

# CATEC Strategic Planning & Designing

## Phase I Research

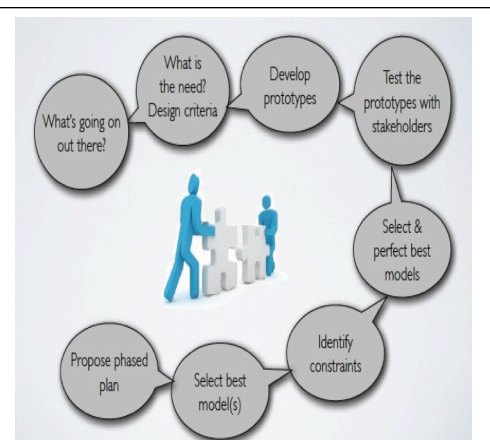
November, 2013

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LLC***



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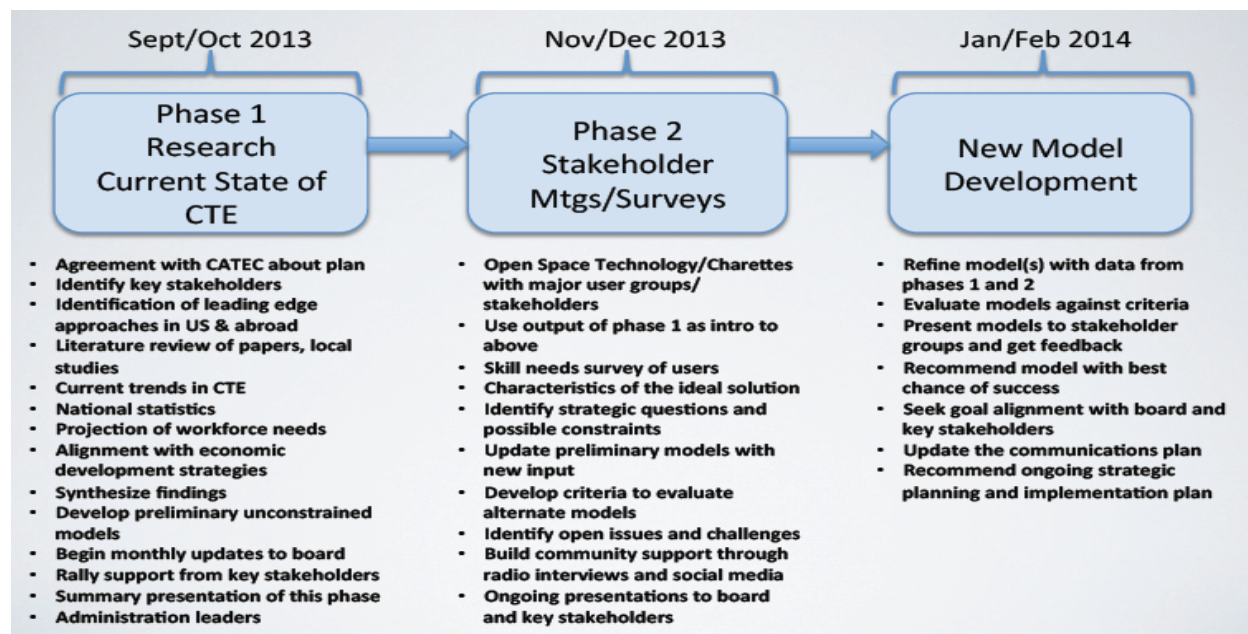


## Introduction – CATEC’s Request and Our Response

In August, 2013, the Charlottesville Albemarle Technical Education Center (CATEC) contracted with Bridgewater Innovations Group, LLC (dba: the bridge, ltd) for the purpose of conducting Strategic Planning and Designing for CATEC. Specifically, Bridgewater Innovations Group, LLC will:

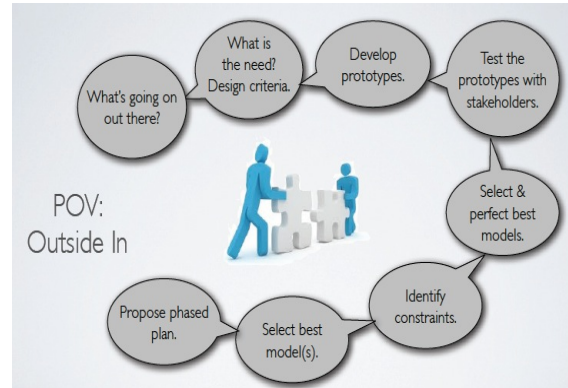
- Conduct a strategic assessment of all program areas, including a thorough review of existing materials and interviews with key stakeholders (staff, board members, partners, donors, program participants, volunteers, and beneficiaries).
- Conduct a three-stage process of strategic planning and designing to include:
  - **Discovery:** Conduct a process of discovering state-of-the-art schooling practices related to Career and Technical Education and specific to regional technical education centers. (September-October, 2013)
  - **Design:** Conduct a process of designing a state-of-the-art regional technical center that integrates community needs, stakeholder values, and highly effective teaching and learning practices while addressing community perceptions and school logistics. (November-December, 2013)
  - **Create:** Conduct a process of creating a regional technical education center in partnership with the CATEC Center Board that incorporates the findings, recommendations, and implications, from each stage of the strategic planning and designing process. (January-February, 2014)
- Maintain regular contact with and prepare regular presentations for the CATEC Center board and the Joint School Boards of Albemarle County and Charlottesville City in accordance with established school board meeting schedules and ad-hoc meetings.
- Prepare a three-year strategic plan and design process for approval by the CATEC Center Board.

