and Swain Counties. Several North Carolina sites have also established common planning periods for academic and vocational teachers. All three sites in South Carolina have academic and vocational teacher teams meeting together frequently to plan joint instructional activities. In Humphrey's County, Tennessee, academic and vocational teachers are having timely meetings, resulting in an increased awareness of common objectives and ways of pursuing cooperative measures to enhance students' achievement. Wheeling Park High School in West Virginia had math and vocational teachers participate in a joint workshop prior to the 1990-91 school year. Vocational and non-vocational department chairs continue to meet with administrators to communicate overall school goals for advancing the reading, mathematics, and science competencies of students pursuing a vocational major. At Mississippi's Pontotoc pilot site, vocational and academic teachers participated in a staff development day at the beginning of this school year to work together in determining what common basic competencies they would integrate into their course content in 1990-91.

Pilot sites are using a host of additional strategies to support vocational teachers and encourage them to integrate curriculums.

- Joint staff development activities are focusing on upgrading the academic content of vocational teachers and the applied learning strategies of academic teachers. (Gwinnett County and Cedartown, Georgia; High Plains, Oklahoma; Memphis, Tennessee.)

- To support the integration of academic and vocational curriculum areas, Red River ATVS in Oklahoma has held an academic skills contest involving feeder high schools. Students who participated could win either gold, silver, or bronze medals. This has emphasized the basic skills project.

- Three vocational technical high schools in New Castle County, Delaware have implemented a daily common planning period. This period provides a consistent time for academic and vocational instructors to gather for discussing, planning, and implementing integration projects.

- Two pilot sites in Oklahoma have developed a major tracking system to monitor basic competencies for students in grades 7-12. This will generate information for counselors, administrators, and teachers to help them plan a more challenging program of studies. The program will also flag at-risk students, track test scores, provide individual student profiles, keep transcript information, print grade cards, and maintain attendance records. The plan includes establishing a computer network so that information can be shared easily from school to school and with the area vocational center.

- West Virginia's United Career Center is increasing support to academic and vocational teachers by establishing a regular time to meet with multi-county superintendents, keeping them apprised of project activities and outcomes. They have also taken steps to establish a close working relationship with a major feeder high school in order to more effectively integrate academic and vocational instruction.

Guiding Students Through a Program of Study

Pilot sites have developed and are using several activities to assist students in planning an educational map that will help them achieve their future education and career goals. This year, Florida pilot sites will use teachers as program advisors to help students complete registration for the 1991-92 school year. To help teachers understand how to use the program of study in the registration process, in-service training will be provided to the faculty. Pilot site coordinators agree that this provides an excellent opportunity to give the faculty a better working knowledge of the vocational offerings and of related academic study needed for students to continue to learn after high school. Trigg County in Kentucky will administer a career aptitude/interest inventory to eighth, ninth, and tenth grade students to help them formulate career goals and to plan a program of studies to achieve those goals. In the future, this testing will be primarily done at the eighth grade level.

Hickman County, Tennessee, planned special field trips to help students see a connection between their high school studies and future employment. One trip included a visit to the Saturn plant and was designed to help students see the need for increased emphasis on mathematics and science. The Humphrey County, Tennessee, site is continuing to evaluate eighth graders and assist them in developing four-year plans. They are seeking to involve parents, teachers, and career specialists as a team to provide support to students in making decisions regarding their high school program of studies.

Each of the three sites in West Virginia is utilizing and refining a four-year program of study process. All students are being assisted during the spring of the eighth grade to develop a four-year program of study which can be revised at any time during high school. The Randolph County site has developed a special planning folder with 10 activities for students to do with guidance counselors or career instructors in the planning of their four-year program of study.

Pilot sites in Oklahoma are working diligently to see that vocational students are enrolled in the high level applied mathematics and principles of technology.

The Hodgson Vo-Tech High School in Delaware has initiated a senior studies manual project which requires all graduating seniors to develop a research report in their career studies area and to demonstrate and orally present findings, prior to graduation, to a panel of teacher advisors and advisory council members.

Restructuring the Large High School for Students in Vocational Studies

The 1990 NAEP results reveal that large high schools participating in the Consortium effort are having difficulty in converting Consortium strategies into practice. The difficulty seems to involve the way they target students pursuing a

vocational major. It appears that the larger the high school, the more difficulty there is in making major changes in practices that impact the lives of the general and vocational students.

The Woodlawn pilot site in Shreveport, Louisiana, is instituting a business academy aimed at at-risk students and seeks to create a "school within a school" with a strong team of academic and business education teachers in grades 9-12.

Similar efforts are being made in North Carolina to create two academies--one, a business academy and the other, a health and human services academy. These involve efforts to create, within a large high school, two schools where academic and vocational teachers will work together with students in a three to four year block that provides students with a challenging program of studies.

These and other efforts throughout the country have proven to provide the structure, stability, and continuity necessary to help advance significantly the educational achievement of students. Other pilot sites with large high schools may need to look at restructuring activities as a way that Consortium strategies can be concentrated and targeted to general and vocational students.

Spreading the Concept Throughout Each State

Most states are pursuing a variety of spin-off activities to encourage other secondary schools to adopt some of the proven practices emerging from SREB pilot sites. In some states, these are rather comprehensive activities aimed at getting other school sites to move toward adopting the total concept. In other states, the strategy is to get high school sites to adopt small parts of the Consortium strategies. The old adage that the composite may be greater than the sum of the parts could be true in this case. All states should look at ways to encourage other school systems to adopt the full range of strategies, not just the applied course or the integration of academic into the vocational curriculum or guidance model. They should "buy in" to the whole package.

In Alabama, the State Department of Education, the Department of Postsecondary Education, and the Alabama Council on Technical Education co-sponsored an information conference on Tech Prep on January 30 and 31. The purpose of this conference was to encourage postsecondary institutions and secondary schools to work together in developing a more rigorous program of study for students enrolled in vocational majors. Georgia plans to encourage its 10 largest school districts to appropriate an ample portion of Carl Perkins Act funds to create at least one pilot site high school built on the SREB concept. Oklahoma has made available mini-grants to districts to implement applied academic courses. In North Carolina, the Governor's Task Force on Workforce Preparedness has recommended the elimination of the general curriculum and that SREB's program of studies concept become the centerpiece of a revised high school curriculum.

South Carolina's Director of Vocational Education and the State Director of Technical Colleges have agreed to devote funds earmarked for postsecondary levels to a program which they call "Preparation for the Technologies." School systems throughout the state are being encouraged to apply for grants under this program.

