Building Rigorous Programs of Study: Background, Research and Setting the Stage

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Why Research?

"If assumptions you hold about a problem are wrong, then it is very likely your solutions will be as well"

Too Many College Grads?

- …turning out vastly more college graduates than there are jobs in the relatively high-paying managerial, technical and professional occupations to which most college graduates traditionally have gravitated.

- Roughly one of three college graduates is in jobs the BLS says require less than a bachelor's degree.

- . … College graduates, on average, are smarter and more disciplined and dependable than high-school graduates—so much of the reported earnings differential has little to do with college learning.

- We have engaged in massive and costly credential inflation to certify competency for jobs.

Richard Vedder, director of the Center for College Affordability and Productivity WSJ 6/21/2012

Not Enough College Grads?

By 2020, our research projects that the United States may have 1.5 million too few workers with college or graduate degrees and 6 million more without a high school diploma than employers will demand. McKinsey Global Institute, 2012

The Labor Market
STEM: Let's clarify . . .

- S&E occupations make up only about one-twentieth (5%) of all workers (5.3% in 2018), Urban Institute, 2007
- 435,000 U.S. citizens and permanent residents ***a year*** graduated with bachelor's, master's, and doctoral degrees in science and engineering. Over the same period, there were about **150,000** jobs added ***annually*** to the science and engineering workforce. .
  http://www.businessweek.com/print/smallbiz/content/oct2007/sb20071025_827398.htm

Is there a shortage of scientists?

Murray said that none of the companies she has talked with has suggested that there is a shortage of qualified chemists or life scientists. She said that ***employers' greatest concern "is not numbers, it is training***." She cited the example of managers who told her they could interview hundreds of candidates for an organic chemistry position but wish they knew how to identify those candidates who ***"can behave collaboratively"*** and have the other broad competencies discussed at the workshop. She argued that the degree to which scientists have these other capabilities "really seems to be the problem."

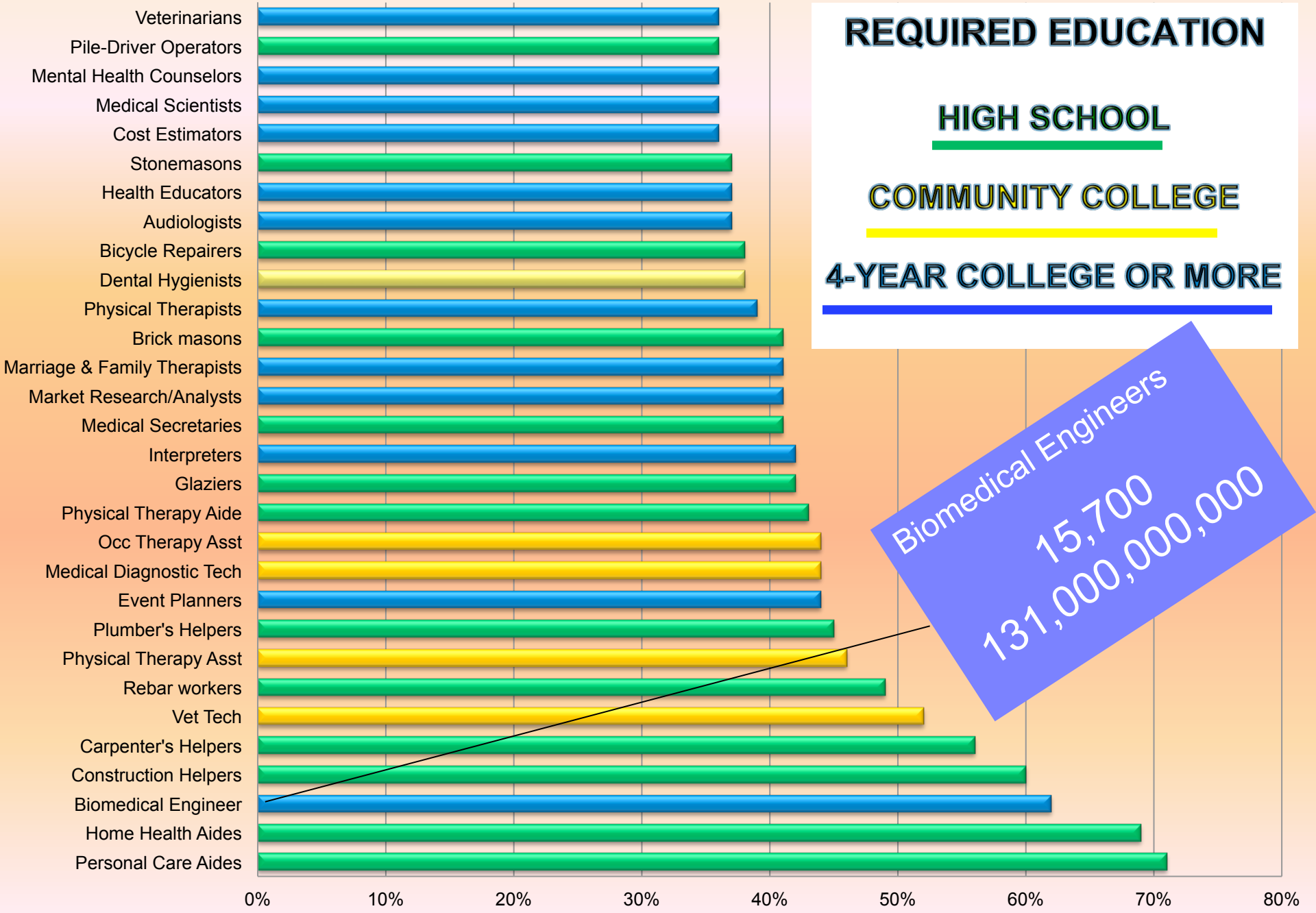
National Research Council. (2008). Research on Future Skill Demands: A Workshop Summary. Margaret Hilton, Rapporteur. Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Starting Point for POS: The Labor Market

Three Perspectives:

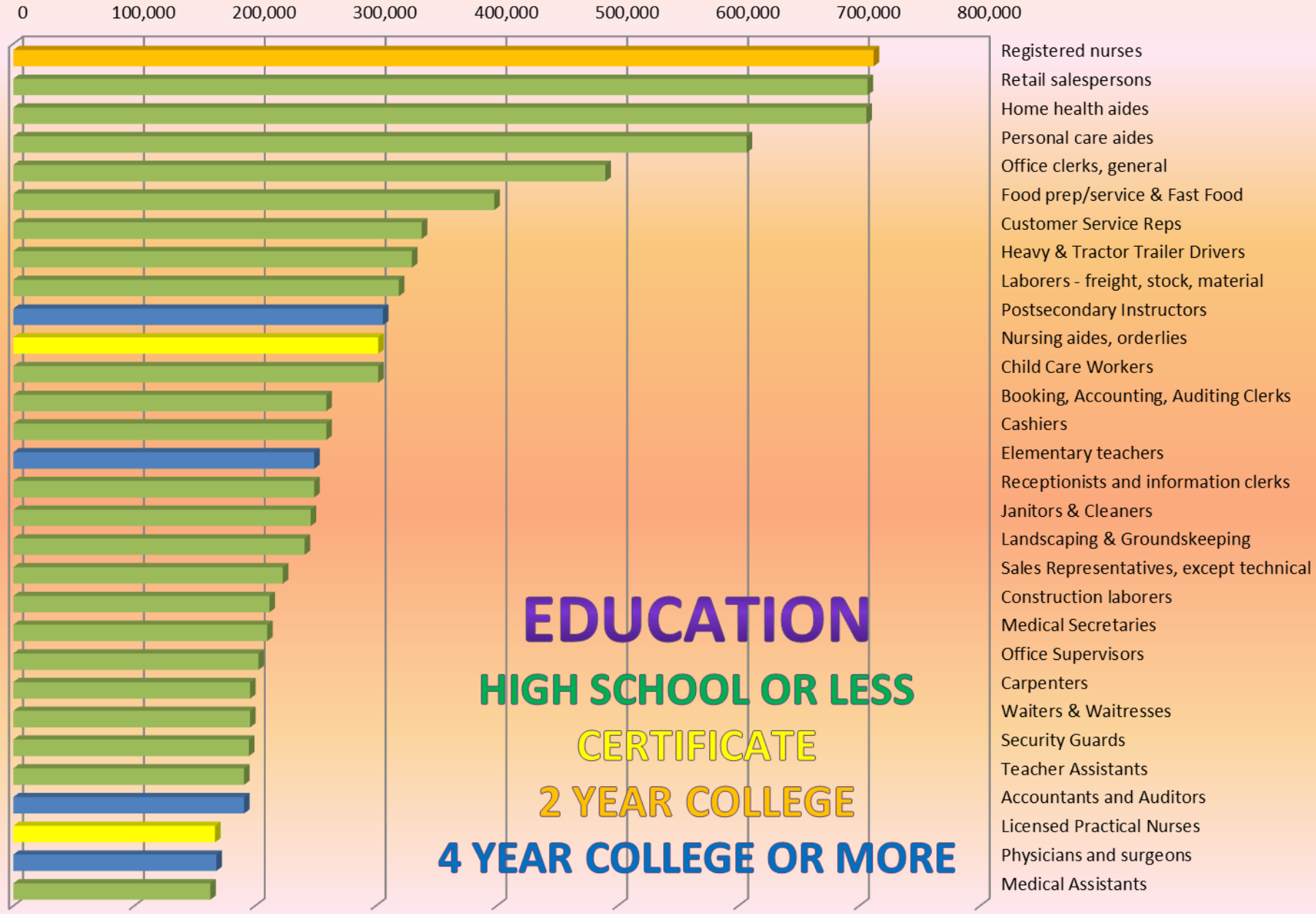
Worse, Worser and OMG!