Bridgewater Innovations Group, LLC developed a Project Timeline for the three tasks:



The Design Process as established by Bridgewater Innovations Group, LLC involved eight steps:

1. Investigation of the current landscape
2. Determination of the need
3. Development of prototypes
4. Testing of prototypes with stakeholders
5. Selection and perfection of best models
6. Identification of model constraints
7. Selection of best model(s)
8. Proposal of phased plan



Bridgewater Innovations Group, LLC Team Members:

Dr. Grant Tate  
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## **The Current CATEC**

CATEC is a jointly owned and operated facility of Charlottesville City and Albemarle County providing technical education to high school students and to adults. A Center Board composed of three members each from the Charlottesville City and Albemarle County school boards governs the 57,000 sq. ft. facility on 20 acres in Albemarle County, which opened in 1973.

During the school day CATEC offers career and technical education courses that supplement Albemarle and Charlottesville area high school students' regular comprehensive high school programs. Evening adult education programs are offered to community members 16 years of age and older.

The Center offers thirteen high-school programs of one- or two-year duration. Two-year programs include Automotive Service Technology, Automotive Body Technology, Barbering, Building Trades, Cosmetology, Culinary Arts, and Masonry. One-year programs include Dental Assisting, Music Industry Technology, and Nurse Aide. Also offered are Firefighting/EMT (one semester each) Green Energy Design & Technology (one- or two-year program), and a one-year Vocational Exploratory Program.

CATEC currently has a faculty/staff of 33 with 314 high school students enrolled in the thirteen offered programs. The facility has an enrollment capacity of 450 students. Fifty percent of the programs meet most industry workplace standards for equipment and facilities, thirty-three percent exceed industry workplace standards (Barbering, Cosmetology, Masonry, and Music Industry Technology). Automotive Body Technology and Green Energy Design & Technology meet most VDOE course standards but are not industry caliber.

State and national certification and licensure vary by program. Students in Barbering, Cosmetology, and Nurse Aide programs may receive state certification/licensure. Automotive Service Technology, Culinary Arts, Dental Assisting, and Masonry offer nationally-recognized certification/licensure. Firefighting/EMT offers state and national certification/licensure. The Automotive Service Technology, Barbering, Cosmetology, Dental Assisting, and Nurse Aide programs receive strong industry recognition with certification/licensure, resulting in competitive employment.

Business involvement is very strong in the Automotive Service Technology and Cosmetology programs; strong in the Barbering, Culinary Arts, Dental Assisting, Nurse Aide, and Firefighting/EMT programs; and gaining strength in the Automotive Body Technology and Building Trades programs. Green Energy Design and Masonry programs have minimal business involvement.

The largest student population is in Cosmetology with 55 students, followed by Culinary Arts with an enrollment of 50 students. Building Trades has an enrollment of 37 followed by the Automotive Service Technology and Nurse Aide programs each with 31, and Automotive Body Technology with 26. Dental Assisting, Music Industry Technology, Firefighting/EMT, and Barbering have enrollments of 18, 16, 15, and 11 respectively. Green Energy Design has an enrollment of 4; Masonry has 7.

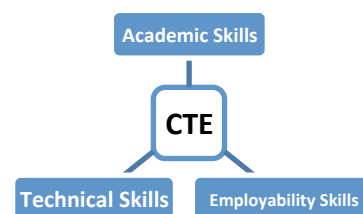
Evening offerings for adult or continuing education at CATEC cover a range of technical education courses designed to enhance current skills, provide new knowledge and skills for increased job marketability, and continue life-long learning. Course offerings include computer training and health services. A broad spectrum of apprenticeship programs includes electronics, carpentry, masonry, plumbing, cosmetology, and barbering.

## Phase I Research

Phase I in the project creation and proposal of a new model for the CATEC of the 21st Century included defining Career and Technical Education (CTE) and its evolving role; the identification of leading edge CTE approaches in the United States and abroad; a literature review of national, state, and local studies and statistics; and projections of national, state, and local workforce needs.

### Career and Technical Education – What it is and how it has evolved

Career and Technical Education (CTE) has replaced Vocational Education in the vocabulary of school administrators in the U.S., whereas Vocational Education and Training (VET) is the term used in Europe. Today's CTE prepares students for a wide range of careers and further educational opportunities, including industry-recognized credentials, postsecondary certificates, and two- and four-year degrees. The goal of CTE is to promote college- and career-readiness skills such as *core academic skills* and the ability to apply those skills to concrete situations in order to function in the workplace and in routine daily activities, *employability skills* (such as critical thinking and responsibility) that are essential in any career area, and *job-specific, technical skills* related to a specific career pathway.<sup>1</sup>



Within CTE, 16 Career Clusters® group occupations and career specialties based on a set of common knowledge and skills that prepare learners for a full range of opportunities, each with 79 related Career Pathways. Comprehensive Programs of Study align academic and technical content in a coordinated, non-duplicative sequence of secondary and postsecondary courses, and lead to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree. Middle schools, high schools, area career and technical centers, community and technical colleges, and other postsecondary institutions offer CTE.<sup>2</sup>

In building the nation's economic vitality, we often overlook the importance of CTE. Too many educators assume that career and technical training is for the last century, not this one. Many reformers treat CTE as old school, rather than as a potential source of cutting-edge preparation for careers. Vocational education lacked academic rigor and relevance. It was a last-stop destination—rather than serving as a launching pad to postsecondary education and industry-recognized certifications leading to a good job.<sup>3</sup>

In past decades, high school graduates throughout the United States perceived minimal options for their futures. They felt compelled to choose one of two forks in the road, with one path leading to college, the other to an entry-level job. The choices, however, are much more complex and interconnected in today's 21st century global economy. Numerous paths, all of which begin with and require a robust high school experience that prepares all students, whether for college or job entry, have replaced the fork in the road.

