

**Minnesota Future Work FY2007 Report**  
**On**  
***Research in Career and Technical Education programs***  
***For***  
***Carl D. Perkins Career and Technical Education Act Planning***

The Minnesota Future Work (MFW) Carl Perkins environmental scanning program is centered on research that provides insight on aligning high school and college CTE programming that results in a successful outcomes for all CTE students. The focal point of the research is on programmatic career pathways/programs of study as primary means for:

- Ensuring that CTE high school students are enrolled in academic and technical programs that lead to achieving a high school graduation credential;
- Developing and expanding support services and programs that provide CTE high school students the knowledge and skills to become college and work ready;
- Ensuring that high school and college CTE students attain credential-based skill proficiency;
- Providing those CTE educational programs that prepare students for high skill, high wage, high demand careers; and,
- Assuring that CTE students make the transition to further education or employment at various self-determined stop-out points along a chosen career path.

Source: *The 2006 Carl D. Perkins Career and Technical Education Act (Perkins IV)*

The MFW environmental scanning focus is on information priorities listed below that were determined by the Perkins Coordinators in a pilot survey during the summer of 2006. This report is organized on the direction determined in the study and CTE career pathways and programs of study:

- 1) Models, projects, methods, and trend analysis.
  - a. innovative career pathways/programs of study
  - b. support services
- 2) Methods to encourage students to enroll and succeed in rigorous courses in core academic subjects.
  - a. college readiness projects
  - b. integration of CTE and academic education
- 3) Providing Industry-recognized credentials.
- 4) Evaluation studies to promote continuous improvements.
- 5) National Research Resources

Source: Report of Interviews of MnSCU college staff and the Carl Perkins Planning Process  
September 19, 2006, Minnesota Future Work

## **Themes from MFW research that cross over the various model projects**

1. Students will be better prepared for college and require less remedial education if they are informed by college and high schools of what courses will enable them to succeed in college.
2. Students who enroll in a rigorous academic curriculum continued their education at a much higher rate than those students who do not. Students “in the middle” who have the potential to be successful in a college preparatory path will: succeed in a rigorous curriculum, enroll in colleges, and enter mainstream activities of the college.
3. Continued development of academic content explicit in CTE courses and CTE teachers understanding and teaching to academic standards will result in CTE students performing well when compared to the general high school population.
4. The rate of student success is greatly increased with a support network and a college staff person is in contact with new at risk college students.
5. Additional Tech Prep programs should be STEM related opportunities that result in high paid in demand careers.

## **Minnesota Future Work Environmental Scanning for Perkins Planning**

### **1. Models, projects, methods, and trend analysis.**

#### **a. Innovative career pathways/programs of study**

##### **Occupational Projections for 2004-2014**

A wide variety of occupations including Health, technology and education jobs are listed on the sort for Minnesota High Growth/High Wage Occupations, 2004-2014 for occupations that require less than a baccalaureate level degree.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/High%20Growth%20High%20Wage%20Occupations%20Requiring%20Less%20than%20Bachelor%27s%20Degree.pdf>

##### **The Career Pathways Guide**

Community colleges often play a linchpin role in career pathways. The career pathways approach helps community colleges better align their various mission areas of workforce development, academic credentialing and transfer preparation and remediation. Students entering into adult literacy or college remedial coursework are better able to advance to and succeed in college-level programs, and all students can more readily earn post-secondary credentials and make progress toward a career.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Academic%20Pathways.pdf>

##### **Schools Helping With Career Choices**

The pathways approach is a coherent, articulated sequence of both rigorous academic and career courses beginning in ninth grade” that lead to an occupational area. In studies,

participating high school student performances was “at least comparable” to the college students. Students enrolled in pathway courses tend to be highly motivated, higher ACT scores, academically gifted students

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Schools%20Helping%20With%20Career%20Choices.pdf>

#### ***Agriculture, Food and Natural Resources Pathway***

##### **Harrisburg Area Community College (HACC) agribusiness program,**

College in the High School’ effort that allows qualified high school juniors and seniors to select special courses taught by their local agricultural educators who have been qualified by HACC. Students who successfully complete the class work earn three college credits which can be transferred to approximately 70 percent of the colleges and universities throughout the United States.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/PA%20Agribusiness.pdf>

*Architecture and Construction Pathway (a model for each pathway will be selected by 7/1/2007)*

*Arts, AV Technology and Communications*

*Business Management and Administration*

*Education and Training*

*Government and Public Administration*

*Health Science*

*Hospitality and Tourism*

*Human Services*

*Information Technology*

*Law, Public Safety, Corrections and Security*

*Manufacturing*

*Marketing, Sales and Promotion*

*Science, Technology, Engineering and Mathematics*

*Transportation, Distribution and Logistics*

## **b. Support services**

### **Project Connect: Smoothing the Transition from High School to College**

Project Connect is not your typical summer program. Components include English, Math, Technology, Wellness, Stop Action, and Career as Student. In English, math and technology students are introduced to college-level learning and give them a sense of the workload in college. The intent is not to remediate but to help developmental-level students understand their placement and to acquaint all students with college expectations for written assignments and for the sort of work that goes on in any college