High Growth Occupations 2010-2020



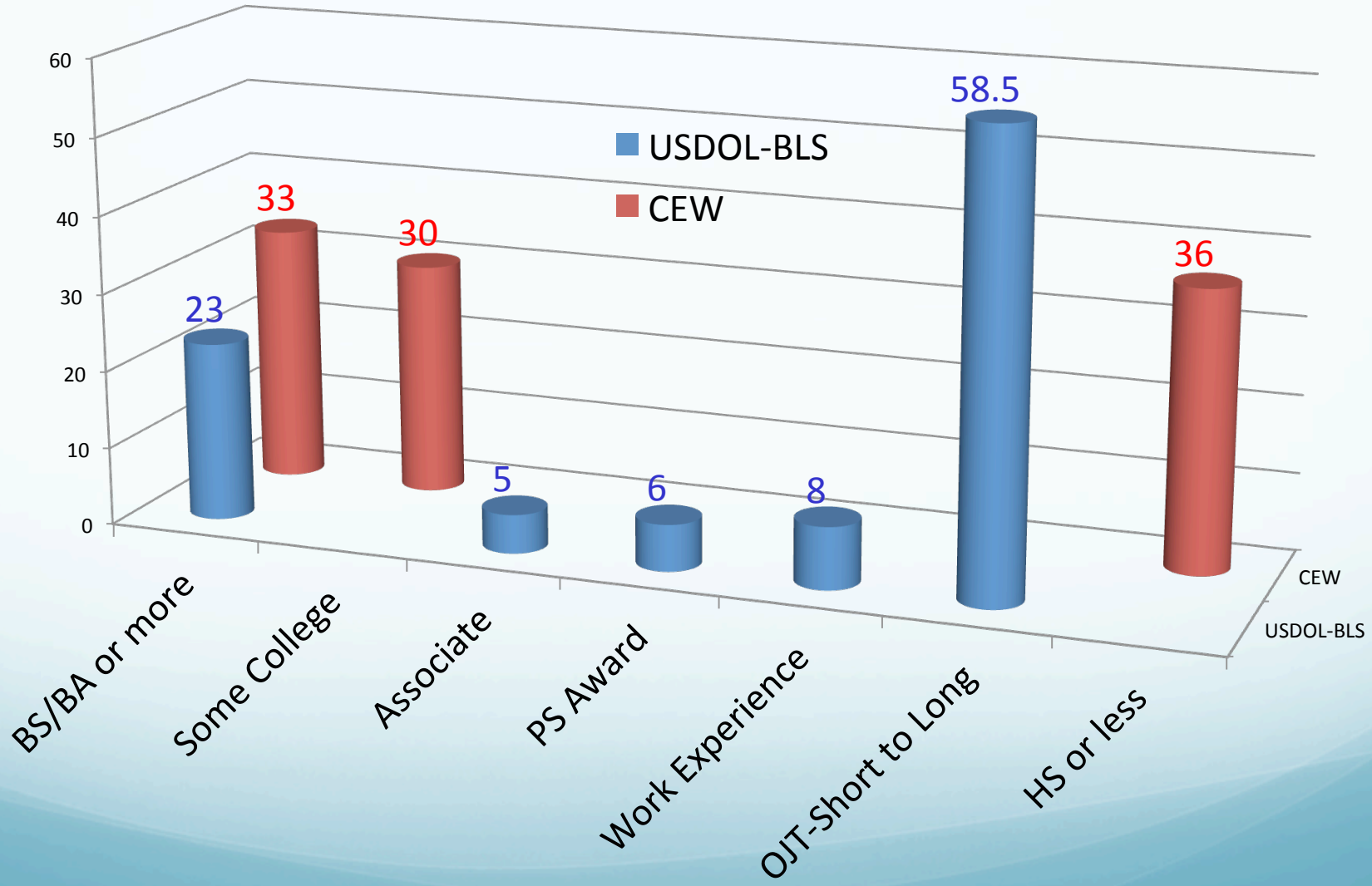
High Demand Occupations 2010-2020

The BLS Perspective

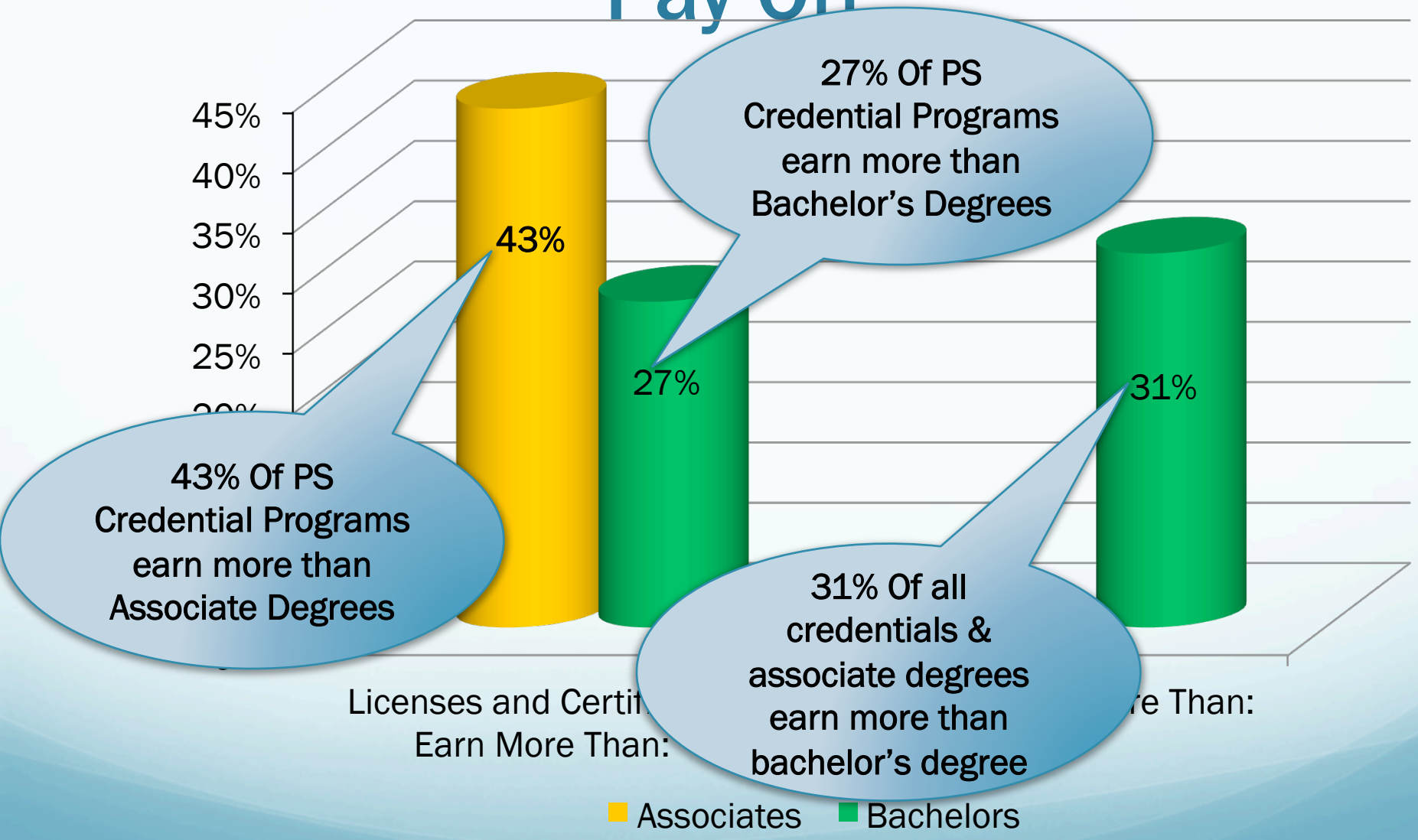


Another Perspective

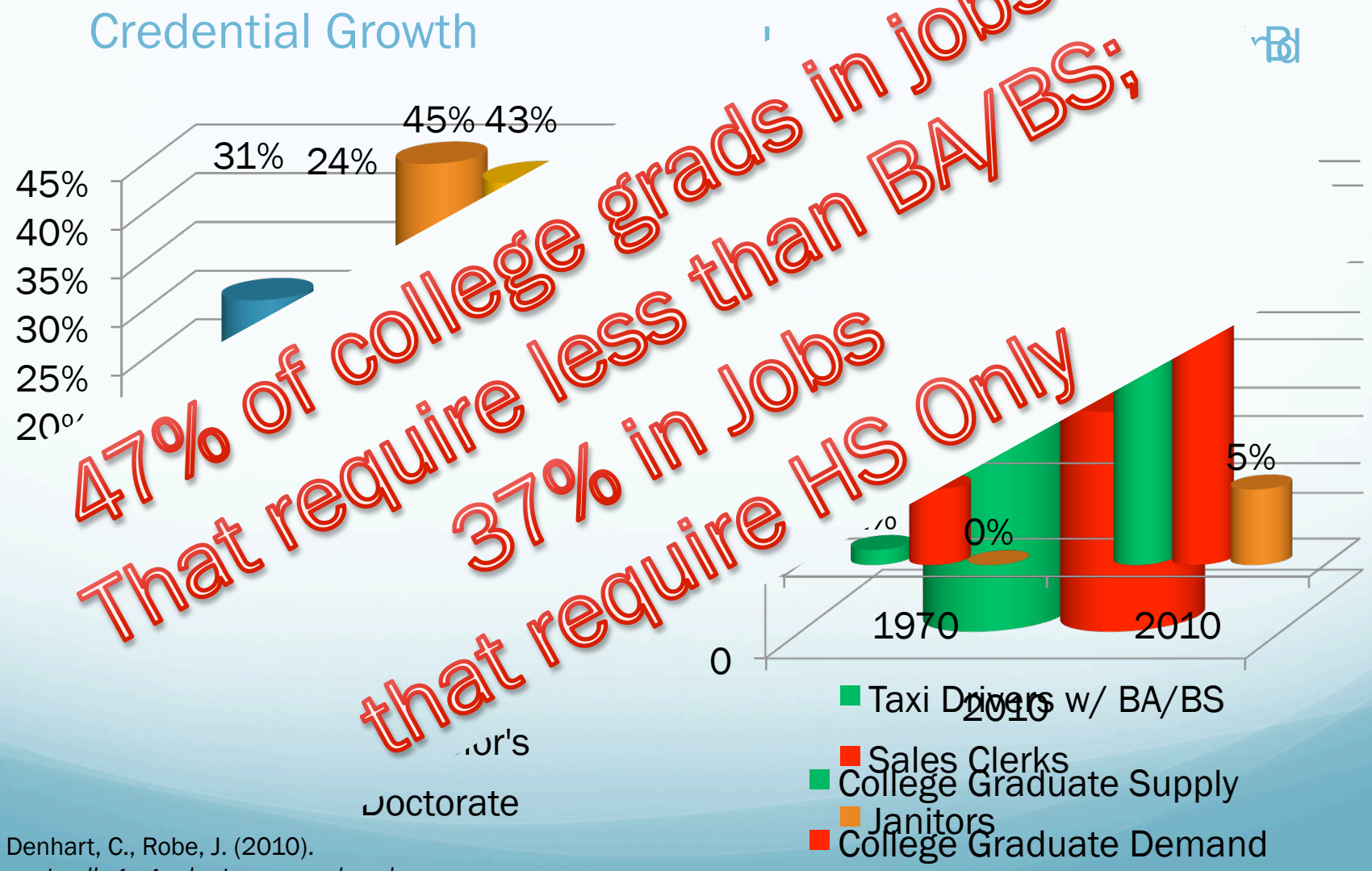
Education and Future Work: BLS & CEW



Sub-Baccalaureate Credentials Pay Off

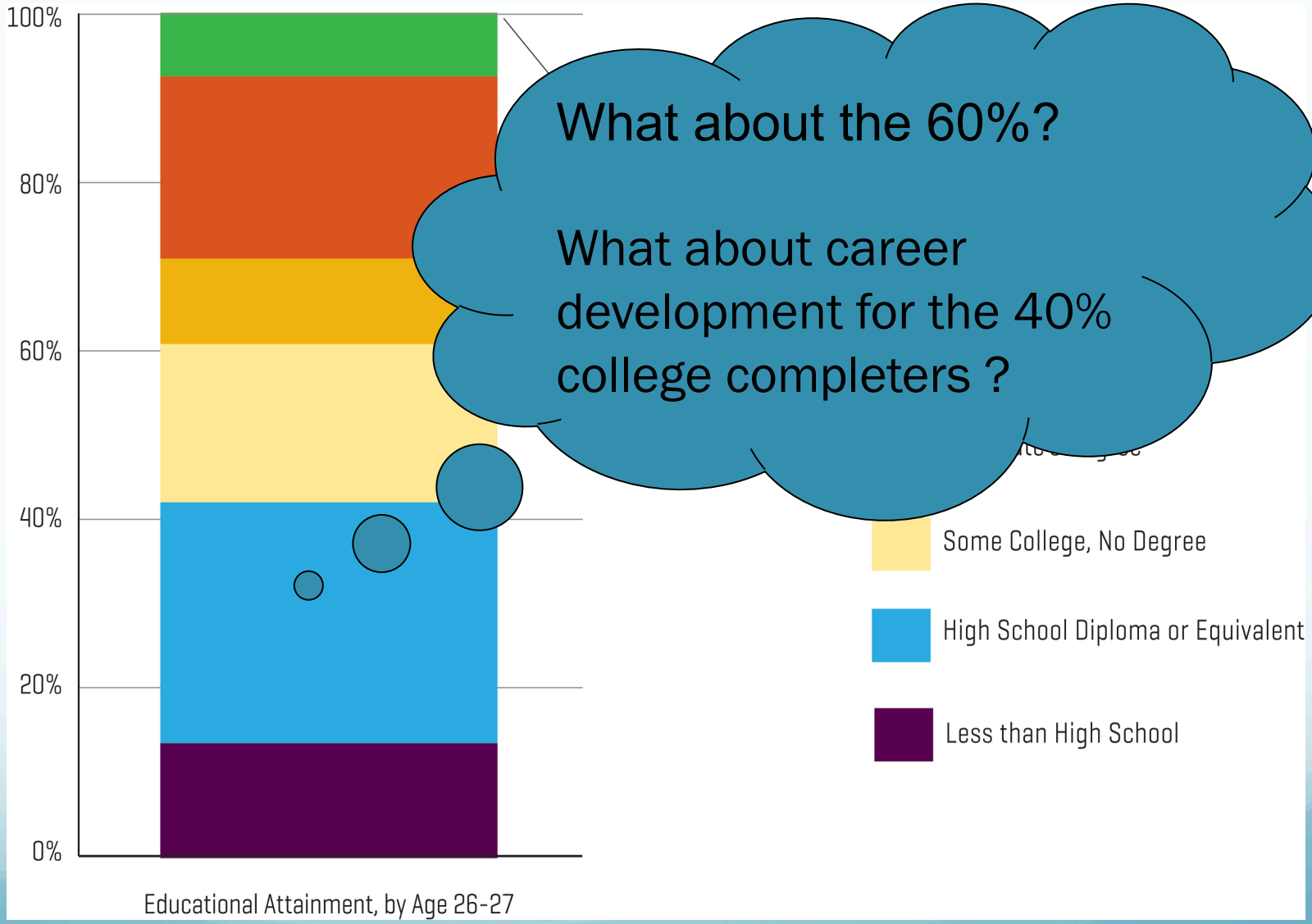


Why Technical Education Matters