As depicted by the graphic, effective career pathways rely on coordination across education and training programs in order to offer a clear sequence of industry-relevant coursework and credentials to job seekers. Today's education and training programs include online and in-person opportunities. After being in the workforce, a person may choose to go back for more credentials to make an upward or lateral career move.<sup>4</sup>



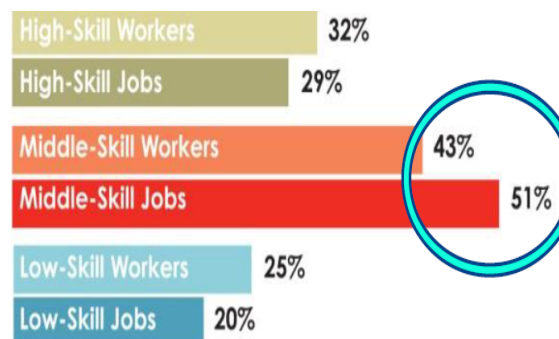
Nationwide, career & technical education programs are changing, evolving and innovating to better serve the country's 21<sup>st</sup> century needs. CTE is preparing students of all ages to help drive America's success and vitality. Further, it is creating an educational environment that integrates core academics with real-world relevance. CTE is leading this change, transforming expectations and making a difference for students, for secondary and postsecondary schools, for businesses and industry—for America.<sup>5</sup>

### Current and Future Workforce Trends

Numerous reports and studies focus on current workforce trends and attempts to predict the workforce of the future. While rapid changes in research, design, and technology make it difficult to accurately forecast the workplace of the next decades, commonalities in current research provide invaluable insights.

According to March, 2012 statistics from the Bureau of Labor Statistics Division of Occupational Outlook, by 2020 the economy will create 54.8 million job openings, 20,276,000 of which will be new jobs and 34,524,000 of which will be openings due to replacement of current workers (mostly due to retirement of current workers).

Other research reveals that current job openings are robust for both the middle skill jobs as well as BA+ jobs—and predict that trend will continue. Middle-skill jobs, which require more than a high-school, but less than a four-year degree, make up the largest part of America's labor market. Job opportunities and workforce forecasts indicate concerns surrounding the demand for middle skills jobs and the supply of skilled workers. About 51 percent of all jobs today are middle-skill. About 43 percent of workers have training for these jobs. This results in a skills mismatch and a middle-skills gap.<sup>6</sup>

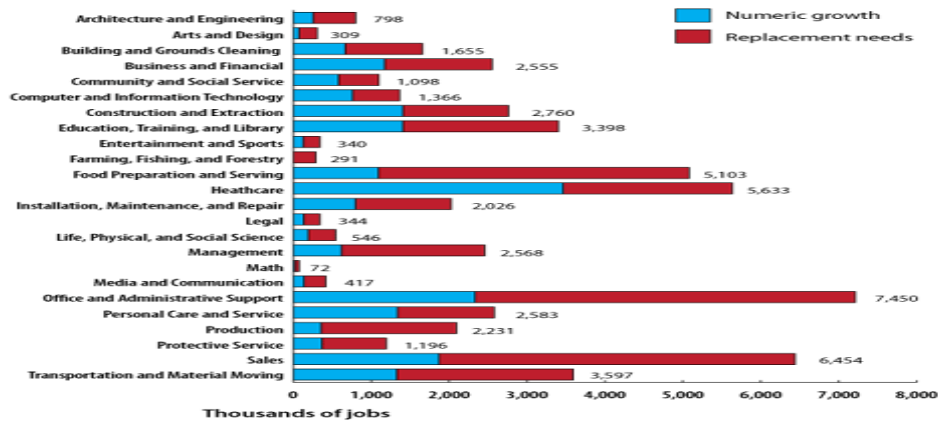


Recent surveys from business and industry support these data. One study, *Advancing Workforce Policy in the States: Developing Skills for Jobs*, a 2013 report by National Skills Coalition Washington DC, included information from two surveys. According to the McKinsey Survey, 64 percent of companies say they cannot find qualified applicants for management, scientific, engineering or technical positions. In another, the National Manufacturing Institute Survey, 67 percent of small and midsize manufacturers report moderate to severe workforce shortages, and they predict this will get worse, not better. Another survey, conducted by The Associated General Contractors of America (AGCA) in August 2013, revealed that 74 percent of construction firms report a struggle to find skilled construction workers at time when construction activity is finally on the upswing.

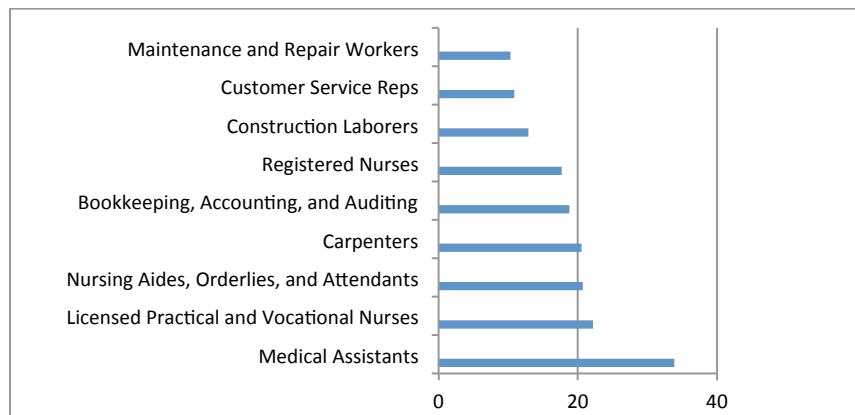
Information in 2012 from the Division of Occupational Outlook (Bureau of Labor Statistics) provides a graphic of job numeric growth and replacement needs by occupational group, 2010-2020. Notable are those occupations consistent with a foundation in CTE.



