Snapshot #36

Preparing High School Students for the World of Work in a Tech Prep Program

St. Mary's County Public Schools
Leonardtown, Maryland

Joan M. Shaughnessy

Research Findings

In St. Mary's County Public Schools, headquartered in Leonardtown, Maryland, students prepare for the educational and employment opportunities of the 21st century by experiencing a genuine integration of traditional academic and vocational programming. Research findings congruent with the approach St. Mary's has taken include the following, excerpted from the Northwest Regional Educational Laboratory's *Effective Schooling Practices: A Research Synthesis/1990 Update*.

At the *classroom* level:

1.1.1 Instruction is Guided by a Preplanned Curriculum

a. Learning goals and objectives are developed and prioritized according to district and building guidelines, selected or approved by teachers, sequenced to facilitate student learning, and organized or grouped into units or lessons.

1.2.2 Classroom Learning Time is Used Effectively

c. Teachers set and maintain a brisk pace for instruction that remains consistent with thorough learning. New objectives are introduced as quickly as possible; clear start and stop cues help pace lessons according to specific time targets.

1.4.3 Personal Interactions Between Teachers and Students are Positive

d. Students are allowed and encouraged to develop a sense of responsibility and

self reliance.

At the *school* level:

2.1.1 Everyone Emphasizes the Importance of Learning

> a. All staff have high expectations for student achievement. Expectations are for all students; all students are expected to work hard toward the attainment of priority learning goals.

2.1.2 The Curriculum is Based on Clear Goals and Objectives

> c. Collaborative curriculum planning and decision making are typical. Special attention is focused on building continuity across grade levels and courses; teachers know where they fit in the curriculum.

> d. Staff, students and the community know the scope of the curriculum and the priorities within it.

2.3.1 Strong Leadership Guides the Instructional Program

> c. The leader has a clear understanding of the school's mission and is able to state it in direct, concrete terms. Instructional focus is established that unifies staff.

> j. Instructional leaders check student progress frequently, relying on explicit performance data. Results are made visible; progress standards are set and used as points of comparison; discrepancies are used to stimulate action.

> p. Leaders express an expectation and strong desire that instructional programs improve over time. Improvement strategies are organized and systematic; they are given high priority and visibility; implementation of new practices is carefully monitored; staff development is supported.

2.3.3. Staff Engage in Ongoing Professional Development and Collegial Learning Activities

At the *district* level:

3.2.1 Curriculum Planning Ensures Continuity

> f. Districtwide curriculum alignment and review efforts are conducted to insure high quality of instruction and consistency across schools.

Situation

St. Mary's County Public Schools serve students in rural southern Maryland. The population in this area has been growing steadily as the county's economic foundation expands beyond its

agricultural base. New opportunities become available as the local Navy facility increasingly employs civilian researchers. In recent years, suburban development has been a factor in population growth, as the outlying areas of both Baltimore and the District of Columbia have begun to encroach on the perimeters of this rural area.

The majority of the population in the county is white. Approximately 88 percent of the high school students are white, and 10 percent are African-American. The remaining 2 percent are predominantly from the Hispanic community. Less than 9 percent of the students qualify for the free or reduced lunch program.

Prior to 1990, the three secondary schools in the county were structured as comprehensive high schools, each providing course offerings targeted for college preparation and, in addition, a path of loosely defined general courses available for all other students. These general courses were not geared toward developing any specific capability. The new Tech Prep program changes this by equipping high school graduates with both technical and academic skills needed in our changing global economy.

Context

In 1987, the school district began to hear complaints from local employers about poorly qualified workers. Business owners said that high school graduates had poor work habits and were ineffectual problem solvers. In a review of the high school curriculum, the district leaders noted that content related to the world of work was nearly absent from the school's curriculum. They also found that the number of high school courses offered had been expanding, but that the expectations for student achievement in these courses were vague or poorly defined.

These concerns motivated St. Mary's County to apply to the Southern Regional Education Board to become a pilot site for school change. The district became one of 28 sites funded in the 1987-88 school year. Work completed at this time led district personnel to hold the view that it is demeaning to students to graduate them from high school without direction, focus, or workforce skills. St. Mary's County began to design their high school courses to teach skills relevant to future job markets. In these courses, staff developed and implemented strategies to help the neglected majority of students--those who are not college bound--make effective career connections. To minimize a "shopping mall" mentality, the district reduced the number of elective courses, keeping only those that were challenging, focused, and directly relevant to students' career plans. By combining high expectations with clear goals, the vocational program was reconfigured to emphasize job-related skills.