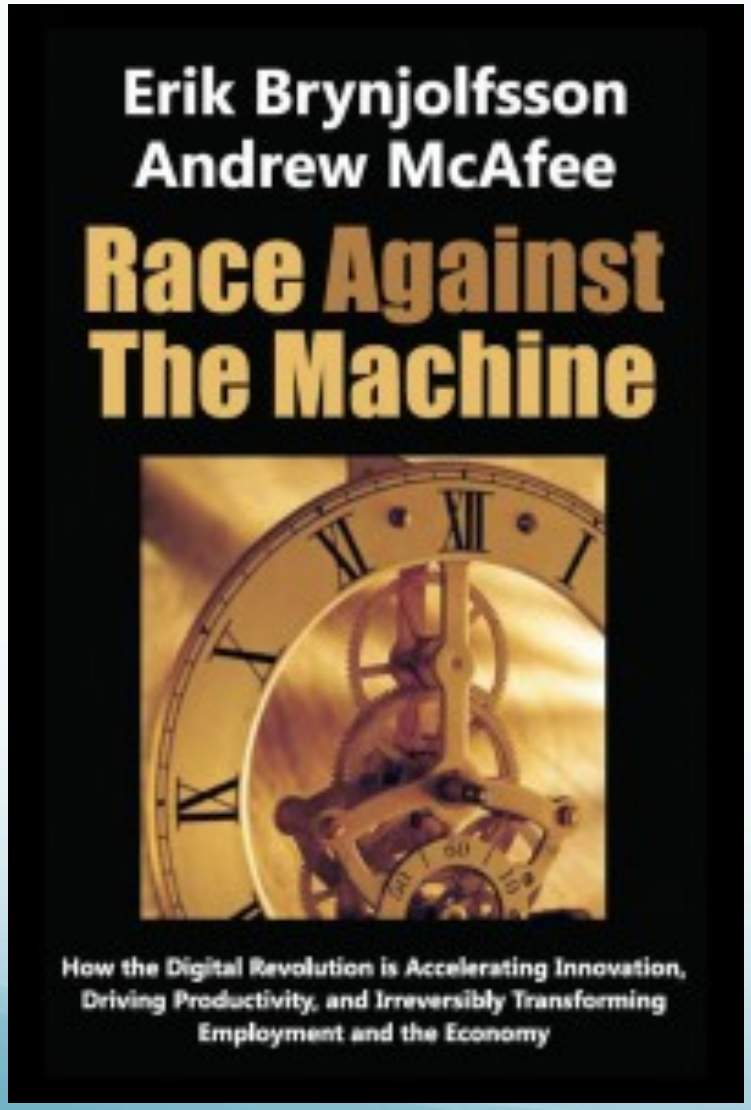
Vedder, R., Denhart, C., Robe, J. (2010).
Why are recent college graduates unemployed

College for all? Only 40% of 27-year olds have earned an



Note: Represents data collected in surveys between 2006-2008; GED is approximation based on data from GED Testing Program.
Source: Current Population Survey Annual Social and Economic Supplement.