Thirty-three school districts in Virginia are participating in the Challenge 2000 program and are developing action plans for implementing the Consortium concepts in fall 1991. An additional workshop is being planned for spring 1991 for other school systems desiring to begin this process next year. Virginia also brought in principals from 16 area vocational centers and comprehensive high schools to explore possibilities of using their schools for offering a spring 1992 satellite course to academic and vocational teachers on reading for learning in the content area.

West Virginia utilized their statewide computer network in the vocational center to make available a basic academic skills for employment program which is accessible to students in all vocational centers. The software is able to assess, remediate, and evaluate students' basic skills relevant to a chosen occupational training area. As a result, a variety of individualized student reports can be generated.

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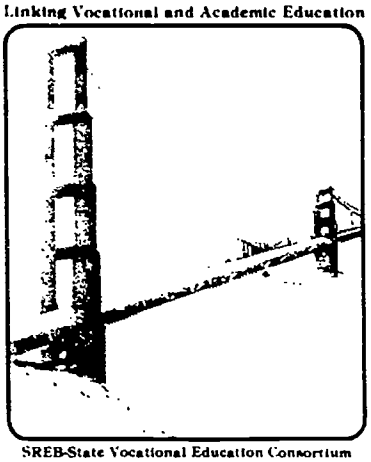

SREB-State Vocational Education Consortium

THE LINK

A NEWSLETTER ON ADVANCING THE ACADEMIC COMPETENCIES OF GENERAL AND VOCATIONAL STUDENTS

Volume 1, Number 2 *April, 1991*

Pilot Site Notes

Do High School Experiences Make A Difference In Student Achievement?

For pilot sites to achieve the SREB-State Vocational Education Consortium goal in reading, mathematics, and science by 1993, it is important that Consortium and staff committees from pilot sites review the 1990 results of the National Assessment of Educational Progress (NAEP). This newsletter examines three aspects of the 1990 NAEP data comparisons: black and white students, females and males, and high achieving and low achieving sites. The teams of vocational and non-vocational teachers and administrators should consider a number of questions as they develop their recommendations to help solve the problems. These questions include:

- What can be done to further close the achievement gap between black and white students?
- Why are fewer black than white students enrolled in those vocational courses -- trade and technical -- that are associated with higher mathematics and science achievement, and what can be done about it?
- What can be done to increase black students' experiences related to higher achievement in mathematics and science?
- What can pilot site staff do to engage male students in learning activities that are associated with reading achievement?
- Why do male students achieve higher than female students in mathematics and science (in some pilot sites, differences are enormous), and what can be done about it?
- Why aren't the same proportion of females as males encouraged to participate in applied mathematics and science courses, and what can be done about it?
- Why do fewer than 50 percent of students in some low achieving sites report that academic teachers are not "interested" in them, and what can be done about it?
- Why do so many students from some low achieving pilot sites fail to see the need for higher level mathematics and science, and what can be done about it?

Comparing Achievement of Black Students and White Students

Black students completing vocational programs in 1990 at the SREB pilot sites scored significantly above the average for all black students nationwide in mathematics, at the national average in reading, and below average in science. In each subject area, white students completing vocational programs at the SREB pilot sites on average scored significantly below all white students in the nation. Consistent with national data, the white vocational students scored significantly higher than their black classmates in all three subject areas. However, the gap between the scores is narrower than is the case nationally for all black and white students -- about one-third less in reading and science and two-thirds less in mathematics.

Black and white vocational students reported a number of differences in their high school experiences. Most dramatic was the type of vocational programs they complete. For example, only 25 percent of the black students completed programs in the technical and trade fields, compared with 42 percent of the white students. A larger percentage of black students (33 percent) opted for business-related programs than did white students (26 percent). In home economics fields, the difference was even greater -- 19 percent for black students, only 6 percent for white students. **Pilot site leaders need to determine why a disproportionate number of black students are enrolled in occupations related to home economics, and what can be done about it.**

More black than white vocational students reported having educational experiences that the Consortium associates with higher academic achievement. This may account for the reason that black students from SREB pilot sites had significantly higher average scores in mathematics than black students nationally and scored at the same level in reading. The following perceptions reported by students suggest that pilot sites with significant black enrollment may be engaging black students more effectively than white students in instructional activities aimed at advancing their achievement in reading and mathematics.

- 20 percent of black students reported either not having homework or not doing it, compared to 34 percent of white students.
- A larger proportion of black students than white reported: liking English; believing English was important; receiving extra help from English and vocational teachers on improving reading and math skills; being questioned on what they read; doing more daily and weekly reading; and receiving help from teachers to find the main idea of a paragraph.
- A larger proportion of black students reported taking a mathematics course their senior year and taking more than two years of mathematics and science courses.
- A larger proportion of black students reported receiving help from teachers and counselors in planning a high school program of study and in the selection of mathematics and science courses.
- A larger proportion of black students reported that their courses were exciting and challenging.
- 47 percent of black students reported that English teachers took greatest interest in their success, while 41 percent of white students reported that it was vocational teachers who were more interested in their success.

- 59 percent of black students reported that they intended to pursue further education, compared to 52 percent of white students.

- 61 percent of the black students reported having failed one or more courses, compared to 54 percent of the white students.

In mathematics and science, white students reported experiences that might give them an advantage over black students. A greater proportion of white students reported: using the metric system in science classes, other classes, and outside of school; having used a telescope, barometer, stethoscope, or a meter that measures electricity; having out-of-school science experiences in growing a flower or vegetable garden, taking care of animals, fixing mechanical things, or going to a zoo or farm; having a part-time job; and that their vocational teachers often stressed mathematics. **Why do more white students have experiences that are associated with higher mathematics and science achievement, and what can be done to increase black students' experiences?**

Comparing Achievement of Female Students and Male Students

Female students completing vocational programs at the SREB pilot sites scored significantly higher than their male counterparts in reading; however, in mathematics and science it was the male students who scored significantly higher. This is consistent with the findings of national testing programs: male students consistently outscore female students in mathematics and science. Why? An examination should begin with the differences in their high school experiences. As might be expected, the types of vocational programs they complete differ dramatically. For example, female students are four times more likely than males to be enrolled in business courses, while male students are six times more likely than females to be enrolled in trade and technical courses. Business courses emphasize competencies in the language arts, while in trade and technical courses the emphasis is on using mathematical competencies.

The following perceptions reported by students suggest that the secondary school is more effective in engaging females than males in learning experiences that would advance reading.

- 25 percent of female students reported either not having or not doing homework, compared to 38 percent of males.