### Jobs Due to Growth and Replacement Needs, By Occupational Group, 2010-20 (projected)



A 2009 publication, *The 30 Occupations with the Largest Employment Growth 2008-18*, depicted technical jobs with the largest employment growth in the US.

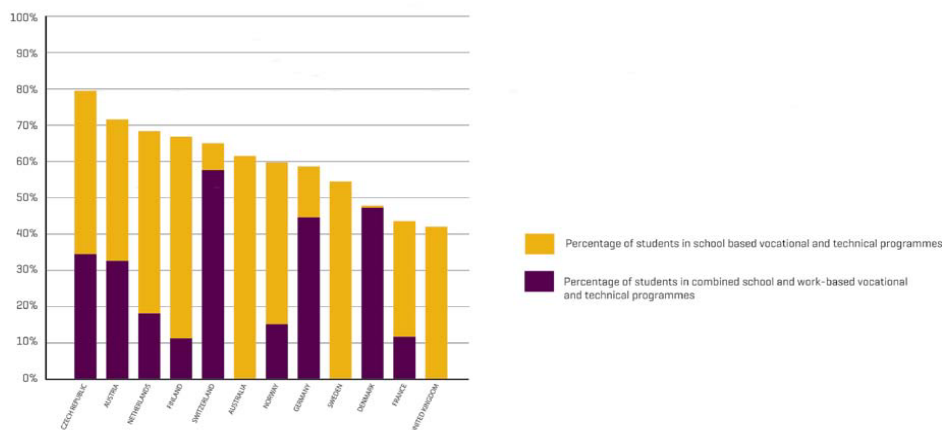


In a recent report, *Regional Existing and Target Industry Analysis*, the Thomas Jefferson Partnership for Economic Development determined targeted industries for Albemarle, Charlottesville, Culpeper, Fluvanna, Greene, Louisa, Madison, Nelson, and Orange. Both this chart and the ones above are consistent with occupations and industries correlated with CTE.

	Albemarle	Charlottesville	Culpeper	Fluvanna	Greene	Louisa	Madison	Nelson	Orange
Bioscience & Medical Devices	•	•							
Business & Financial Services	•	•	•	•	•	•	•	•	•
Information Technology	•	•	•		•				
Defense & Security	•	•	•		•				
Health Services	•	•	•	•	•				•
Agribusiness, Food Processing & Tech	•					•	•	•	•
Transportation & Logistics				•		•			•
Chemicals & Plastics						•			
Forest & Wood Products				•		•		•	
Light Manufacturing			•	•		•			•
Arts, Design, Sports & Media	•	•			•		•	•	

## The Global Perspective

Presently, many industries look overseas to find workers with the skills required in growing fields like information technology and advanced manufacturing. Why? If you look at the U.S. secondary education system through a comparative lens, one big difference becomes immediately apparent: most advanced nations place far more emphasis on vocational education than we do.<sup>7</sup> According to the Organization for Economic Co-operation and Development's (OECD) 2008 *Education at a Glance*, the U.S. does not have the focus on school-based career and technical education programs or on combined school and work-based career and technical education programs found in other countries.



A look at international models provides a better understanding of this focus on career and technical education absent in the U.S. OECD data show that secondary students in competitor nations devote a higher share of their course work to secondary vocational education programs than the United States, with the exception of Canada. Using OECD standards of vocational education enrollment, in most European countries examined, almost half or more of secondary school graduates enroll in a vocational-oriented program (in which they earn 25 percent or more of their total credits). Even in Korea and Japan, with their strong academic traditions, a quarter of secondary graduates concentrate in vocational education by OECD standards. By contrast, since the early 1980s the percentage of U.S. secondary students meeting OECD standards declined from about 18 percent to six percent.<sup>8</sup>

Throughout northern and central Europe especially, vocational education and training (VET) is a mainstream system, the pathway helping most young people make the transition from adolescence to productive adulthood. In Austria, Denmark, Finland, Germany, the Netherlands, Norway, and Switzerland, after grade 9 or 10 between 40 and 70 percent of young people opt for an educational program that typically combines classroom and workplace learning over the next three years. This culminates in a "qualification" (diploma or certificate). In virtually all of these countries, vocational education also provides a pathway into tertiary education for those who choose to take it.<sup>9</sup>

VET has two basic models. The first, usually referred to as apprenticeship or the dual system, has students spend three or four days in paid company-organized training at the workplace, with the other day or two in related academic work in the classroom. Germany has the oldest and best-known apprenticeship system, which offers programs leading to recognized qualifications in about 350 different occupations. Switzerland also has a very highly regarded apprenticeship system.

A second group of countries have opted for a model of vocational education provided in school-based programs, although they all incorporate at least some work-based learning. These countries typically introduce students to a broad cluster of occupations (e.g. health care or IT) before narrowing the focus of training in the third year.<sup>10</sup>



## **Job Shortage or Skills Shortage?**

Obtaining a good job—one capable of providing a family-sustaining wage—has become the ultimate standard for educational adequacy. The mass postsecondary educational system has arrived, leaving academics the debate over “college for all.” Experts might contest whether everyone needs some college education—but the labor market clearly has linked middle-class employability to postsecondary education and training.<sup>11</sup> Essentially, postsecondary education or training has become the threshold requirement for access to middle-class status and earnings in good times and bad. It is no longer the preferred pathway to middle-class jobs—it is, increasingly, the only pathway.<sup>12</sup>

The debate further continues as to whether the country is facing a job shortage or a worker shortage. As many studies indicate, we have a large potential workforce—an existing and growing population, many of whom are currently unemployed or underemployed. The focus is not on workers overall. It’s not a worker shortage. For many companies, it’s a talent shortage. The skills gap continues.<sup>13</sup>