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Project%20Connect.pdf>

### **What Works for Latino College Students**

*Excelencia* in Education provides data-driven analysis of the educational condition of Latino college students and increases attention on the completion of the high school and increase Latino academic success in college. *Excelencia* adds value to efforts closing the achievement gap in an area of critical unmet need—ensuring the educational success of Latino students in

higher education-while linking with effective Pre K-12 strategies that enhance Latino college-going.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/What%20Works%20for%20Latino%20College%20Students.pdf>

### **Career-tech Can Help American Competitiveness**

High-quality career and technical education can ensure America's future in the global economy through increased student engagement, the innovative integration of math, science and literacy skills, and by meeting the needs of employers. Where academic content has been made explicit in CTE courses and CTE teachers understand and teach to the state's academic standards, CTE students have outperformed the general high school population. Students must be exposed to future career opportunities during their formal education, and it is critical to get students interested in STEM-related occupations early in their educational careers

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Career-tech%20Can%20Help%20American%20Competitiveness.pdf>

### **Financing Adequate Career and Technical Education in Wisconsin**

A growing number of CTE courses are focused on (or have the potential to address) engineering, technology, and health service or health science workforce development needs. Studies indicate of high school course taking revealed that a combination of four academic and three CTE courses had the greatest positive effect on high school graduation rates. Sustain active instructional and career guidance roles (a web of collaboration among partners beyond high school) for education-business-higher education partnerships that are focused on high wage careers that prepare youth for science, technology and engineering related careers.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Financing%20Adequate%20Career%20and%20Technical%20Education%20in%20Wisconsin.pdf>

### **The Puente Project: A Proven Track Record of Academic Success**

This is a program that improves student success in college. The colleges work with high schools in their region to cooperatively provide courses. Puente is open to all students. Students in the program take an accelerated two-course English class sequence with a curricular focus on Latino literature and experience, meet regularly with a Puente counselor who helps navigate the college application process and follow a college-prep curriculum, are matched with a professionally and academically successful mentor from the community and attend field trips to college campuses.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20Puente%20Project.pdf>

### **Workers' Job Skills Criticized in Report**

Insufficient academic skills among entry-level workers as well as inadequate abilities to work in teams, think critically and communicate are listed job worker deficiencies. HR managers give poor grades to their entry-level hires, and they implore business leaders, educators and policy-makers to work together to improve the graduate readiness. successful partnerships among businesses, schools and the public, aimed at promoting youth participation in science, technology, engineering and math. That sort of collaborative approach can help produce better workers.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Workers%27%20Job%20Skills%20Criticized%20in%20Report.pdf>

### **The Next Big Thing for Community Colleges?**

Problems are occurring in occupational programs at two- and four-year institutions - especially the issue of poorly prepared students - are holding back vocational programs. Many community colleges have long had "2+2" programs that link the curriculum in the last two years of high school with two years at a community college, speakers said that those programs aren't reaching enough students and aren't nearly ambitious enough in steering students in the

right direction. Some states are requiring middle and high schools to have career specialists to help students plan their education so they won't need remedial training later.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20Next%20Big%20Thing%20for%20Community%20Colleges.pdf>

## **2. Methods to encourage students to enroll and succeed in rigorous courses in core academic subjects.**

### **a. College readiness projects**

#### **Getting Students Ready for College and Careers**

Not only do states need more students to graduate from high school; they also need graduates who are ready for what lies ahead: more advanced learning and high expectations on the job. States do not have college- and career-readiness standards built into high school curricula, instruction and statewide assessments. This means that teachers are not always focused on college and career readiness. And it means that courses are not equally challenging from school to school, or even from classroom to classroom. Student learning and college success will suffer if dual enrollment students are not ready for college-level courses, if the courses offered are not really college level, or if these courses displace other school-based, high-level English and mathematics courses

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Getting%20Students%20Ready%20for%20College%20and%20Careers.pdf>

#### **Academic Pathways, Preparation, and Performance: A Descriptive Overview of the Transcripts from the High School Graduating Class of 2003-04**

Ninety one percent of graduates who completed an academic curriculum and 46 percent of students who completed occupational curriculum demonstrated mastery at proficiency level 3 on the ELS:2002 12<sup>th</sup> grade mathematics assessment, which is simple problem-solving, requiring low-level mathematical concepts. Among the high school graduating class of 2003-04, 26 percent followed an academic curriculum concentration, 15 percent followed an occupational curriculum concentration, 3 percent followed both an academic and occupational curriculum concentration, and 56 percent followed a general curriculum.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Academic%20Pathways.pdf>