- 84 percent of the females reported that teachers helped them to improve their writing skills, compared to 75 percent of males.

- 39 percent of the female students reported that English teachers took the greatest interest in their success during high school, compared to 30 percent for male students. Not surprisingly, a larger proportion of females reported liking English, finding English easy, and considered English very important or more important than other courses.

- 53 percent of the female students reported that their vocational teachers often stressed reading, as well as writing, compared to about 40 percent of the male students.

- 89 percent of female students reported that the high school had prepared them to write business letters, in comparison to 78 percent of male students.

- A larger proportion of females than males reported that they read more novels than other types of books; books on sports and on how-to-do things ranked higher among male students.

Why do these differences exist and what can pilot sites do to more effectively engage male students in those activities that are associated with higher reading achievement?

High school experiences also may explain, in part, the higher achievement of male students in mathematics and science. Although larger proportions of female students than male students take algebra I and II and chemistry, more of the male students have opportunities to use mathematics skills and to experience the linkage between science and technology.

- A larger proportion of female students than male students reported a dislike for mathematics and science; a larger proportion of males feel as good in mathematics as in other classes, in contrast to the female students, of whom a larger proportion thought mathematics and science were hard.

- Males, in greater proportions than females, thought it was important to know algebra and geometry to secure a good job and plan to pursue a career requiring the use of mathematics.

- A greater proportion of males reported using the metric system in classes other than science and mathematics.

- A larger proportion of males reported having used the following science equipment: telescope, barometer, stethoscope, or a meter that measures electricity.

- A larger proportion of males reported having outside-of-school science experiences in: reading books and articles about science and scientists; fixing mechanical things; watching television shows about science; using science kits outside of school; talking about science with friends; and having science-related hobbies.

- 74 percent of the female students reported having taken algebra I, compared to 67 percent of males; 20 percent of the male students and 12 percent of the female students had taken applied or technical mathematics.

- 64 percent of the female students and 61 percent of the male students reported receiving special help in math from teachers -- for 27 percent of the male students and 18 percent of the female students, the special help came from vocational teachers.

- 34 percent of the female students reported having taken chemistry, compared to 25 percent of males; 9 percent of the male and 3 percent of the female students had taken principles of technology (applied physics).

- 58 percent of the female students reported having taken more than two science courses, compared to 51 percent of males.

- 30 percent of the male students reported that their vocational teachers often stressed science, compared to 23 percent of the females.

Lack of participation in courses and experiences that use mathematics and science concepts to solve real world problems could lead to female students' reluctance to consider careers in mathematics, science, and technology.

TABLE 1

Comparing Vocational Students in High and Low Achieving Pilot Sites by Gender and Race, Using Percentages

Demographic Character of Respondents	Comprehensive High School		Area Vocational Center	
	Site A	Site B	Site A	Site B
Gender:	%	%	%	%
Male	43	53	74	68
Female	57	47	26	32
Race/Ethnicity: Black	11	7	6	14
White	86	90	94	86
Hispanic	2	0	0	0

TABLE 2

Comparing Vocational Students in High Achieving and Low Achieving Pilot Sites on School Expectation Indicators, Using Percentages

Reported Responses of Vocational Completers	Comprehensive High School		Area Vocational Center	
	Site A	Site B	Site A	Site B
1. Most courses were challenging and exciting.	% 73	% 60	% 50	% 44
2. Encouraged to take more mathematics and science courses.	71	39	47	35
3. Encouraged to take difficult math and science courses.	63	41	57	40
4. Took a math class senior year.	37	10	45	28
5. Took three or more years of math courses.	58	30	84	39
6. Took three or more years of science courses.	58	30	54	36
7. Most courses repeated content.	44	59	65	77
8. The school cared and listened to student.	97	85	85	76
9. Teachers taking greatest interest in students' success:				
English	35	17	22	25
Mathematics	24	13	22	8
Vocational	35	67	42	51

TABLE 3

Comparing Vocational Students in High and Low Achieving Pilot Sites on Indicators Related to Achievement in Mathematics and Science, Using Percentages

Reported Responses of Vocational Completers	Comprehensive High School Site A	Comprehensive High School Site B	Area Vocational Center Site A	Area Vocational Center Site B
1. Mathematics and science courses taken:	%	%	%	%
a. Algebra I	72	44	84	40
b. Algebra II	39	11	44	11
c. Geometry	49	16	62	11
d. Chemistry	38	5	17	9
2. Mathematics is viewed as very important	98	78	85	80
3. Students agree or strongly agree with the following statements:				
a. Mathematics helps a person think logically	79	55	74	63
b. It is important to know mathematics,such as Algebra or Geometry in order to get a good job	61	41	65	52
c. It is important to know arithmetic in order to get a good job	87	77	91	69
d. I would like to take more mathematics courses	43	21	39	28
e. Estimating is an important mathematics skill	75	62	79	65
4. I never use metric system of measurement in:				
a. mathematics classes	12	19	15	21
b. science classes	10	23	20	26
c. outside of school	27	40	29	74
5. Students either agree or strongly agree with each of the following statements:				
a. Most mathematics has practical use	86	73	85	73
b. My parents really want me to do well in mathematics	85	66	84	75
c. I feel good when I solve a mathematics problem by myself	89	73	84	71
d. I like to be challenged by difficult mathematics problems	53	35	50	38
6. Vocational teachers often stressed mathematics	76	59	63	57
7. Students reported having used the following science equipment:				
a. A meter that measures electricity	55	37	55	49
b. Telescope	84	79	91	84

TABLE 4

Comparing Vocational Students in High and Low Achieving Pilot Sites on Indicators Related to Reading, Using Percentages

Reported Responses of Vocational Completers	Comprehensive High School Site A	Comprehensive High School Site B	Area Vocational Center Site A	Area Vocational Center Site B
	%	%	%	%
1. Never read a story or novel	9	40	24	52
2. Never read a poem	10	33	17	48
3. Never read a play	30	57	36	68
4. Never read an article about science	27	32	22	43
5. Teacher almost always or more than half the time pointed out special words	65	35	63	49
6. Vocational teacher often stressed reading	68	48	no significant difference	

TABLE 5

Comparing Vocational Students in High and Low Achieving Pilot Sites on Indicators Regarding Post-High School Aspirations, Using Percentages

Reported Responses of Vocational Completers	Comprehensive High School Site A	Comprehensive High School Site B	Area Vocational Center Site A	Area Vocational Center Site B
1. What will take largest amount of time after high school	%	%	%	%
Working	34	50	40	63
Military	10	5	11	7
Further Education	55	37	29	13
2. Talked a great deal about planning school program with				
Father	33	24	30	24
Mother	56	37	50	39

Other reported statistically significant differences have to do with students' post high school goals and their perceptions of the school's expectations for them.