This revamping of the high school curriculum was based on findings from two lines of research. One reveals that half of today's students are kinesthetic learners--those who learn best through movement and physical involvement with learning materials. Another body of research argues that successful program changes are founded upon extensive involvement of staff. Thus, district leaders began to enlist the support of all staff, calling upon teachers to raise expectations and revise coursework to include hands-on experiences in technology. District and building administrators began to stress the importance--and raise the status--of job preparation. They emphasized that the schools' vocational program was an integral and valued part of the overall school program. Administrators demonstrated their support by incorporating the most up-to-date technology available into the program.

Program designers also recognized the need to ensure that change was economically and logistically feasible. The modifications made in this district have been completed with local funding and with no significant increase in personnel. The schools operate on a budget that is comparable to those of many high schools. The current teacher/pupil ratio in the high schools is 1:21, and the average class size is 25. High school staff teach six periods a day.

Components of St. Mary's Tech Prep Program

The Tech Prep program developed in St. Mary's County focuses students' attention on their future employment choices by engaging them in a variety of career-related experiences throughout their school years. Students are guided through an extended career orientation experience beginning in the elementary school and intensifying during their middle school years. Then, students' experiences in high school courses concentrate on skills needed by workers in the 21st century.

GUIDANCE IN THE ELEMENTARY AND MIDDLE GRADES

Career awareness is emphasized in the elementary grades and is followed by a career exploration program at the middle school level. Starting in the sixth grade, student aptitudes, interests and abilities are assessed; and this information is used aggressively in personalized counseling.

In the middle school years, the district creates individual folders for each student with all the data related to career selection. In addition, job shadowing and research projects are required to help students set their goals. All eighth graders take the Differential Aptitude Test in September. When these results are returned, individual career counseling with each student is used to explain the results and plan course registration in ninth grade.

OVERVIEW OF THE HIGH SCHOOL PROGRAM

Once students are in high school, counselors reiterate career themes in their mandatory semi-annual contacts with ninth grade students. Students self-assess their skills with two instruments: the Job OA and the Harrington-O'Shea for Career Decision Making. Orientations to the Technical Center maintained by the county are provided for ninth and tenth graders.

High school students are required to select one of four career cluster options:

- Applied Business/Management Technologies
- Applied Engineering/Mechanical Technologies
- Applied Health/Human Services Technologies
- Four-Year College Preparation.

All incoming ninth grade students--including those who are college bound--are required to enroll in a course that introduces them to technologies in one career cluster. These courses are structured around short but intensive modules and are designed to engage students by offering hands-on experiences in a wide array of topical areas. College-bound students, along with the rest of the student body, pick from one of the three areas below.

Modules in the **Business/Management** cluster for ninth graders include:

- Computer-Aided Drafting
- Electronic Publishing
- Problem Solving/Human Relations
- Automated Accounting
- Free Enterprise/Entrepreneurship
- Marketing

In the **Engineering/Mechanical cluster**, some of the modules are:

- echnology
- Medical Technology
- Bridge Construction
- Residential Wiring
- Hydraulic Systems
- Solar Power
- Laser and Fiber Optics
- Architectural Drawing
- Robotics
- Aeronautics

Those ninth graders choosing the **Health/Human Services** cluster are oriented to such areas as:

- Biotechnology
- Environmental Water Management
- Horticulture
- Agriscience
- Computer-Aided Design/Interior Design
- Food and Nutrition
- Textiles

For all students, technology training and career focus are integral parts of their school experience. While half of the students in high school enroll in the College Preparation courses, the other half now have a specific job-related purpose for high school.

ROLE CHANGES FOR TEACHERS

The redesign of the high school required cooperation from vocational and academic teachers and from counselors. Much of the work depended upon the vocational teachers. These teachers were motivated to make dramatic changes in course content and instructional strategies because, prior to Tech Prep, declining enrollment in vocational education meant that they had to market their own courses to maintain their jobs. Moving to a Tech Prep approach provided a new role for vocational teachers, i.e., it enabled them to become leaders of change rather than reactors.

The district started its redesign with two curriculum development workshops for all teachers during the summer months. In year one, the major impetus was to link math teachers and vocational teachers by giving them personal contact with one another. Once the teachers knew each other's names and faces, they learned more about each other's jobs by trading places in the classroom. A vocational teacher came into geometry classes and taught a unit on the area of solids. A geometry teacher went to a carpentry class and taught the math formulas for elliptical arches. Teachers who participated in the job trade say this experience "opened their eyes" to

new ways of teaching and to a better appreciation of the work of their colleagues in other departments. Teachers established ongoing collaborative relationships based on these early experiences of "walking in each other's shoes."