To succeed, manufacturing and technical workers need better training, and must be more creative and highly skilled than ever before. Like their counterparts in other settings, such as hospitals and labs, manufacturing workers are now “knowledge workers” who must use their brains every minute of every shift to get the job done. They must understand complicated processes and be able to predict, prevent, troubleshoot, and solve problems in a high-pressure environment. This means that, as in other economic sectors, high-level, multidisciplinary technical training is a vital part of worker preparation.<sup>14</sup>

This problem is not limited to the manufacturing sector. Across a wide range of industries that rely on middle-level workers, institutions are not teaching the skills that employers need. The private sector spends roughly \$135 billion per year training its workers, struggling to correct for an ill-prepared workforce.<sup>15</sup>

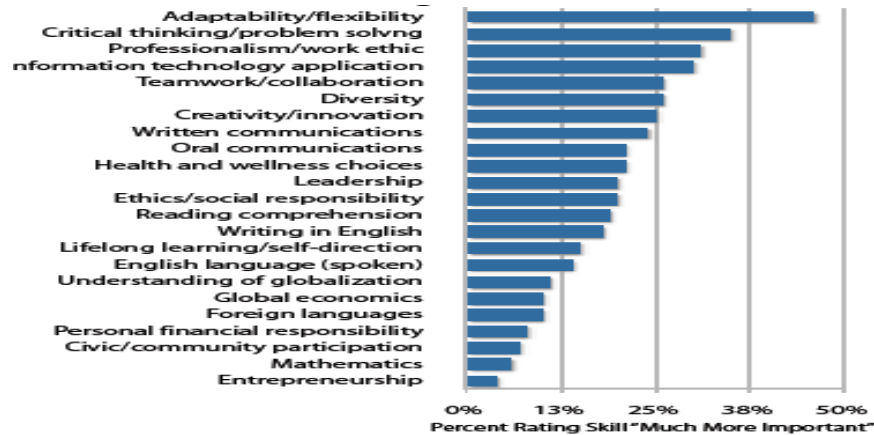
## **Workplace Readiness Skills for the Future**

As technology races ahead, low-skill workers will reallocate to tasks that are non-susceptible to computerization—i.e., tasks requiring creative and social intelligence. For workers to win the race, however, they will have to acquire creative and social skills.<sup>16</sup>

The outlook for workers without college degrees may be uncertain, but not devoid of hope. There will be job opportunities in middle-skill jobs, but not in the traditional blue-collar production and white-collar office jobs of the past. Rather, what is expected is a growing employment among the ranks of the “new artisans”—licensed practical nurses and medical assistants; teachers, tutors and learning guides at all educational levels; kitchen designers, construction supervisors and skilled tradespeople of every variety; expert repair and support technicians; and the many people who offer personal training and assistance, like physical therapists, personal trainers, coaches and guides. These workers will adeptly combine technical skills with interpersonal interaction, flexibility and adaptability to offer services that are uniquely human.<sup>17</sup>

Despite changes in the workplace over the past twenty years, employers from all sectors and across the nation rate workplace skills, character, and behavior as vital qualities for entry-level employees. In 2008, the Society for Human Resource Management reported responses from human resource professionals when asked how skill requirements had changed over the past two years. Respondents, from companies employing workers from high school graduates through four-year graduates, indicated that workplace readiness skills were becoming more important in the workplace—not less. As the chart below shows, workplace readiness skills such as adaptability/flexibility, critical thinking/problem solving, and professionalism/work ethic were judged as becoming more important than in the previous two years.<sup>18</sup>

## Skills Considered “Much More Important Now” than Two Years Ago for New Entrants



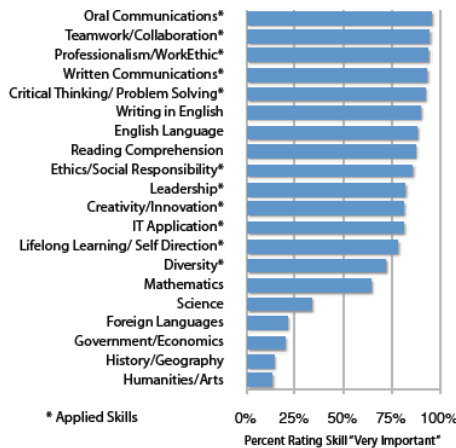
In 2009, the Weldon Cooper Center researchers sought input from Virginia employers on a proposed update of the workplace readiness skills in Virginia’s career and technical education curriculum. Employers from a variety of fields submitted comments on a list of 21 skills developed by the Career and Technical Education Consortium of States, Virginia’s CTE Resource Center, and the Weldon Cooper Center and based on an evaluation of national research, national assessment programs, and workplace skills curricula in use in seven other states.<sup>19</sup> Employers were asked to prioritize skills determined to be “essential” for employees.