- 64 percent of the female students reported plans for further study, compared to 44 percent of male students. Also, 78 percent of the female students reported that their high school had adequately prepared them for college, compared to 54 percent of the males.

- A larger proportion of males reported their teachers were unwilling to listen to them (14 percent males and 9 percent females); courses were not challenging and exciting (39 percent males, 32 percent females); and teachers did not expect them to do well (17 percent males, 10 percent females).

It is important that educators at the secondary level examine why differences exist between male and female vocational students, especially those differences that, on the surface, offer potential for advancing students' competencies in reading, mathematics and science.

Comparing High Achieving and Low Achieving Pilot Sites

If educators believe that socio-economic status is only one of the factors affecting student achievement, then the differences between the experiences of students in high achieving pilot sites and those from low achieving pilot sites provide ideas for accelerating the academic achievement of students.

To compare high and low achieving pilot sites, all sites were ranked on their students' performance on reading, mathematics, and science sections of the National Assessment. Six sites ranked in the top 25 percent on all three tests; five sites ranked in the low 25 percent on all three. For comparison, a comprehensive high school pilot site and an area vocational center serving more than one high school from each group were selected by matching general socio-economic, community, and demographic factors (See Table 1). SREB then compared reported student responses to a range of performance indicators for each of the two sets of sites. Only those indicators with statistical differences are reported here. These comparisons are presented in Tables 2 through 5. Site A is the high achieving site and Site B represents the lower achieving site.

Table 2 reveals striking differences in students' perceptions of what schools expected of them. Students from higher achieving sites reported that their courses were challenging and exciting, while students from lower achieving sites reported that the content of courses was often repetitive. Students in high achieving sites reported that they were encouraged to take more mathematics and science, and to take more difficult courses as well. This encouragement evidently paid off. Differences are striking between the two groups of sites in the percentage of students reporting that they took a mathematics class their senior year in high school and in the percentage of students who took three or more years of mathematics and science. There are no differences in the number of vocational courses taken.

A larger proportion of students from high achieving sites reported that academic teachers were interested in their success. For instance, these students reported that schools cared about them and listened to them. Student responses suggest that academic teachers at high achieving sites have more interest in the

success of students pursuing a vocational major than is the case at low achieving sites. More than 50 percent of the students from low achieving sites reported that vocational teachers showed the greatest interest in their success. At higher achieving sites, student responses were much more evenly divided among English, mathematics, and vocational teachers. Given this knowledge, pilot sites, whether a comprehensive high school or an area vocational center working with a feeder high school, should pay particular attention to ways of enlisting greater involvement of mathematics, science, English, and vocational teachers in the success of vocational students.

At high achieving sties, a much higher proportion of students reported having taken algebra I and II, geometry, and chemistry. One clue for this may be found in Table 3, which shows that students in high achieving pilot sites view mathematics as very important and believe that knowing mathematics, such as algebra and geometry, will help in getting a good job. Moreover, these students believe that mathematics helps a person to think logically, and they consider estimating an important skill. Based on students' perceptions, it appears that higher achieving sites have done a more effective job in helping students see the practical use of mathematics and in creating a learning climate that more students enjoy. In addition, students from high achieving sites give their vocational teachers more credit for often stressing mathematics than do students from the low achieving sites. Information in Table 5 suggests that parents, particularly mothers, of students in high achieving sites have taken a much more active role in helping their children plan a high school program of study.

These differences suggest that sites seeking to raise the mathematics and science achievement of their students should:

- Purposely seek ways to educate both parents and students to increasing workplace demands for a greater understanding of mathematics and science;
- Reduce student access to low level mathematics and science courses and increase the proportion of general and vocational students taking algebra I and II, geometry, chemistry, and physics taught by faculty committed to helping students succeed through applied and student-centered instructional activity; and
- Encourage teams of mathematics, science, and vocational teachers to implement joint learning projects to help students see the relevance of mathematics and science within the context of their occupational pursuits.

Information presented in Table 4 suggests that the English program taken by students in low achieving sites is not nearly as successful in getting vocational students to read novels, poems, and plays as the programs offered in high achieving sites . These students' responses indicate that many pilot sites should begin to re-examine what they expect of general and vocational students enrolled in English literature classes. Apparently, almost half of the students in the two low achieving pilot sites never read the type of materials associated with American and European literature.

A larger proportion of students from high achieving sites report that their teachers always, or more than half of the time, point out special words to them before beginning to read a passage. At least in one of the high achieving pilot sites, significantly more students reported that vocational teachers often stress reading. Reading is the most essential vocational skill and it is also the most needed skill for becoming an

informed citizen who continues to learn and develop intellectually. Sites seeking to raise the reading achievement of students completing vocational programs should pay much more attention, in both academic and vocational courses, to those teaching practices that result in students reading more, both in school and outside of school. More reading is being done in school and outside of school by students in higher achieving sites.

More students from high achieving sites report post high school plans for further education and military service, while more students from low achieving sites report employment as their primary goal upon leaving high school. (Table 5) These differences suggest that sites seeking to improve the education of vocational students may need to do much more to help their students understand the academic foundations needed to continue to learn in a postsecondary education setting or in the workplace. Students pursuing vocational studies are very practical. When given information about the changing requirements of work, most are likely to use that information to make personal decisions about courses they should take in high school. However, too many of the students currently completing vocational programs are operating under the old assumption that reading and language arts, mathematics, and science are not essential elements for entry and advancement in the workplace.

The main goal of all teachers and administrator at every pilot site should be to help students see the connection between higher level language arts, mathematics, and science competencies and possible future employment.

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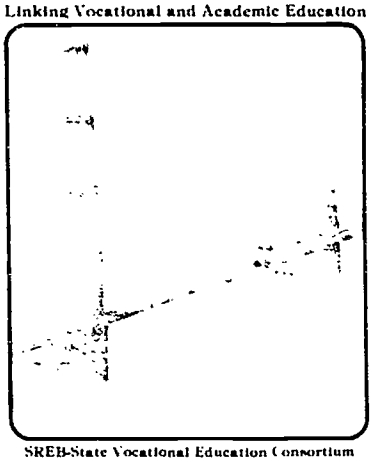
Linking Vocational and Academic Education



SREB-State Vocational Education Consortium

THE LINK

A NEWSLETTER ON ADVANCING THE ACADEMIC COMPETENCIES OF GENERAL AND VOCATIONAL STUDENTS BY INTEGRATING ACADEMIC AND VOCATIONAL EDUCATION

Volume 1, Number 3 *August 1991*

CHANGING HIGH SCHOOLS: A PROGRESS REPORT

ON THE SREB-STATE VOCATIONAL EDUCATION CONSORTIUM

This edition of *The Link* will outline what the SREB-State Vocational Education Consortium is learning about integrating academic and vocational education to strengthen students' competencies in communication, mathematics, and science.