A 3rd Disconcerting Perspective



Computers now exhibit human-like capabilities not just in games such as chess, but also in complex communication such as linguistic translation and speech (Think Siri)

A 3rd Perspective: The Race Against the Machine (The Machines are Winning?)

- The Google car(truck?)
- IBM Watson
- Deep Blue
- The “Square”
- Text readers/ Pattern recognition (goodbye legions of lawyers-only 60% accurate)
- Automated ‘call centers’ (goodbye India)
- GeoFluent (goodbye translators)
- Vending machines for … everything

That's the Uncertain Reality of the Labor Market

How has education responded?

Rigor = More

A narrow curriculum

High school has become the new middle school

Where Have We Been: 30 Years of "Reform"

Context: Since the mid-1980s we have:

Added the equivalent of *one full year* of core academics (math, science, language arts) to high school graduation requirements.

- (NAEP) *Reading scores have not improved or significantly declined**
- (NAEP) *Science scores have not improved or significantly declined**
- (NAEP) *math scores have remained relatively unchanged*

*Depends on the starting and ending timeframe

Taking more math is no guarantee

- Only 26% of students who took Alg I, II & Geometry scored a 22 (ACT Benchmark) on the ACT exam scoring an average of 17.7[1]
- Adding Trig increases to the average score to 19.9[1]
- Not until calculus is added, does the average score exceed 22 – 5 years of high school math.
- 43% of ACT-tested Class of 2005[1] who earned A or B grades in Algebra II did not meet ACT College Readiness Benchmarks in math[2]

1. ACT, Inc (2004) *Crisis at the Core*

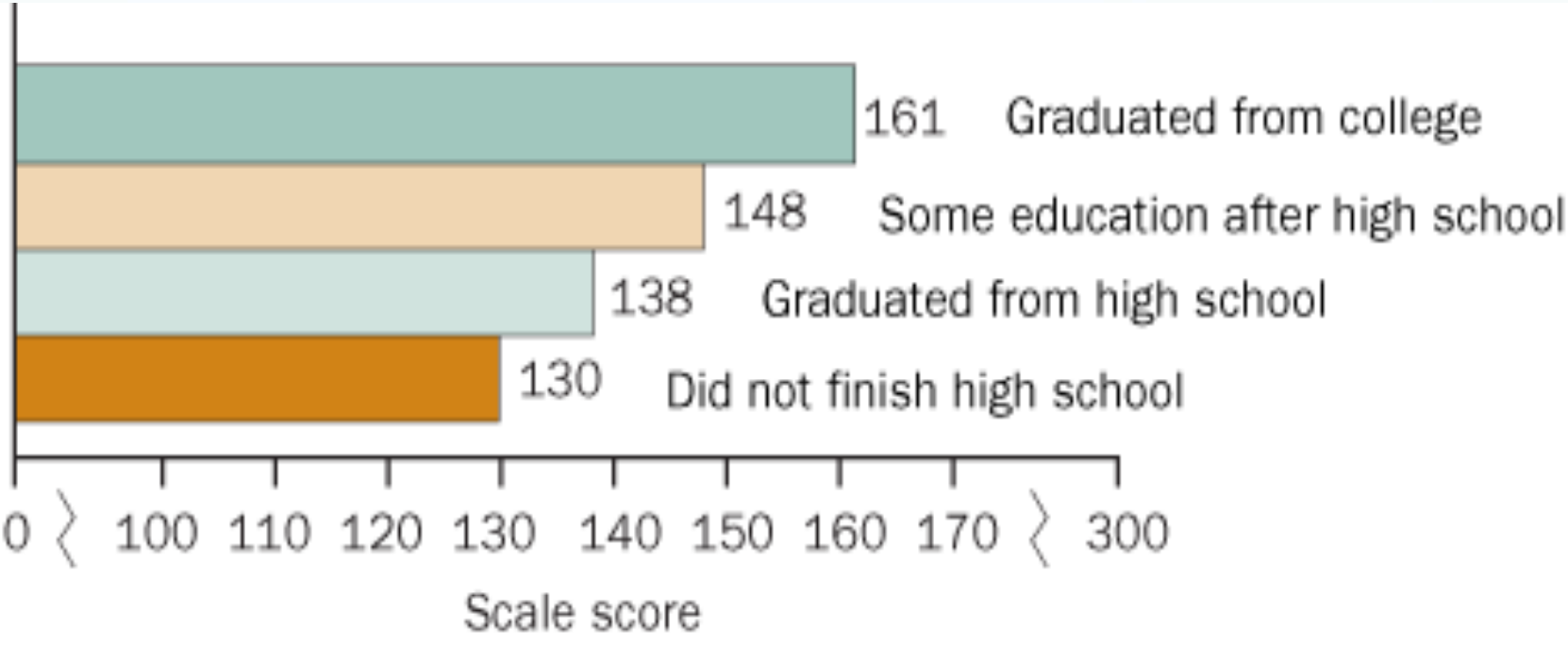
2. ACT, Inc. (2007) *Rigor at Risk*.

College Ready Math:
Liberal Arts Majors' Math Requirements

- Rutgers
- University of Minnesota
- UC-Berkeley

- One course in college-level mathematics.
- One course, (Mathematical Thinking)
- Test out (basic understanding and competency in math, statistics, or computer science) or 2-unit course.

One solution?



Be born to smarter parents!

It is not getting much better

Your child is less likely to graduate from high school than you were; the United States is now the only industrialized country where young people are less likely than their parents to earn a diploma

Houston Chronicle, Libby Quaid, 10/23/08

*NCES, 2012

So, Those are the Challenges . . .

What does "average" CTE do?