### Percent of Virginia Employers Rating Skills “Essential”

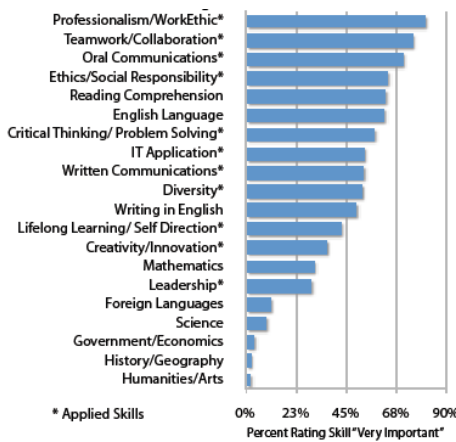
1	Positive Work Ethic	96%
2	Speaking & Listening	96%
3	Professional Ethics	95%
4	Participates As A Team Member	89%
5	Reading & Writing	89%
6	Diversity Awareness	82%
7	Reasoning, Problem-Solving, & Decision-Making	76%
8	Technology Applications	68%
9	Understanding Health, Wellness, & Safety	67%
10	Understands The Big Picture	64%
11	Lifelong Learning	63%
12	Job Acquisition & Advancement	60%
13	Telecommunications	58%
14	Internet Use & Safety	58%
15	Creativity, Innovation, & Adaptability	57%
16	Leadership & Resource Management	54%
17	Research & Synthesis	53%
18	Applying & Understanding Mathematics	51%
19	Data & File-Management	50%
20	Computer Hardware Basics	34%
21	Employment-Related Financial Literacy	34%

The Weldon Cooper Center reports on another study, in which over 400 employers across the nation ranked the importance of eleven “applied” skills (those called workplace readiness skills in Virginia), and nine basic or “academic” knowledge/skills. Respondents rated the importance of these skills for employees entering the workforce at three education levels: high school graduates, two-year college or technical school graduates, and four-year college graduates. For these employers, applied skills topped the list of skills rated “very important” for employees at all three educational levels.<sup>20</sup>

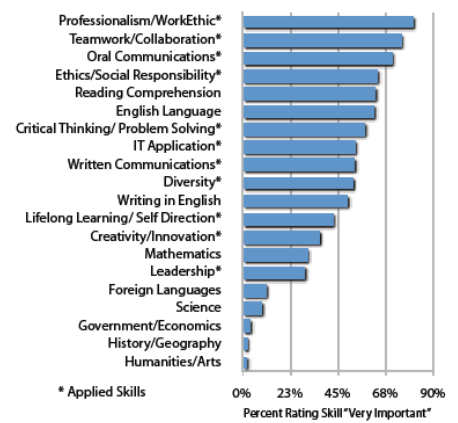
### “Very Important” Skills for 4-Year College Graduates



### “Very Important” Skills for 2-Year College Graduates



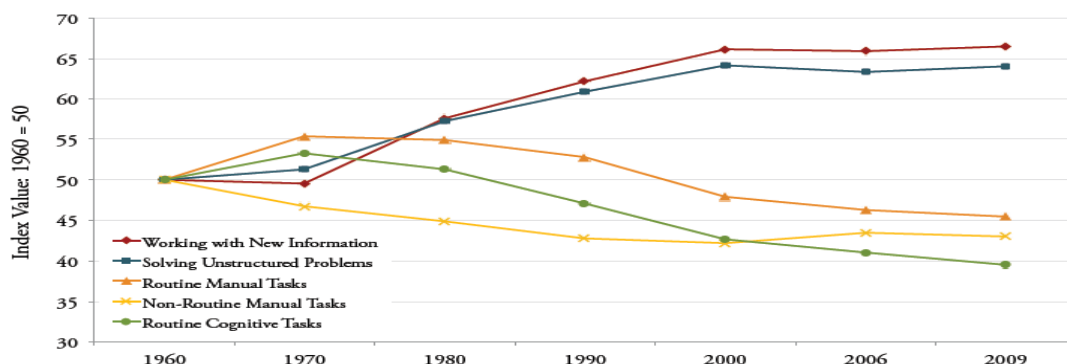
### “Very Important” Skills for High School Graduates



While many middle-skill jobs are susceptible to automation, others demand a mixture of tasks that take advantage of human flexibility. These middle-skill jobs will persist, and potentially grow, because they involve tasks that cannot readily be unbundled without a substantial drop in quality. Consider, for example, the frustration of calling a software firm for technical support, only to discover that the technician knows nothing more than the standard answers shown on his or her computer screen—that is, the technician is a mouthpiece reading from a script, not a problem-solver. This is not generally a productive form of work organization because it fails to harness the complementarities between technical and interpersonal skills. Simply put, the quality of a service within any occupation will improve when a worker combines routine (technical) and non-routine (flexible) tasks.<sup>21</sup>

In *Dancing with Robots: Human Skills for Computerized Work*, Levy and Murnane contend that human work in the U.S. economy increasingly consists of three types of tasks: non-routine manual tasks, solving unstructured problems (car repair), and working with new information (determining a customer’s Internet problem). The growing importance of the second and third tasks represents a significant shift. For much of the 20th century a significant amount of work involved following directions. In many situations, directions were a shortcut—a way to accomplish a task without much knowledge of the underlying process. Today, work that consists of following clearly specified directions is increasingly being carried out by computers and workers in lower-wage countries. The remaining jobs that pay enough to support families require a deeper level of knowledge and the skills to apply it.<sup>22</sup> To further demonstrate the changing skills of the workplace, Levy and Murnane developed an Index of Changing Work Tasks in the U.S. Economy, depicted below.