The good news is you can improve secondary schools for those students enrolled in general and vocational studies. The bad news is this cannot be done instantly. It takes time and leadership. You cannot change schools by merely setting a standard, testing students, and then reporting how little they know. You also have to help schools change the system by changing what is taught, how it is taught, what is expected of students, and how they evaluate their performance against outcome standards. You have to help school leaders and faculty acquire a new vision of how their school can be different.

There are barriers to making substantive changes in secondary schools. The most difficult to overcome are the beliefs, attitudes, and traditions of an educational system characterized by a uniform, but fragmented, secondary school curriculum, a long-standing--and often ineffective--instructional approach, and a school climate that separates students into the college-bound "bright ones" and "the others." The typical educational system disconnects academic learning from practical application of that learning. **It promotes higher expectations for some students and very low expectations for others within the same school building.** This system demands, and gets, a solid effort from some students; but for others the demands are small and those students put forth little effort to succeed. In large schools, the tendency has been to provide a niche for each student, ignoring the need to challenge them. **Above all, school leaders must first acknowledge that they have a problem.** Before these high schools can change, school leaders must recognize that many students enrolled in the general and vocational studies have not been well served.

There are, of course, other barriers operating within and outside the schools--the political climate, demographic shifts, community values and concerns, our own academic or vocational background and experiences. **As a network of schools bound together toward a common goal, we have encountered all of these barriers and others during the past three years.**

What Is the SREB-State Vocational Education Consortium Trying To Do?

In 1988, 13 states--now 16 states--set out to raise significantly the basic competencies in mathematics, science, and communications of students pursuing vocational studies. Specifically, the goal is to close by one-third, over a five-year period, the achievement gap between students pursuing a vocational major and those completing the college preparatory curriculum. Considering that more than 60 percent of high school students in SREB states are in general and vocational programs, how well these students perform in high school and later will determine in good measure how well our states perform in our increasingly global economy.

The Consortium is based on the assumption that all high school students need to be able to interpret what they read, solve work-related science and mathematics problems, and make wise decisions. The aim is to teach a portion of the core college preparatory curriculum in English, mathematics, and science to many more students. The Consortium places emphasis on the different ways students learn and are motivated to learn mathematics, science, and language, rather than on the differences in what they are taught. We are looking at different ways to teach essential content from college preparatory courses to more students, rather than trying to force-feed all students through one traditional approach.

The goal of integrating academic and vocational education is much more than a vocational initiative. **It is part of a larger educational reform strategy to change what goes on throughout the secondary school curriculum and raise expectations about what students can learn. It is an attempt to make the more rigorous parts of the academic curriculum more accessible to a greater number of secondary youth.** It is promoting a process that helps students see the relevance for mastering higher level academic content by allowing them to learn through using academic competencies to solve real work problems. This process allows students to see the connections between much of symbolic academic learning and its use in the fields of work in which they envision themselves. **The approach seeks to answer two basic questions many students ask about school: "Why do I need to know this?" "How will I ever use it?"**

Initially, SREB and state leaders, drawing from the effective school research, generated a set of "essential practices" that, if carried out in high school, we believed would improve the reading, mathematics, and science performance of students enrolled in general and vocational studies. These essential practices include:

- Establishing high expectations of students in both academic and vocational classes;
- Revising vocational programs to reinforce higher order concepts in communications, mathematics, and science;
- Revising academic courses to teach essential concepts from the college preparatory curriculum through an applied process;
- Requiring students with vocational majors to complete three courses each in mathematics and science, with at least two credits in each area being equivalent in content to courses offered in a college preparatory program, and to complete at least four courses in a vocational major and two related courses;

- Encouraging vocational and academic teachers to work together in preparing students for continued learning on the job or in schools;
- Revising the instructional process so that the student is a worker and is actively engaged in the learning process;
- Providing guidance and counseling services that help students plan and pursue a more challenging program of studies; and
- Providing extra help that will enable students to complete successfully a program of studies that includes higher level academic content.

Each state agreed to fund at least two pilot sites and to assist them in carrying out these practices. We now have 38 pilot sites participating. In addition, the states and local sites agreed to participate in a common assessment process that would include:

- Student and faculty surveys;
- Using the National Assessment of Educational Progress (NAEP) Exam in 1988, 1990, and 1993, to measure the reading, mathematics and science competencies of students who had completed a vocational major; and
- Doing a transcript analysis of these students so that we could link student achievement to the amount and type of courses taken in high school.

In 1988, baseline information was collected on students completing a vocational major from the initial SREB pilot sites. This information was again collected in the spring of 1990 on students completing vocational programs from the same and from new sites.

Do High School Experiences Make a Difference in Student Achievement?

The Consortium has enabled SREB to study achievement levels in mathematics, reading, and science of over 3,100 pilot site high school graduates completing a vocational major in 1988 and 3,600 such graduates in 1990. We studied their performance in relation to their high school curriculum experiences. **The evidence overwhelmingly suggests that the quality of students' high school experiences has a major impact on their achievement. What students are taught, how they are taught, what level of effort is expected of them, and the type of support and encouragement they receive represent powerful forces in student achievement.**

Attitudes found in schools regarding these "non-college bound" students and their curricular experiences become major factors in determining their achievement. By having a large number of pilot sites, we are able to compare high achieving sites and low achieving sites having similar socio-economic, community, and demographic factors. We also can compare the groups based on student responses to a range of performance indicators. A review of four communities--two high achieving sites and two low achieving sites--with students from similar socio-economic backgrounds shows that the students enrolled in vocational courses have two dramatically different types of high school experiences.

Striking differences exist among pilot sites in students' perceptions of what schools expect of them. More students from the high achieving sites report that their courses were challenging and exciting; students from lower achieving sites report that the content of their courses was often repetitive. Students in high achieving sites report that they also were encouraged to take more difficult mathematics and science courses.

This encouragement evidently paid off. For instance, there are striking differences between the two groups of sites in the percentage of students who reported taking a mathematics class their senior year in high school and in the percentage of students who took three or more years of mathematics and science.