#### **Advancement via Individual Determination**

The program goal is to ensure that students “in the middle” who have the potential to be successful in a college preparatory path will: succeed in a rigorous curriculum, enroll in four-year colleges, enter mainstream activities of the school, and become educated and responsible citizens. Guidance counselors, working with AVID teachers, use AVID criteria to screen and select candidates for the program. They ensure that AVID students are placed in college preparatory classes. They assist the AVID teacher in monitoring the achievement of AVID students and in disseminating information about the program.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/AVID.pdf>

#### **Research on New College Students**

Until recently, state officials rarely worked with college and business leaders to define exactly what skills and information actually signify college and work readiness. Colleges need to create better data management tools to track student performance over time, develop and communicate high school graduation and college-entrance requirements that meet the demands of the real world, and encourage shared accountability for student success. Four out

of five college students (82 percent) say that they would have worked harder if their schools had demanded more of students, set higher academic standards and raised expectations of how much coursework and studying would be necessary to earn a diploma.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Research%20on%20New%20College%20Students.pdf>

### **Academ-e: Early College Distance Education Program**

The first early college distance education program in Maine, the University of Maine Academ-e offers fourteen courses for university credit to Maine high school seniors through online, video-conferencing and on-campus elements. Early college is rapidly emerging as a key strategy for boosting student achievement and aspirations in Maine. There is heightened interest in Maine to enhance the quality of its schools through increased expectations and rigor, increasing aspirations among its students, and encouraging early college programs throughout the state.

<http://www.umaine.edu/academ-e/orientation.html>

## **b. Integration of CTE and academic education**

### **Mathematics across the Community College Curriculum**

In workshops, math and non-math faculty across the disciplines create, evaluate and modify projects that incorporate mathematics across disciplines. Workshops support faculty, nationwide, in integrating mathematics into their curricula. The project heightens awareness among two-year college faculty of the important role two-year college's play in creating a numerate society.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Mathematics%20across%20the%20Community%20College%20Curriculum.pdf>

### **Trying to Make Math (and Science) Count**

Minnesota survey data was part of voluntary college-readiness testing the students took last fall and winter. Nearly all of the state's 10<sup>th</sup>-graders and about two-thirds of the state's eighth-graders took the exams. The data also revealed wide, early gaps in college-readiness.

Although Minnesota's average ACT scores always look great, the state ranks low in the total number of high school students who take any math, let alone advanced math.

[http://www.cte.mnscu.edu/researchcorner/Future%20Work/Trying%20to%20Make%20Math%20\(and%20Science\)%20Count.pdf](http://www.cte.mnscu.edu/researchcorner/Future%20Work/Trying%20to%20Make%20Math%20(and%20Science)%20Count.pdf)

### **The Toolbox Revisited: Paths to Degree Completion from High School Through College**

The Toolbox Revisited is a data essay that follows a nationally representative cohort of students from high school into postsecondary education. Students who enrolled in a rigorous academic curriculum continued their education with 95 percent of these students earned bachelor's degrees (41 also percent earned masters, first professional, or doctoral degrees) by December 2000. Universities and community colleges should inform students and parents of the increased opportunity for success in addition policymakers and others who habitually read such reports.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20Toolbox%20Revisited.pdf>

### **Career-Based Intervention**

Components of the Ohio Career-Based Intervention program include the following: State Standards, Job Shadowing, Tech Prep programs, Contextual lesson plans, Core Integrated and Academic Competencies, Work Experience and Career Exploration Program, and Work-Based Learning. The College Tech Prep program offers optional Summer Internships at local

businesses, health care facilities, and industrial sites and various scholarships for Tech Prep students to continue their education at the college level.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Career-Based%20Intervention.pdf>

#### **Pathways to College Access and Success**

For the 2002-03 school year, 71 percent of public high schools reported that students took courses for dual credit, meaning that they took a course for both high school and college credit. Today, a growing number of policymakers, education reform groups, and researchers argue that middle- and even low-achieving high school students may benefit from participation in these programs. Develop multiple ways to ensure that all students-regardless of academic background and level of motivation-learn about the credit based transition program

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Pathways%20to%20College%20Access%20and%20Success.pdf>

### **3. Providing Industry-recognized credentials.**

#### **Indiana's Skills Certification System**

Certifications are documentation issued after successful completion of an examination to attest to the bearer's knowledge and skills in a particular occupational area. These certifications are valuable economic credentials that are often specified by employers as credentials necessary for a job or advancement within the company. Indiana established the use of certificates in 1992 in response to meet demands of business & industry.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Indiana%27s%20Skills%20Certification%20System.pdf>

#### **The Perceived Influence of Industry-Sponsored Credentials**

The study found an increasing prevalence, acceptance, and a positive effect from Industry-Sponsored Credentials. Holding an ISC was associated with more positive perceptions of access to training and the positive impacts of credentials on the recruitment process and on employees; chances for career success.