### Index of Changing Work Tasks in the U.S. Economy 1960-2009

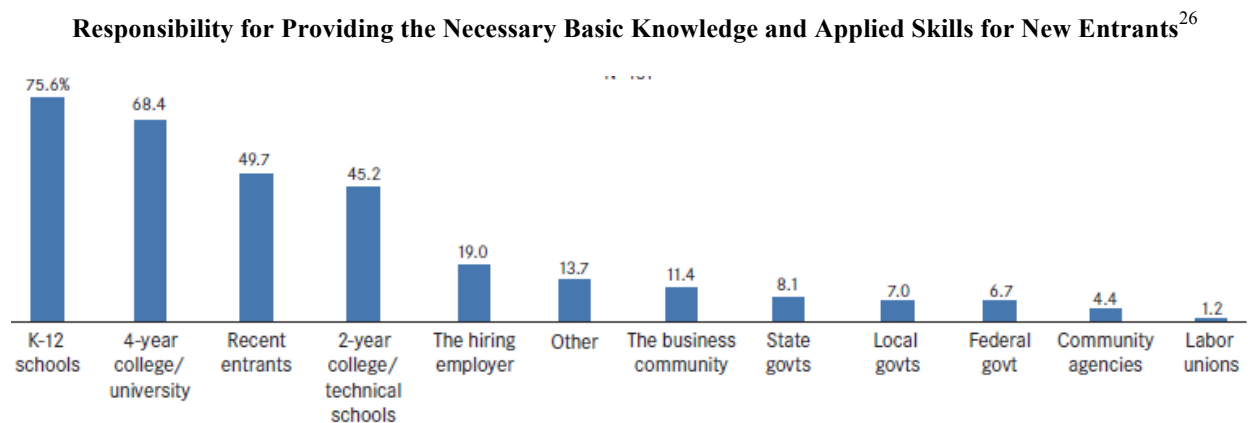


## CTE – Significance, Barriers, Needs, and Promising Practices

Dr. Joseph Scarcella, Professor of Education and M.A. Program Coordinator for the Career and Technical Education Teacher Education Program, California State University, San Bernardino, predicts that with greater technological advances, the influence of CTE throughout education will become more profound and will require even more connection between academics and CTE: “As technology evolves, our society is going to become so complex that we will have to have some form of CTE imbedded in all of our education.”<sup>23</sup> And, according to Dr. Stephen S. Fuller, Center for Regional Analysis at George Mason University, “Demand for workers to fill new and replacement jobs will substantially exceed the supply of available workers in every major occupational category.”<sup>24</sup>

In light of these comments and the research indicative of the need for middle-level skills for current and future employment, the evidence of job-skills gaps, and the diverse skills required for the 21<sup>st</sup> century workforce, it is imperative that career and technical education be considered a major component in the economic landscape. The question is, then, how do we make CTE programs viable resources for employers and who is responsible?

In the 2006 *Are They Really Ready to Work? Employers’ Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce*, a report conducted jointly by The Conference Board, Partnership for 21st Century Skills, Corporate Voices for Working Families, and the Society for Human Resource Management, over 400 employers across the nation employers were asked who should be responsible for providing the necessary basic knowledge and applied skills for their new entrants? Over seventy-five percent of employers indicated that K-12 schools should be responsible for making new entrants work-ready.<sup>25</sup>



Yet, according to research, there are obstacles to overcome in order to elevate the position of CTE programs as viable sources of Virginia’s, and indeed the nation’s, future workforce. Numerous studies have determined barriers to the success of CTE.

### ***Barrier: Attitudes/Perceptions/Engagement***

For many, there is still a stigma attached to CTE and a perceived notion that career and technical education remains the “vocational training” of a generation ago.

Not all parents are receptive, fearing that CTE involves removal of students from the regular school setting and poses a threat to academic learning, drawing children away from college preparation and attendance.<sup>27</sup>

Employer engagement and partnership is lacking. Some employers have little confidence that involvement in partnerships or school-to-work initiatives will be cost effective or reap rewards in reduced hiring costs and greater productivity. School-to-work concerns include costs of bringing students into the organization/allocating time for skilled workers to work with them, laws regarding child labor and safety, insurance costs for general liability and workers' compensation, and management and employee resistance to work-based learning.<sup>28</sup>

Postsecondary institutions, both two- and four-year colleges, may be reluctant to participate in collaboration with high schools/CTE programs with concerns surrounding increased costs and hassles involved in collaboration efforts and the threat to institutional control and accountability.<sup>29</sup> The end result is a loose coupling and duplication among providers.

Teachers may be fearful of change and reluctant to devote the time and effort required to learn and incorporate new ways of teaching and learning into their instruction, curriculum, and classroom management.<sup>30</sup> Professional development to support and guide faculty is often deficient.

High school guidance counselors often guide students toward college preparation rather than career-pathway exploration. Career guidance at many CTE centers is nonexistent.

Minimal media attention to CTE results in limited public awareness of the opportunities available. CTE centers do not self-promote to highlight merits, accolades, and accomplishments.

While some employers turn to CTE as an important source of talent to fill skilled positions within their companies, education and workforce policies have not been sufficient to date to close major skills gaps in the U.S. labor market (relative to demand).<sup>31</sup>

### ***Barrier: Lack of Effective, High-Quality CTE Programs***

CTE programs often lack alignment with college- and career-readiness standards AND with the needs of employers/industry/labor. Programs do not provide students with a curriculum based on integrated academic, technical content, and strong employability skills AND work-based learning opportunities that enable students to connect what they are learning to real-life career scenarios and choices. Often students do not graduate with industry certifications or licenses and postsecondary certificates or degrees that employers use to make hiring and promotion decisions.<sup>32</sup>

Many CTE centers are obsolete in terms of adequate the facility, space, equipment, and functional labs. Funding streams are inadequate to sufficiently maintain a center geared to the 21<sup>st</sup> century workplace. Too often, regulations or organization constraints impact the ability of a center to move forward.

### ***What's Needed***

A 2012 report, *Investing in America's Future: A Blueprint for Transforming Career and Technical Education*, issued by the U.S. Department of Education's Office of Vocational and Adult Education, proposed a transformation of CTE and the ushering in of a new era of rigorous, relevant, and results-driven CTE shaped by four core principles: 1) Alignment between high-quality CTE programs and labor market needs; 2) collaboration among secondary and postsecondary institutions, employers, and industry partners; 3) accountability for improving academic outcomes and building technical/employability skills; and 4) innovation to support CTE implementation of effective practices.