Students completing a vocational major from low achieving sites did not perceive their teachers to be committed to accelerating their academic achievement. Fortunately, when asked "to indicate which teachers showed the greatest interest in their success," students from high achieving sites were equally divided among English, mathematics, and vocational teachers. However, more than 50 percent of the students from low achieving sites reported that vocational teachers showed the greatest interest in their success.

At high achieving sites, a much greater proportion of students reported having taken Algebra I and II, Geometry, and Chemistry (Table 1). **Based on students' perceptions, it appears that high achieving sites have done a more effective job than low achieving sites in helping students see the practical use of mathematics and in creating a learning climate that more students enjoy.** In addition, students from high achieving sites gave their vocational teachers more credit for often stressing mathematics than did students from low achieving sites.

Table 1

Math and Science Experiences of Students Completing a Vocational Major at High and Low Achieving Sites

	Comprehensive High Schools		Area Vocational Centers	
Courses taken:	Site A	Site B	Site A	Site B
Algebra I	72%	44%	84%	40%
Algebra II	39	11	44	11
Geometry	49	16	62	11
Chemistry	38	5	17	9
Vocational teachers stress mathematics	76	59	63	57

Note: Site A is a high achieving site; site B is a low achieving site.

The English program in low achieving sites is not as successful in getting vocational students to read novels, poems, and plays as are the programs offered in high achieving sites (Table 2). **Apparently, almost half of the students in the two low achieving pilot sites never read materials from literature.**

Table 2

Language Arts Experiences of Students Completing a Vocational Major in High and Low Achieving Sites

	Comprehensive High Schools		Area Vocational Centers	
	Site A	Site B	Site A	Site B
Never read a story or novel	9%	40%	24%	52%
Never read a poem	10	33	17	48
Never read a play	30	57	36	68
Vocational teachers stress reading	68	48	36*	37*

Note: Site A is a high achieving site; site B is a low achieving site.
* There is no significant difference.

The two pilot sites with the highest student achievement are also those that provided their students greater access to the basic college preparatory core curriculum and reinforced these academic competencies through vocational instruction. **The two sites with the poorest student performance provided students enrolled in vocational courses access to a steady diet of low level academic courses and to vocational classes that failed to make the connection between academic knowledge and its application in the workplace.**

The evidence being accumulated through the Consortium initiative supports carrying out the essential practices as a means to improve students' performance. Nowhere is this clearer than in the comparison of high school experiences and performances between the 1988 and the 1990 students from the same sites who completed vocational programs.

What Changes Are We Seeing in Pilot Sites?

Preliminary analysis of the 1988 and 1990 information reveals that some sites made significant gains in just two years in the academic achievement of students completing vocational programs, while others made modest gains, and still other sites actually had declines in achievement. Vocational students in 17 of the 28 original sites showed either dramatic or modest improvement in reading, mathematics, and science achievement between 1988 and 1990. The data available suggest that the 1990 completers of vocational programs had similar socio-economic backgrounds to the 1988 completers. Sites making the greatest gains in achievement also were those that had made the most progress in implementing the "essential practices" of the Consortium initiative.

Sites Making Greatest Gains in Achievement

In the spring of 1990, eight of the 28 original pilot sites made dramatic gains in the average reading, mathematics, and science scores as measured by the NAEP tests (Table 3). These sites have several distinguishing features.

First, six of these sites had been among the lower achieving sites in 1988. Thus, they could clearly see from the 1988 data that they had a problem when compared to other sites. **Second,** all eight sites could be classified as rural or located in small towns. **Third,** each site was either a single high school working with an area vocational center or an area vocational center working with two or more high schools. **Fourth,** system and school leaders were involved from the beginning. In most instances, this included the vocational administrator, the school principal, and the superintendent. **Finally,** these sites have a stable student population, which is mostly white.

Table 3

Average NAEP Scores of Students Completing Vocational Programs

at SREB Pilot Sites Making Greatest Gains

	Reading	Mathematics	Science
1988	50.7 (0.1)	284.5 (0.5)	254.7 (1.0)
1990	54.4 (0.3)	290.3 (1.1)	278.9 (1.7)
1993 Goal	55.5	301.0	280.7

Note: The numbers in parentheses represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to an average score--referred to as the "confidence interval"--allows one to be 95 percent sure that the score falls somewhere within that range. Therefore, if the confidence intervals of two average scores do not overlap, the scores are said to be statistically significantly different from one another.

What is different about the experiences of the 1990 students completing vocational programs and those of 1988 in sites making the greatest gains? **First, there is evidence that these sites were able to get a core group of teachers--academic or vocational or both--to bond together and focus their mission on the outcomes in reading, mathematics, and science for students in general and vocational studies.**

Second, these sites had a specific curricular and instructional plan to influence students' performance in reading, mathematics, and science. For example, between 1988-89 and 1990-91, all eight sites had undertaken a major initiative to advance the reading achievement of students through both their academic and vocational classes.

Third, students completing vocational programs in 1990 had more access to the basic content of college preparatory courses in communications, mathematics, and science than did 1988 graduates. The percentage of students reporting that their vocational teachers often stressed reading, mathematics, and science went up as much as 25 percent at some sites. At other sites, the percentage of 1990 graduates reporting to have taken higher level English, mathematics, and science courses increased as much as 30 percent. Both student-reported information and on-site visits revealed other evidence that these sites had expanded students' access to the content of a college preparatory curriculum by increasing enrollment in existing basic college preparatory courses, implementing applied academic courses, and integrating academic content into vocational courses.

Fourth, expectations for vocational students were raised. The percentage of students at some sites who reported doing one hour or more of homework increased dramatically. Furthermore, in 1990 more students reported taking a mathematics course their senior year than in 1988, and more students reported having been encouraged to take higher level mathematics and science courses.

Finally, these eight sites had strong action-oriented leaders who were able to focus on the problem of improving student achievement and enlisted others in the effort. After the 1988 assessment, these schools never doubted that they had problems. Site leaders took the initiative to change and were actively supported by the superintendent. The principal and teachers at these sites had freedom to revise curricular and instructional approaches and academic and vocational teachers were provided time to meet and plan together.

Sites Making Modest Gains

Nine of the 28 original sites made modest, but significant, gains in reading and science achievement between 1988 and 1990 (Table 4). Black students at these sites also made significant gains in mathematics achievement.

These nine sites represent a mixture of rural areas, small towns, and urban areas. Five of the nine sites involved an area vocational center, two were comprehensive high schools with significant vocational offerings, and two represented general high schools with very limited vocational offerings. Sizes of the schools were mixed; at least five sites had 1,000 students and upward, while four of the sites were smaller.