To Address College & Career Readiness: *Make High School Matter*

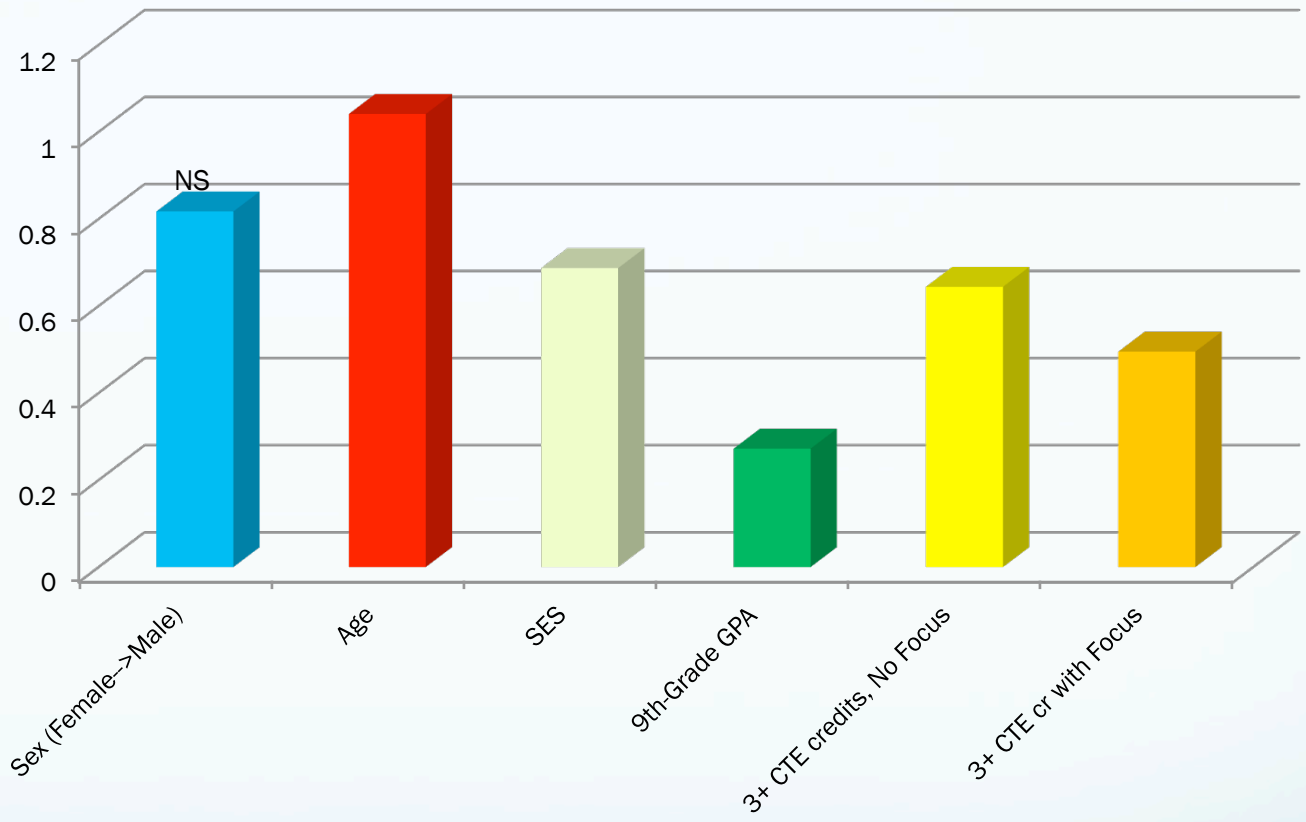
Increase Engagement
Completing HS
Completing PS/ Industry credential

Improve Achievement
Academic
Occupational
Technical

Enhance Transition
Through School
To continuing education
To the workplace
To a successful adulthood

CTE Keeps Kids in School

A Survival Analysis



NS=Statistically not significant

- CTE Participation helps students “survive” high school
- **Each CTE credit taken (at 3 or more) reduces the hazard of dropping out compared to students taking less than 3 CTE credits**

Engagement: We have a boy problem

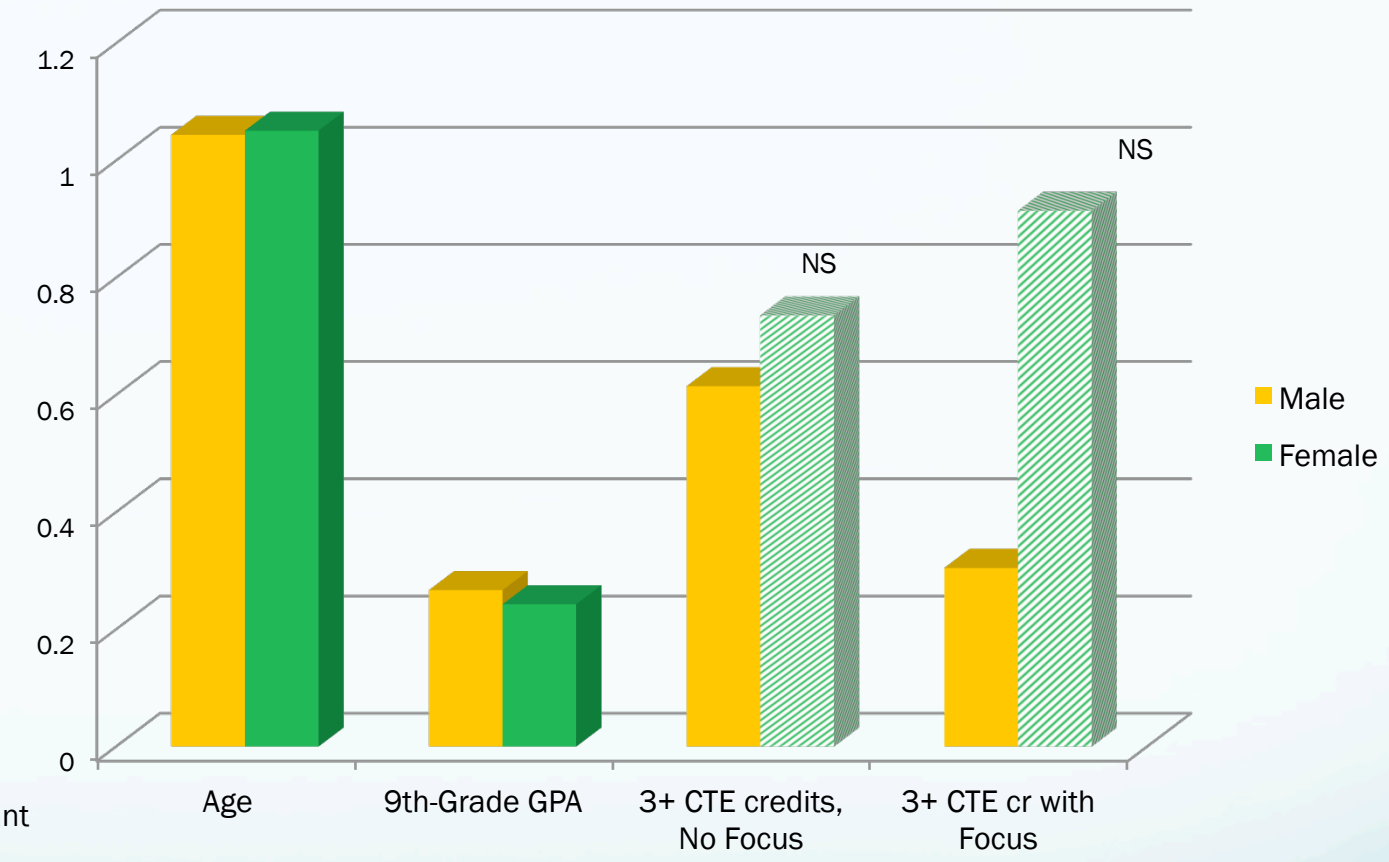
… but many of the people who don't fit in are boys. A decade or so ago, people started writing books and articles on the boy crisis. At the time, the evidence was disputable and some experts pushed back. Since then, the evidence that boys are falling behind has mounted. The case is closed. The numbers for boys get worse and worse.