The National Skills Coalition recommends two additional characteristics for robust CTE programs: Sector/Industry Partnerships and Career Pathways/Integrated Education and Training. Sector/industry partnerships involves engaging employers in a meaningful way by convening multiple employers from a regional industry sector to assess and validate labor market information, identify expected job openings and skills and credentials required for these jobs and to engage education/training providers and other

stakeholders to develop solutions and training programs targeted to the skill needs. Career pathways/integrated education and training implies a sequence of education and training courses and credentials that are built around the skill needs of employers and industry sectors, contextualized learning, multiple entry and exit points, stackable credentials or credits leading to industry recognized credentials, intensive wraparound support services and job placement.<sup>33</sup>

### ***Promising Practices***

A review of CTE programs across the U.S. revealed commonalities in successful practices. In these cases, the program:

- Is relevant to community/industry needs
- Is aligned with high employment demands & regional economic development plans
- Contains classroom instruction concurrent with work-based learning and soft skills training
- Gives exposure to multiple aspects of industry or job category
- Includes mentoring, apprenticeships, on-the-job work experience
- Provides performance evaluation of demonstrated competencies
- Provides credentialing: certificates, end-of-program assessments
- Provides involvement with competitions, conferences, career development events
- Includes career and lifelong learning counseling
- Includes academies, career clusters, specific career pathways
- Includes partnerships among high schools, community colleges, employers
- Includes dual enrollment linkages among high schools, community colleges
- Includes two-, three-, and four-year programs
- Provides up-to-date lab and project-based learning opportunities
- Is part of a collaborative network of providers
- Has multiple funding streams
- Has engaged employer involvement
- Has highly competent faculty and staff with relevant practical experience
- Has a strong faculty recruiting and development capability
- Has strong competencies in project-based course design
- Has multiple course delivery channels

### ***Some notable programs across the country:***

Massachusetts and Wisconsin are two recipients of federal School-to-Work Opportunities Act (STWOA) implementation grants dedicated to combining school-based learning, work-based learning, and connecting activities.

Maryland and Pennsylvania have strong programs in tech prep and apprenticeship. In PA, 76 industry partnerships, concentrated in 11 targeted industry clusters, cover every county & encompass local workforce and economic development agencies, education and training providers, non-profit and faith-based organizations, and, most importantly, small and large employers with similar workforce challenges.

Pennsylvania's SOAR (Students Occupationally and Academically Ready) aligns PA Academic Standards and Validated Core Common Competency Lists.

Washington, D.C. allocated \$2.8 million to help city high schools plan for nine new "career academies" meant to help students gain the skills they will need to enter the workforce after graduation. The academies will offer internships and training in one of three career tracks: hospitality, engineering and information technology—three areas in which the District needs workers.

Oklahoma's Craftsmanship 2000 (C-2000) is a model school-to-work transition program.



Wisconsin's Youth Apprenticeship program is part of a statewide School-to-Work initiative. Designed for high school students, the program integrates school- and work-based learning to instruct students in employability and occupational skills defined by Wisconsin industries.

Importing the Northern European apprenticeship model to the United States, three community college programs combine classroom learning with paid worksite training and guarantee successful graduates a job:

Volkswagen Academy – a partnership between VW and Chattanooga TN State Community College in a three-year apprenticeship program.

Apprenticeship Charlotte (NC) – apprentices earn a three-year associate degree or a more streamlined certification in a particular technical field and earn a wage for their on-the-job training.

Future for ME – a Maine partnership of employers, community colleges, and philanthropists with the goal of training workers for 1,000 unfilled, mid-skill manufacturing jobs. Recruits earn a two-year associate degree and then work as machinists for small companies. A separate, one-year program trains workers in robotic textile manufacturing.

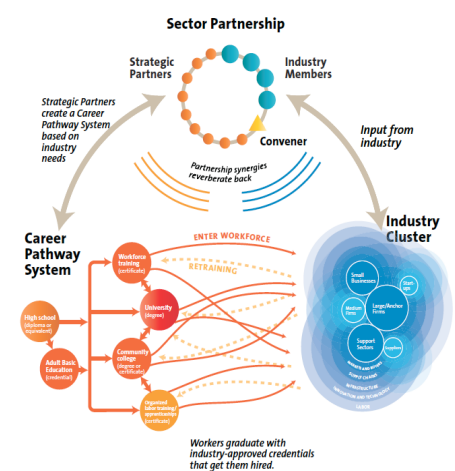
## Conclusions

Methods of work are under pressure and changing rapidly. The continuous state of transformation in technologies, products, and markets requires agility in workforce development and redeployment. While some sources predict that many jobs of the future will require high-skilled, college-degreed workers, research also points to the current and growing need for workers with mid-level skills. Middle-level job requirements outstrip the supply; our supply system is simply not equipped to meet the demands. A skills gap—the mismatch between job requirements and the current skills of many workers—exists and is expected to continue.

Many studies attempt to predict the jobs of the future. Such predictions are difficult, with many past predictions proven wrong. While workforce-forecast research is inconsistent, job skills requirements are consistent across all sources. Future work skills—proficiencies and abilities required across different jobs and work settings—compels an integration of hard and soft skills.

The future of the country's workplace necessitates that all workers have the opportunity to equip themselves with the tools necessary to succeed in their careers and in whatever field they choose in the 21<sup>st</sup> century global economy. Research drives the message: The landscape has changed, appropriate and applicable education and training is imperative, and educational institutions must adapt quickly in response. Career and technical education must be redefined so it is regarded as a valued and respected pathway, as a partner with other educational/training organizations and with industry sectors, and as a means of developing an agile and well-aligned, adequately-equipped workforce.

Obstacles exist, but so do the opportunities.



*"We cannot always build the future for our youth, but we can build our youth for the future."* Franklin D. Roosevelt

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