Table 4

Average NAEP Scores of Students Completing Vocational Programs at SREB Pilot Sites with Modest Gains

	Reading	Mathematics	Science
1988	53.9 (0.1)	293.6 (0.2)	269.5 (0.5)
1990	54.7 (0.1)	294.4 (0.5)	272.3 (0.5)
1993 Goal	55.5	301.0	280.7

Note: The numbers in parentheses represent the standard error, a function of the size of the sample and the variability of scores within the sample. The range of scores obtained by adding and subtracting two standard errors to an average score--referred to as the "confidence interval"--allows one to be 95 percent sure that the score falls somewhere within that range. Therefore, if the confidence intervals of two average scores do not overlap, the scores are said to be statistically significantly different from one another.

At the time of the 1990 assessment, only three of the site superintendents had become active leaders in the Consortium effort; primary leadership came from the systems' vocational administrators. The student population at these sites was 85 percent white.

What is different about the school experiences of 1990 students completing vocational programs and those of 1988 at sites making modest gains? Evidence suggests that sites making modest gains took two steps. First was the addition of applied academic courses to teach content that was at the college preparatory level. For example, the percentage of students taking applied mathematics courses at these sites went from 14 percent in 1988 to 23 percent in 1990. The percentage of students taking an applied physics course went from 4 percent in 1988 to over 12 percent in 1990 The second step was a substantial increase, at some sites, in the percentage of students who reported taking college preparatory English classes. For example, in 1988 one high school eliminated all tracking in English classes and, as a result, its male students completing vocational programs now meet the Consortium's reading goal.

Unlike the eight sites making large gains in achievement, there is no evidence at these sites that expectations were raised, that vocational teachers increased their emphasis on related academic instruction, or that academic teachers made efforts to integrate applied learning into regular academic courses.

Sites Having Declining Scores

The 11 sites experiencing a significant decline in average scores in reading, mathematics, and science between 1988 and 1990 had several distinguishing characteristics. **First**, most are urban and can be characterized as large schools (eight of 11). **Second**, students at only four of the 11 sites had access to an area vocational center. **Third**, based on student-reported information, these students had less access to vocational studies than did students at other sites. **Fourth**, approximately one-third of the students completing vocational programs at these sites in 1990 were minority students. **Fifth**, these sites had one thing in common: Between the 1988 assessment and the 1990 assessment, the system superintendent was uninvolved. At only four of the 11 sites was the building-level administrator involved.

Why did the average scores of 1990 students decline, rather than improve at these schools? **First, between 1988 and 1990, these sites experienced major demographic shifts.** The proportion of vocational graduates who were classified as minorities went from 19 percent in 1988 to 32 percent in 1990. The change in demographics is probably due to two factors. In some of the pilot sites, school boundaries had been changed; and in other schools, the 1990 data were collected on a more representative group of students completing a vocational program. In 1988, for example, some large schools failed to test the students attending the area vocational centers, thus omitting many minority students from the testing process. However, it should be noted that the academic achievement declined for all groups--males, females, blacks, whites, and Hispanics.

Second, in the main, there is very little evidence that these sites did anything to carry out the Consortium's essential practices between 1988 and 1990 for junior and senior students. For instance, there is no evidence of:

- **Increasing efforts to focus on student outcomes in reading, mathematics, and science.**
- **General and vocational students receiving greater access to the basic core of the college preparatory curriculum or aggressively being pushed into higher level courses; in some instances, the proportion of students taking these courses actually declined between 1988 and 1990.**

- **Establishing higher expectations for these students and providing extra help to students to reach them.**
- **Encouraging general and vocational students to enroll in applied mathematics and science courses during the last two years of high school.**

Third, some of these sites intentionally chose to begin carrying out the essential strategies with their freshman and sophomore classes, which meant that the changes did not affect the 1990 graduating class. For example, one school began in 1988 to reduce the number of sections of low level English and mathematics classes for freshmen and sophomores. Another site elected to implement applied mathematics, physics, and English classes at the tenth grade level, enrolling 60 general and vocational students into these classes. As juniors, these students met the Consortium's goal in reading and mathematics, while at the same school, the seniors who were completing lower level academic studies ranked among the lowest achieving students.

Fourth, these sites were represented by large high schools where, apparently, it takes more time to define problems, target a group of students, and get enough staff involved to make a difference in student outcomes. Even by 1990, school principals at most of these sites had not formulated a vision of how a challenging program of academic and vocational studies could accelerate academic achievement.

Fifth, school leadership at sites showing declining achievement, on the whole, failed to get academic and vocational teachers to focus on the outcomes for a targeted group of students at junior and senior levels. **At some sites, change was thwarted by central office staff that discouraged problem-solving at the building level.** More of these schools operated under a regulatory and a compliance mind-set, rather than focusing on problem-solving for improvement. Staff at the school building level seemed to have less authority to make changes than did the building leaders at sites making the most improvement. Leadership at declining sites was often unsuccessful or slow in focusing their efforts on students in vocational and general studies.

The 1990 NAEP assessment helped sites with declining scores to recognize that they had a problem. In November of 1990, 32 of the 38 pilot site superintendents met in Atlanta with SREB staff to discuss the results from the 1990 NAEP assessment. That event served to raise the importance of this effort for many superintendents. Based on visits since January of 1991 to sites with declining scores, there is evidence that generally the system superintendents are aware of their problems and have begun taking steps to support the school principal in carrying out many of the Consortium's essential practices designed to drive up the reading, mathematics, and science achievement of their students.

What Changes in Curriculum, Instruction, and School Organization Are Pilot Sites Making?

Since January 1991, external teams have conducted 15 on-site review visits to participating schools. Each visiting team was composed of vocational and academic leaders from other states and within that state and, in 10 of the 15 visits, a representative from the private sector. This is the third year for these on-site reviews.

At 13 of the 15 sites visited there was clear evidence that five specific changes are occurring for students enrolled in general and vocational curriculum. The review teams are finding:

- Raised expectations by reducing the number of low level academic courses offered, by encouraging or requiring students to take higher level mathematics and science courses and make a greater effort to succeed in these courses;
- An increased percentage of students taking courses in English, mathematics, and science from college preparatory curriculum, adapting academic courses to include applied learning strategies, and having teachers encourage students to take these courses;
- Vocational teachers are emphasizing academic content in their courses by getting students to read technical materials, revising vocational courses, having students do joint learning projects with academic teachers, and assigning homework;
- Academic and vocational teachers are meeting, planning together ways to improve the academic achievement of students, and sharing a common goal to improve the academic achievement for general and vocational students; and
- Systems are being put in place to provide the extra help students need to succeed in the accelerated curriculum.