David Brooks, NYT July 5, 2012

- By 12th grade, male reading scores are below females'
- 11th grade boys write at an 8th grade girl level
- Boys used to have an advantage in math and science, but that gap is nearly gone.
- Boys are more likely to have discipline problems
- Boys account for ¾ all D's and F's
- Men are a minority in college (40%)
- 2 million fewer men graduate from college over the past decade than women
- Grad school gap is even higher

CTE Keeps Boys in School!

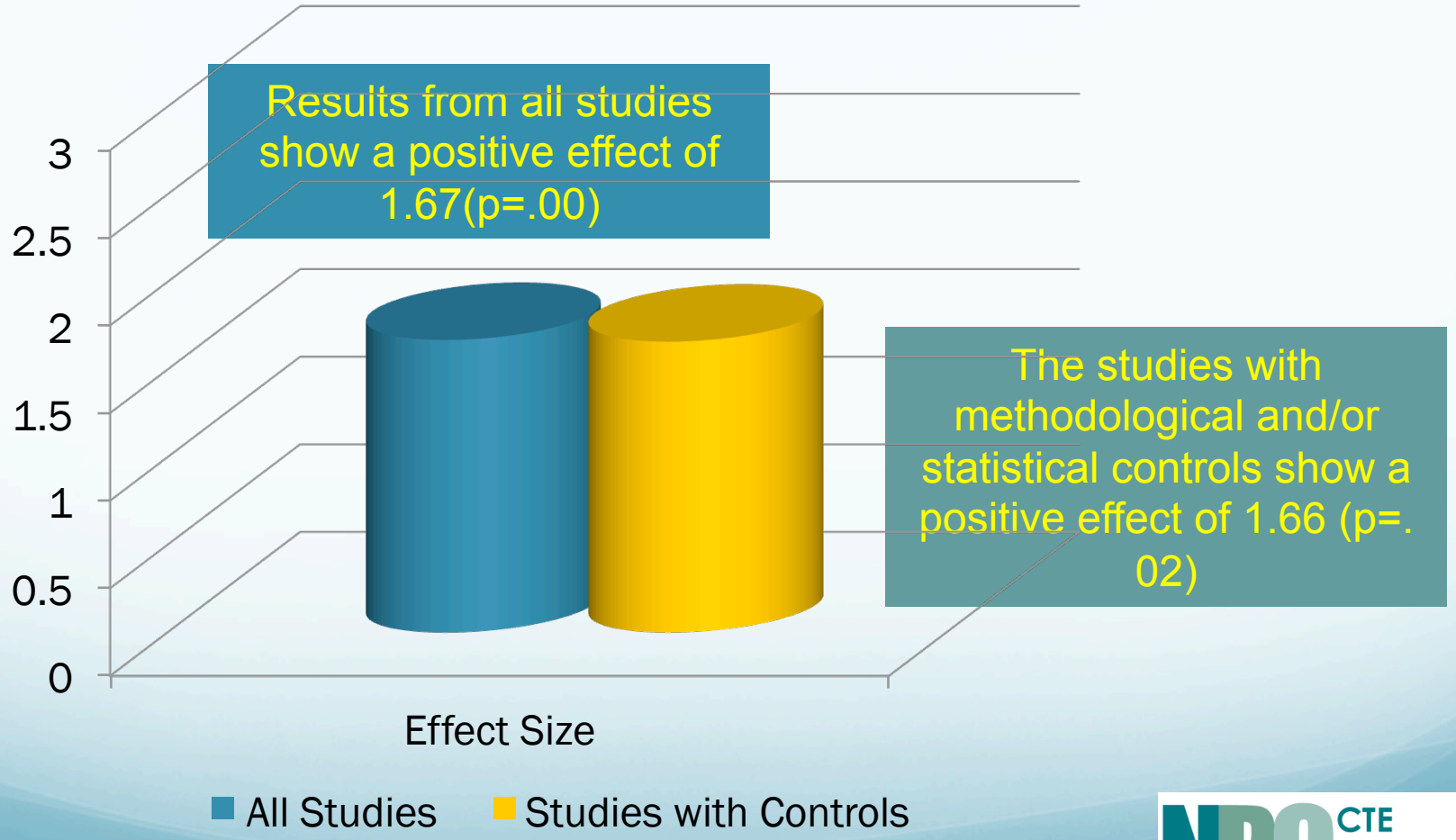
A Survival Analysis



NS=Statistically not significant

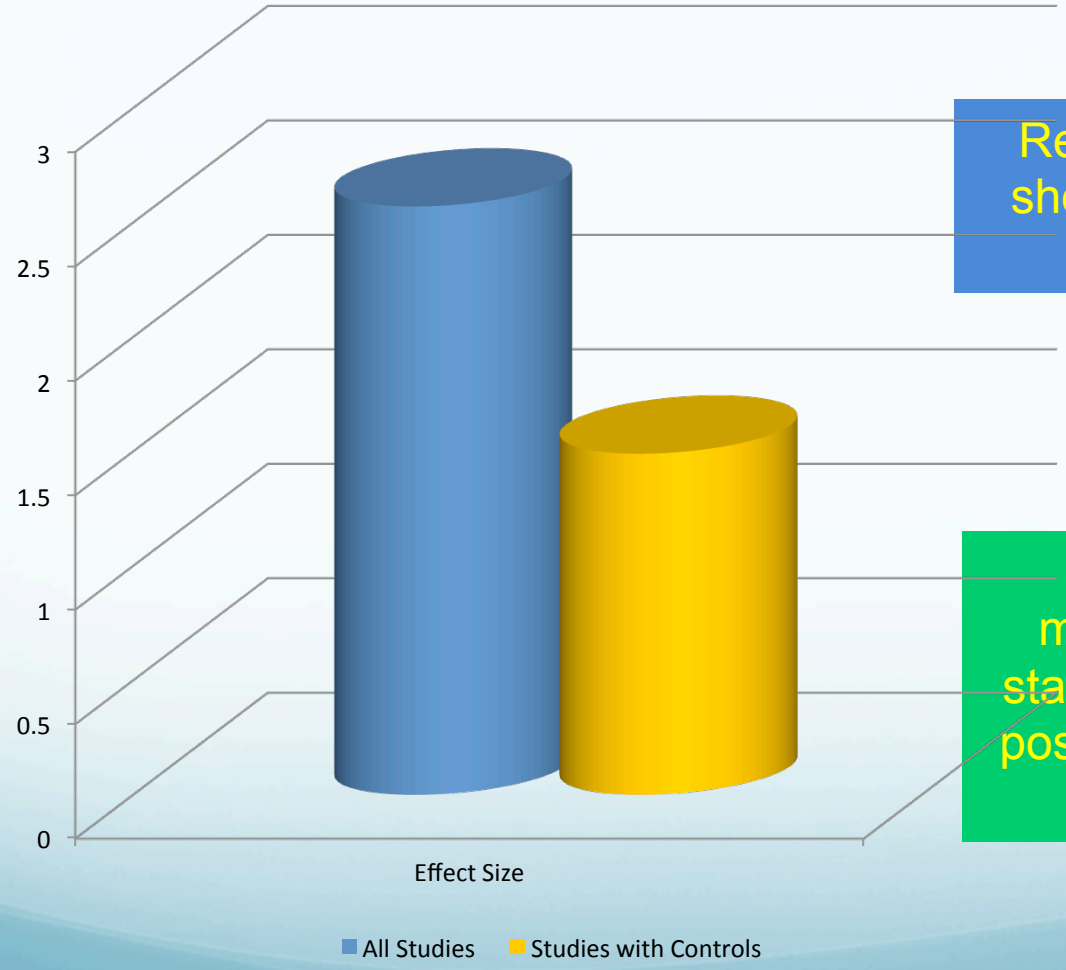
- CTE Participation helps boys "survive" high school
- **There is no CTE "survival" effect for girls; but it "does no harm"**