Cross-department connections have become the driving focus in curriculum development. Vocational and academic teachers have worked cooperatively to create instructional strategies that engage students with technology in the classroom. Their success is readily apparent in the ninth grade laboratory courses that orient students to the world of technology. Working cooperatively continues to challenge teachers to improve their initial efforts. The first version of the modules used in the ninth grade laboratory courses was created by the teachers during the summer, but the development process is ongoing as teachers locate new materials or see a need for modifications.

The career preparation theme continues to be supported by all teachers, academic and vocational. Teachers have modified the curriculum to link the academic content in their courses to real-world application. All teachers have added units to their classes to make student experiences more contextual and to insure that the curriculum includes "problem-rich" activities. Training continues to be provided each summer. In August 1994, four-day institutes were offered on two separate topics: "Teaching Through the Learning Channels" and "Teaching Tomorrow's Work Force." The first of these provides a more comprehensive understanding of sensory preferences for learning and guides lesson plan revision so teachers include more concrete teaching strategies. The second institute prepared teachers to manage classroom experiences so students learn both academic and interpersonal skills in the same lessons.

These large-scale changes are based upon trust in teachers' abilities. The district also provides opportunities for teachers to gauge their own growth and conduct their own self-evaluations.

CHANGES IN COURSE CONTENT

Curriculum integration has been focused on real work situations. In English classes, for example, applied communications have been integrated into literature study. Ninth graders learn how to follow the type of directions used in a job setting. Eleventh graders study techniques of persuasion and advertising and look for examples in their day-to-day experiences. Discussions can center on the influence of printed materials with references to diverse sources. Anything from Revolutionary War literature to Channel One broadcasts may be included. To connect literature study to the more "applied" components of the curriculum, readings are often integrated with other courses students are taking. For example, English students read *Lord of the Flies* at the same time they were studying the functions of governmental rules. Teachers of both courses prompted students to connect the concepts with their discussions.

Course content has also become more challenging as summer workshops prepare teachers to incorporate skill building in higher-level critical thinking and problem solving into all curricular areas.

TECHNOLOGY SKILLS

Staff who teach the ninth graders stress the importance of providing students with an overview on the development of technology. Teachers see the importance of making their whole course consistent with the philosophy of hands-on experiences. Teachers avoid lectures to deliver content; instead they develop experiments or simulations for students. Classroom activities

demonstrate the impact of technology in our society.

Success in lab activities depends heavily upon the kind of skills that high school students bring with them. Teachers say that having keyboarding skills, for example, makes it much easier for students to interface with computers. Students also need inquiring minds and a willingness to try new experiences. Ideally, students need to be prepared for this curriculum in their middle school experience.

CONNECTION TO STATE REQUIREMENTS

State mandates have been the impetus for developing some aspects of the program. In St. Mary's County, the district doesn't aim for mere compliance, but takes these mandates as new opportunities. For example, Maryland now requires that all high school students complete 75 hours of community service. The state also requires students to pass minimum competency exams called the Maryland Functional Tests. The district has taken advantage of these circumstances by allowing students with high scores on the Functional Tests to fulfill their requirement for community service by tutoring those students who have not been successful in their first attempt at the tests.

FORMATION OF REGIONAL PARTNERSHIPS

Beginning in 1989, St. Mary's County established cooperation with two neighboring counties. Together, these three counties have forged a combined mission and have fleshed out the specifics for the three career cluster areas. Their collaborative work was formalized in an agreement between the three counties and the regional community college. All of these agencies have agreed to provide resources to deliver advanced school-to-work training to students. The regional Technical Center stands as a testimonial to their combined commitment to the Tech Prep concept.

CONTACT WITH LOCAL BUSINESSES

A first step in community involvement is the formation of strong partnerships with local businesses; these provide apprenticeships for students. The St. Mary's district has fostered this cooperation via the Business Education Community Alliance (BECA), a community-based alliance which promotes career connections by arranging for job shadowing, teacher mentoring and employer surveys of business needs. This group has sponsored the study of job functions and technical specifications for regional jobs, so that curriculum developers can match course expectations to job specifications. Schools also invite 40 business people to an annual luncheon and ask these potential employers to provide targeted feedback about the students entering the workforce.