We saw more progress this year in revising curriculum, instruction, school organization, and school climate than we had seen in the two previous years combined. **Patience, persistence, consistency, and the long-term view are essential ingredients for school improvement.**

What Have We Learned That Might Have Policy Implications for Improving Secondary Schools?

Several aspects of the Consortium initiative have implications for state and local policy.

First, a major effort to improve secondary schools should focus on a few outcome goals, such as significantly improving the communications, mathematics, science and problem-solving skills of students in the general and vocational curriculum.

Second, policy initiatives to improve student outcomes should suggest the basic ways the current system may have to change to achieve the desired outcomes. Through the Consortium, SREB provided pilot sites with a few research-based "essential practices" for improving secondary schools. **These were not presented as a prescriptive mandate, but rather as guiding principles to provide structure and assistance to secondary school personnel as they plan how their high schools could change to increase student achievement.**

Third, what we have learned suggests that the focus of improvement must be at the school building level. But, the local school needs encouragement and support from both the state and the local system's central office staff. Each school must have a problem-solving focus and the authority to depart from traditional practices in carrying out an action plan for improving student achievement.

Fourth, based on our experience, we have found that legislative mandates and accountability are important, but they alone are not sufficient to change the quality of secondary schools. It will take state leadership that is willing to:

- Help local systems and schools define and solve their own problems;
- Spend several years helping local schools make changes necessary to improve student achievement;
- Convene teachers and principals from a network of schools working on common problems so they can learn from each other and be exposed to some of the most knowledgeable people in the nation on ways to improve schools;

- Help secondary school teachers and administrators form a new vision of how their schools can be different.

Fifth, schools need a few discretionary dollars for staff development, materials, time for teachers to work together, and time for academic and vocational teachers to coordinate instruction. The secondary school is a very fragmented institution. A few dollars can go a long way in helping a core of teachers to work together toward a common goal.

Finally, keeping the score and reporting the results are essential for improving secondary schools. The score-keeping process must be more than communicating to the community how bad the schools are. It should focus on both the experiences that students have while going through the secondary schools and on the consequences of those experiences on students' performance. The Consortium has linked students' high school experiences to their achievement on NAEP. We have attempted to use an assessment process that allows schools to see the connection between the quality of school experiences and students' performance by providing school leaders with information that compares their students' experiences and performances with those from sites whose students score better or worse than their students. **We see the confidence of administrators and teachers at many sites increase as they experience success in accelerating the achievement of students in general and vocational studies.**

Priorities for Pilot Sites for the 1991-92 School Year

Based on the 1990 NAEP assessment results and visits to 15 pilot sites during 1991, three Consortium priorities are proposed for the 1991-92 school year.

- **The first priority is to close achievement gaps in reading, mathematics, and science.**

  To close the gap in reading will require both academic and vocational teachers to adopt "Reading for Learning" strategies for getting male students to read and comprehend materials in the content area. In pilot sites where vocational and academic teachers receive help in using those strategies, students have made significant improvement in reading.

  To close the gap in mathematics will require: 80 percent of vocational students to be in a higher level mathematics course during their senior year; increased use of applied learning strategies by teachers of college preparatory mathematics courses; and a greater involvement of girls in the advanced applied mathematics course.

  To close the gap in science will require enrolling all students pursuing a vocational major in either Principles of Technology or Applied Biology or Chemistry during either the eleventh or twelfth grade; increasing the use of applied learning strategies in college preparatory science courses; and eliminating student access to low level science courses that do not provide lab-based learning experiences.

- **The second priority--to institutionalize basic changes in what is taught, when it is taught, and how it is taught--requires continued efforts to plan and carry out programs of study.** A planned program is essential for integrating the content from the college preparatory curriculum with career and vocational studies.

- **The third priority is an ongoing staff development program aimed at broader implementation of Consortium curricular, instructional, and school organizational strategies at each site.**

Where Does the Consortium Go to in the Future?

Four major items for consideration are on the Consortium agenda for the future.

First, the immediate plans are to continue, at least through 1993, the initiatives with the 38 pilot sites so we can learn more about ways to improve large urban high schools, means to sustain and make further improvements at other sites, and how to better connect the secondary initiative to two-year postsecondary schools.

Second, assist participating states in setting up a State Network of Model Schools committed to Consortium goals and strategies, with SREB performing a leadership and assessment role. The stimulus for this is the new federal vocational education legislation that has as its primary purpose the goals and strategies of the SREB-State Vocational Education Consortium. Thus, federal resources are available to support the development of state networks of model schools.

Third, expand the Consortium initiative to include identifying goals and basic strategies that postsecondary instruction and SREB pilot site schools might follow to improve and strengthen the connection between the two levels of education for general and vocational students.

Fourth, pursue strategies for increasing the involvement of private sector employers in helping pilot site schools accelerate student learning.

Summary

As you would expect, the Consortium's goal is about something very important: Improving secondary schools for the "other 60 percent" of students--those who are not identified as college-bound. Consortium initiatives have resulted in getting academic and vocational educators to work together at the school building level to create new approaches for improving student achievement. These approaches seek to help general and vocational students link symbolic academic knowledge to problems and situations that have more meaning to them. **This goal has long-term potential for replacing the general curriculum with a more rigorous program of studies that serves to raise students' expectations, motivation, and achievement and simultaneously better prepare students for employment and postsecondary education.**

We are also using leadership strategies in which teams of teachers from different schools are learning from each other and reshaping the attitudes and practices concerning what is taught, how it is taught, and what is expected of students enrolled in general and vocational studies. It is an approach to improvement that is based on patience, consistency, persistence, and the long view of making substantive change. **It is an effort that seeks to provide the same focus and purpose to students in general and vocational studies that the best secondary schools now provide their students in the college preparatory program of study.**

What the Consortium is about is "do-able." It is more a matter of will, vision, and commitment than it is about large increases in expenditures of dollars.

This paper has been adapted from a presentation made by Gene Bottoms to approximately 100 legislators from the 15 SREB states during SREB's 40th Annual Legislative Work Conference in July 1991. The document was prepared by Gene Bottoms, Consortium Director, and Alice Presson, Program Associate. For more information about the SREB-State Vocational Education Consortium, contact either Gene Bottoms or Alice Presson at (404) 875-9211. Additional copies of this report can be purchased at $1.00 per copy.