Modernizing Career and Technical Education Programs

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BY KAREN DRAGE

High-quality career and technical education (CTE) programs can launch America's future competitiveness through increased student engagement, the innovative integration of traditional academic courses, and by meeting the needs of both employers and the economy as a whole. American students failing to keep pace with their international counterparts have given serious cause for concern as the gap continues to widen despite myriad education reform movements.

Recent reform efforts have focused on increasing graduation requirements—which in turn led to the elimination of elective courses such as CTE in the secondary curriculum; the results of reforms are "epidemic level" dropout rates across the country as described in this article posted on the ABC News Web site:

"A recent study by the Department of Education found that 31 percent of American students were dropping out or failing to graduate in the nation's largest 100 public school districts. The implications from dropping out of high school are enormous, including a higher risk of poverty and even an abbreviated lifespan," (Thomas & Date, 2006, p. 1).

While increased graduation requirements have limited the number of CTE courses offered at the secondary level, statistics show that participation in CTE programs increases earnings and improves employment outcomes, reduces dropout and absentee rates, and improves postsecondary outcomes. Modernized CTE supports strong economic competitiveness by:

- increasing student engagement;
- improving math, science and literacy skills;
- meeting America's workforce needs; and
- meeting employer needs for highly skilled workers.

Although CTE was ignored in President Bush's No Child Left Behind legislation, the Domestic Policy Council reported in 2006 that the president noted that expanded investments in CTE were essential to meeting educational goals, and instrumental in "providing each new generation of Americans with the educational foundation for future study and

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inquiry in technical subjects." Modern CTE programs expose students to future career opportunities and also technical skills at a time when it is critical to get students interested in science, technology, engineering and math (STEM)-related occupations early in their educational careers. Technological advances have transformed the nature of work, and the American educational system has not kept pace with these advances. As a result, tomorrow's jobs will require more knowledge, better skills and more flexible workers than ever before.

Connecting the Classroom and the Real World

In an effort to get the American education system aligned with the technological advances, a partnership involving states, schools, educators, employers, industry groups and other stakeholders was created and new curriculum guidelines, academic and technical standards, assessments, and professional development materials for 16 career clusters were developed. The 16 career clusters were developed to link what students learn in school with the knowledge and skills they need for success in college and future careers. Richard W. Riley, former U.S. education secretary, said:

"Our 16 broad career clusters will help students enhance the link between the knowledge they acquire in school and the skills they need to pursue their dreams. Without limiting students, career clusters help them focus on an area of interest or a possible career path," (States' Career Clusters Initiative, 2008).

One of the 16 career clusters is the STEM pathway. The STEM pathway contains two groups. One group contains the knowledge and the other group the skills required to prepare for careers in STEM. CTE is the foundation to STEM pathways at the middle and high school levels. Programs such as Project Lead The Way (PLTW), which prepares middle and high school students to meet the challenges of tomorrow's workforce, have been very successful in introducing America's youth to careers of the future. Unlike the traditional middle and high school curricula where there is little connection between the classroom and the real world, students in PLTW experience the hands-on, real-world approach of learning. The PLTW curriculum allows students to see how the lessons they learn in the classroom are valuable tools to be applied in their everyday lives (Project Lead the Way, 2008).

CTE and Emerging Fields

While career clusters and PLTW have been instrumental in attracting attention to STEM and CTE in the middle school and high school curricula, CTE needs to stay ahead of the curve and promote emerging fields in technology, such as biometrics. Biometrics—user authentication based on a fingerprint, voice pattern, retinal scan or other biological characteristic—is rapidly gaining momentum, leading to a variety of new jobs in related fields. As biometrics hit the mainstream, the technology is proving itself as both a convenient and secure method of user identification (Edwards). Organizations using biometric identification include hospitals, financial institutions, retailers, governments and security companies. These organizations employ individuals from all the career tech program areas; therefore, the foundation to the STEM pathway can easily begin in CTE with a discussion on how biometrics is used in these organizations and the skills needed to pursue a career in biometrics.

Many students will become intrigued with the technology and engrossed in the role it will play in their future. Integrating biometrics technology into the curriculum will provide students with a strong understanding of the subject matter and enable them to make informed decisions about how this technology is being introduced into society, as well as to determine the best methods of analyzing the results of its introduction. From an industry standpoint, many businesses will be seeking qualified individuals who have knowledge of and experience in biometrics technology; biometrics is a viable career choice even in a time of economic decline (Daggett, 2005). CTE courses attract and serve a diversified population that can serve such emerging sectors.

Incorporating biometrics into coursework at the middle and high school levels will require the retraining of CTE teachers and realigning the current curriculum. Reinventing American high schools to meet the needs of students in the present and in the future requires a willingness to change familiar structures and practices in the best interest of our young people. William Daggett, widely known for his efforts in high

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school redesign, believes that successful schools prepare all students for the future. The constant change in technology is an example of the challenges of this concept. China is now positioned to become the world leader in biotechnology and nanotechnology research and development. Daggett reported that 60 percent of all bachelor's degrees in China are awarded in the areas of science and engineering and 90 percent of the world's scientists and engineers will work in Asia by 2010. The dynamics of competitiveness at the national and global level and the challenges America faces is constantly on the minds of the business and education community. CTE can be instrumental in closing the competitiveness gap by adopting a proactive approach to curriculum development as opposed to the traditional reactive approach.

Investigative Learning

While some of the other academic areas may dispute the fact that biometrics can be effectively taught in CTE programs by CTE teachers, it is well known that students in middle and high school will not take courses that are not interesting. Therefore, the draw at this level is in how biometrics is taught and less about what will be taught.

What sets CTE apart from the other academic areas is its focus on the application of knowledge and the creation of in-depth understanding to solve problems. Real-world problem solving delivers the high-value goods in the classroom. Greenes (1996) contends that unstructured problem solving burns lessons into a young mind so much more effectively than reading about it. Investigative learning accentuates the natural curiosity and investigative nature of middle and high school students while encouraging the application of higher-order learning skills. This method includes utilizing curiosity-provoking situations, problems and questions to captivate students' interest and attention (Greenes, 1996).

While investigative learning experiences, sometimes referred to as applied learning, are important to any student, they are extremely beneficial to minority students. "The opportunity to combine academic performance coupled with practical experience in a monitored environment becomes a critical ingredient to the successful minority's entrance into the marketplace," (Jones, 1995, p. 78).

Investigative learning has also proven to be a successful methodology for teaching students with disabilities. Inclusive schoolwide practices of investigative learning may include using grade-level teaming, cooperative learning in "pods," researching, analyzing, discussing and writing about scientific and social questions (ERIC/OSEP Topical Brief, 2002). Because CTE is rich in the investigative learning methodology and thereby serves different type of learners and various learning styles, it is the perfect environment for teaching biometrics to a diverse population of students.

Moving CTE Forward

It is time for CTE to move beyond promoting the teaching of soft skills. Indeed, critical thinking, communication and teamwork skills are needed to prepare students for the world of work in an internationally competitive economy. But CTE needs an updated focus—one that will convince administrators to support CTE in the secondary curriculum. Modern CTE programs, geared to technology and industrial standards, can provide the same level of rigor and relevance to which the other traditional academic courses aspire, and at the same time sustain the unique identity of CTE. The future of CTE lies in promoting high standards—both in academic and occupational areas—and developing curriculum in emerging fields such as biometrics. As the country moves into an era of change, it is time that CTE embraces this change and opens its eyes to the new realities of work and education. T

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