[http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20Perceived%20Influence%20of%20Industry\\_1.pdf](http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20Perceived%20Influence%20of%20Industry_1.pdf)

### **4. Evaluation studies to promote continuous improvements.**

#### **Richland College: A Community College Long-Term Commitment**

Richland College in Dallas was awarded the 2005 Baldrige Award. RLC has four strategic planning priorities: identify and meet community educational needs; enable all students to institutional effectiveness. Located in Dallas, Texas, RLC is the first community college to receive the Malcolm Baldrige National Quality Award.

[http://www.cte.mnscu.edu/researchcorner/Future%20Work/Richland%20College\\_%20A%20Community%20College%20Long-Term%20Commitment.pdf](http://www.cte.mnscu.edu/researchcorner/Future%20Work/Richland%20College_%20A%20Community%20College%20Long-Term%20Commitment.pdf)

### **5. National Research Resources**

#### **The College Ladder: Linking Secondary and Postsecondary Education for Success for All Students**

Of high school graduates, about 66% enroll in some kind of postsecondary education institution immediately following high school, but only about 25% of them earn a degree. Secondary-Post-Secondary Learning Options provide students access to rigorous academics, exposure to the world of college, and an opportunity to imagine a different future-many of the things that are missing from their high school experience. SPLOs should be included in the range of options that communities and educators make available to young people.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/The%20College%20Ladder.pdf>

### **Success For Low-Skill Adult Students**

The findings indicate that community and technical colleges should consider making at least one year of college-level courses and earning a credential a minimum goal for the many low-skill adults they serve. Support should be given to the far larger group of students who have or earn a high school diploma or GED but never go beyond basic skills in community college. More aggressive efforts to educate them about their college education opportunities, combined with “bridge programs” that ease their transition to college, might increase their enrollment and success in college-level programs.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Success%20for%20Low-Skill%20Adult%20Students.pdf>

### **A Whole ‘Nother World --Students Navigating Community College**

Freshman students experiencing problems indicated they took too many classes at once, skipping over recommended prerequisites, or arranging inconvenient class schedules. Research indicated younger students fresh out of high school may need more career advice and direction — more help with their “planful competence” — and assistance with making their college attendance personal. Perhaps community colleges could provide such students with opportunities to connect a college education to the demands of the “real world,” through volunteer work and internships specially designed for younger students.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/A%20Whole%20%27Nother%20World-Students%20Navigating%20Community%20College.pdf>

### **Math and Science Education and United States Competitiveness: Does the Public Care?**

Americans believe overall math and science education is important to U.S. global competitiveness, but are unsure about the importance of math and science after graduation. Most of those surveyed (70 percent) believe that general math and science skills will be very important to all college graduates in the 21<sup>st</sup> Century. However, less than a third (31 percent) said they believe math and science classes offered to students not majoring in those fields are very relevant to life after graduation.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/MATH%20AND%20SCIENCE%20EDUCATION%20AND%20UNITED%20STATES%20COMPETITIVENESS.pdf>

### **Building Pathways to Success for Low-Skill Adult Students**

Only 13 percent of the students who started in ESL programs went on to earn at least some college credits. Less than one-third (30 percent) of adult basic education (ABE/GED) students made the transition to college-level courses. Short-term training, such as the type often provided to welfare recipients seeking to enter the workforce, may help individuals get into the labor market, but it usually does not help them advance beyond low-paying jobs. More aggressive efforts to educate them about their college education opportunities, combined with “bridge programs” that ease their transition to college, might increase their enrollment and success in college-level programs.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Building%20Pathways%20to%20Success%20for%20Low-Skilled%20Adult%20Students.pdf>

### **Action Plan for Higher Education: Improving Accessibility, Affordability and Accountability**

Recommendations include Stronger K-12 preparation and align high school standards with college expectations and raising awareness and mobilizing leadership to address the issue of adult literacy as a barrier to national competitiveness and individual opportunity.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Action%20Plan%20for%20Higher%20Education.pdf>

**Closing the Expectations Gap 2006**

Very few states have high school tests in place that are rigorous enough to signal whether students are ready for college-level work. As a result, colleges largely ignore the results of those tests and instead administer their own admissions and placement tests.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Closing%20the%20Expectations%20Gap%202006.pdf>

**Transforming Higher Education: National Imperative—State Responsibility**

Recommendations include Dual enrollment, concurrent enrollment and early college programs can all help prepare students for college and finish faster.

<http://www.cte.mnscu.edu/researchcorner/Future%20Work/Transforming%20Higher%20Education.pdf>