Teachers themselves have been identifying and summarizing national and regional business trends so they can tap into this information when they do their curriculum development work. For example, the assessment of regional needs demonstrated that there was no computer repair business operating in the area. A group of alert electronics teachers noted this lack, and as part of a project for an electronics class, have established a PC repair company. Now, with the help of the Technical Center, students are being trained to meet an immediate community need, while they benefit from on-the-job training and a supplemental income.

To maximize the compatibility of the Tech Prep classes with real-life work contexts, the

program administrators have created many opportunities for teachers to interface with businesses and other employers to learn about the demands of the workplace. During the summer, 43 of the district's teachers worked in local businesses for two weeks. Teachers use this experience to develop and modify their curriculum. The district also has agreements with over 140 local businesses for a job-shadowing program.

Tech Prep in Practice

Halfway through the school year, the ninth grade students in the Applied Engineering course are re-examining their career goals. Using the Vision Plus computer program, students have prioritized their job expectations. The program probes students with a series of queries, e.g., what is the most important consideration when you select a career? Students are asked if they are seeking a position with consistent hours, minimal on-the-job pressure, frequent travel, or a specific salary level. Students respond to each question posed by the computer. Once students make their personal choices, the computer program searches its data banks and lists promising job options that match the student's profile. The program provides information about wages in this particular field and outlines career paths possible within chosen industries.

Down the hall, in the Applied Health lab, other ninth graders are busy working on one of this course's fourteen modules. In this class, the teacher acts as coach and facilitator, and students take responsibility for their own learning. As each group tackles their "work" assignments, the teacher floats from station to station, supervising and answering questions. The modules are structured so that students spend two weeks or ten class periods on each assignment; then they rotate to tackle another of the topics. Student work is self-paced, and instructions for completing the module are usually self-explanatory.

At the environmental waste management work station, three girls are watching a six-minute videotape in which Walter Cronkite is explaining the hydrologic cycle. After the video ends, students work together to answer questions about the cycle in their notebooks. At another work station across the room, two students role play entrepreneurs experimenting with desktop publishing. During the class period, they create a flyer announcing the opening of their new business.

The modules themselves lead students through new content in a personalized way. In addition to providing students with information, modules often require that students apply their learning in specific activities.

Most students seem to be able to pace their work so that they can complete the modules in ten 45-minute class periods. However, if students need assistance working through a unit, they flick on a light at their work station, signaling their teacher to come to their station without disturbing other students.

Results: Changes in Perceptions of Vocational Courses and Increased Student Performance

As part of the Tech Prep program, all students in the school learn about the importance of technology. Technology is portrayed as both a tool to enhance the learning process and a skill

required of all who will live in the 21st century. Emphasizing technology in all courses means that the general perception of vocational education is being modified. The status of technology-related coursework has been raised, because of the new emphasis on job preparation. As a result, enrollment in upper-division courses has increased.

One expected outcome for this program is to increase student achievement, and the data collected indicate that there have been positive ramifications.

Here in St. Mary's County, the average score on the math portion of the Scholastic Aptitude Test (SAT) has increased 50 points during the last four years. Student scores on the Maryland Functional Tests in reading, writing and citizenship are at their highest levels, and a great many more students pass these tests on their initial try. For example, in the 1990-91 school year, 64 percent of the first-time mathematics test takers and 74 percent of the first-time writing test takers passed the state's functional tests. In the 1993-94 school year, 90 percent passed the math test, and 95.7 percent passed the writing test on their first attempt. Since the inception of the Tech Prep program, the number of students completing more rigorous courses (such as advanced placement sections, upper-level mathematics or science courses, and foreign languages) have also increased. In 1990, approximately 30 percent of the high school graduates were meeting state standards for either the college or the occupational program. In 1993, the students designated as "program completers" had increased to 66 percent. The district aims to improve upon this; its goal is to ensure that 90 to 95 percent of all students in the Class of '95 meet these standards.

Behavioral data also indicate that students are rising to the challenges of the new program. Currently, the average daily attendance at the high schools is 93.6 percent; this is the highest in their history. The student dropout rate has declined a phenomenal 300 percent, from 8 percent to 1.9 percent. In addition, the number of discipline referrals has been cut in half.

Data gathered also show that the community is taking a more active role in their schools now. Throughout the county, the number of hours volunteers have spent in the schools almost doubled in a three-year period, from 33,000 in the 1989-90 school year to over 60,000 in 1992-93.

Each year the program has continued to explore new ways to make the high school years more successful and more focused for the students in this county. More information on the St. Mary's County program is available from Stephen G. Olczak, Career and Technology Education, St. Mary's County Technical Center, Route 1, Box 49-2, Leonardtown, Maryland 20650, (301) 475-5501.

May 1994