Meta Analysis CTE Participation & College Enrollment: Average Effects



NRC CTE
National Research Center for Career and Technical Education

Meta Analysis CTE Participation & Employment



Results from all studies show a positive effect of 2.57(p=.00)

The studies with methodological and/or statistical controls show a positive effect of 1.49 (p=.00)

Not Just Our Work: Economists' Perspective

"There is one approach that does tend to improve graduation rates and labor market earnings, especially for at-risk youth: high-quality career and technical education (CTE)"

Holzer, H.J., Lane, J.I., Rosenblum, D.B. & Andersson, F. (2011). *Where are all the good jobs going*.

So, Those are the Challenges . . .

What can POS do?

A System's Approach

To Career & College Readiness

Programs of Study

What is a POS?

Perkins

Incorporate secondary education and postsecondary education elements;

Coherent and rigorous content in a coordinated, non-duplicative progression of courses that align secondary education with postsecondary education . . . to adequately prepare students to succeed in postsecondary education;

May include dual or concurrent enrollment programs;

Lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree.

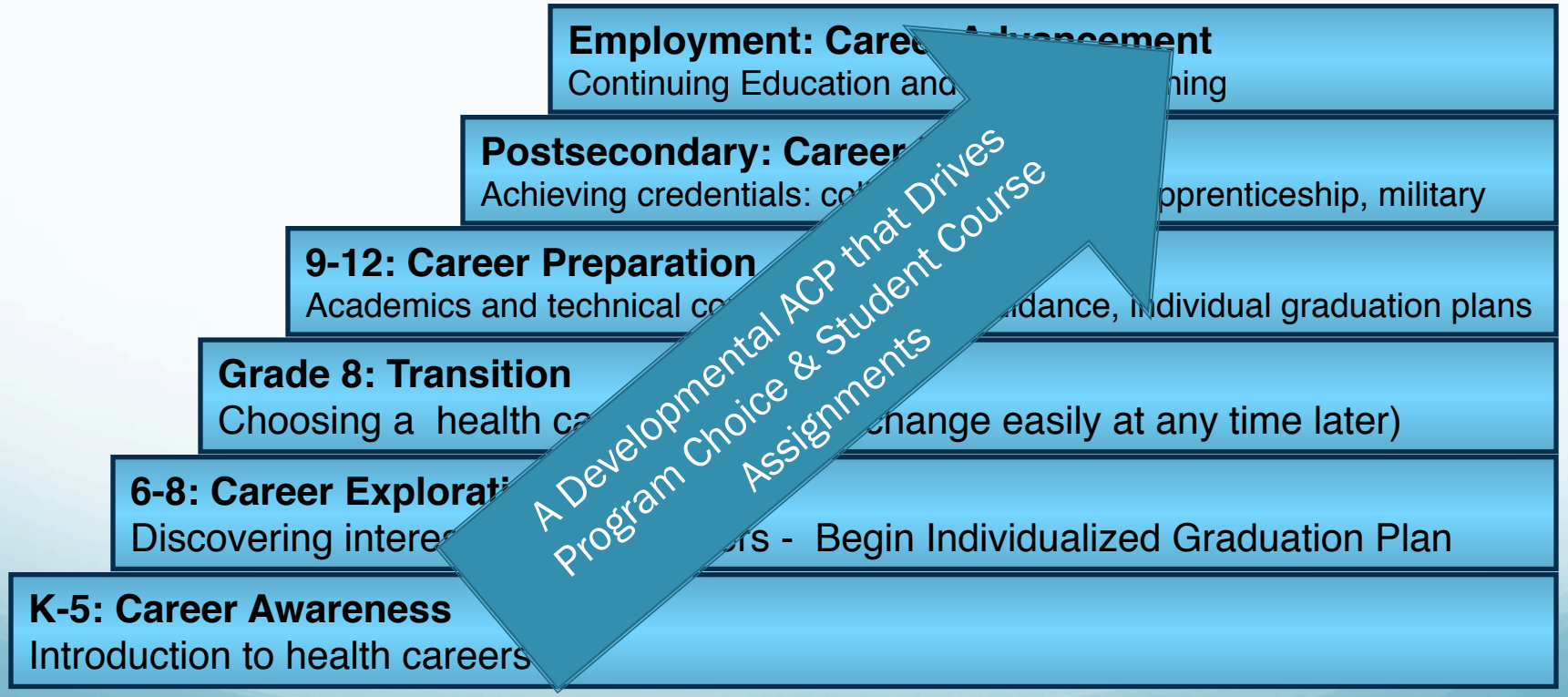
To Test the Concept of POS . . .

- Complete high school?
- Achieve academically?
- Achieve occupationally?
- Transition to life beyond high school?

- 3 rigorous, longitudinal studies to examine various elements of POS
- A Cross-Site Study examining 3 exemplary sites from the rigorous studies to determine common attributes and elements that make programs work
  - The 10 elements developed by OVAE and others used as interview/ observation framework
- A qualitative study to examine development and technical assistance in 6 states (not reported here)

Research is points toward:

Engaging Students through Career Development



3-Way Integration

System

- Vertical Alignment, “Articulation”
- Industry & Education Partnerships
- Career Clusters/Pathways
- Dual Credit/Enrollment

Programmatic

- Incorporate more academics into CTE
- Incorporate more CTE into Academics
- Career Academies/MCHS/TCTW

Curriculum/Instructional

- CTE to Academic & Academic to CTE
- Pedagogic framework; Signature Features
- Teacher skill/performance

Emergent trends

- Some evidence of academic achievement effect, but the evidence is mixed
- Mandate did not appear to have much effect on POS implementation (e.g., % of students engaged in POS, use of dual credit)
- 10 OVAE elements are not equally important or too costly to employ (e.g., TSA)
- Other elements may be more important (e.g., external funding)

Emergent Trends II

- Even when the policy is required by law, implementation is uneven and may be skewed towards lower performing districts.
- Career guidance/career development is emerging as a necessary condition for RPOS
- Cost is a barrier (counseling, TSAs, professional development)

Implicit Assumptions: With Policy Implications

- Education reforms operate independently of economic context
- Adolescents are rational, logical decision makers
- The 10 “elements” are the right elements to ensure POS success
- Accountability challenges for POS
  - What will POS success mean?
  - Enrolled in any college?
  - Pursuing same POS pathway?
  - Student sense of contribution of POS?

Other Approaches

An Industry Driven POS-Toyota

THE SKILL PIPELINE PROBLEM

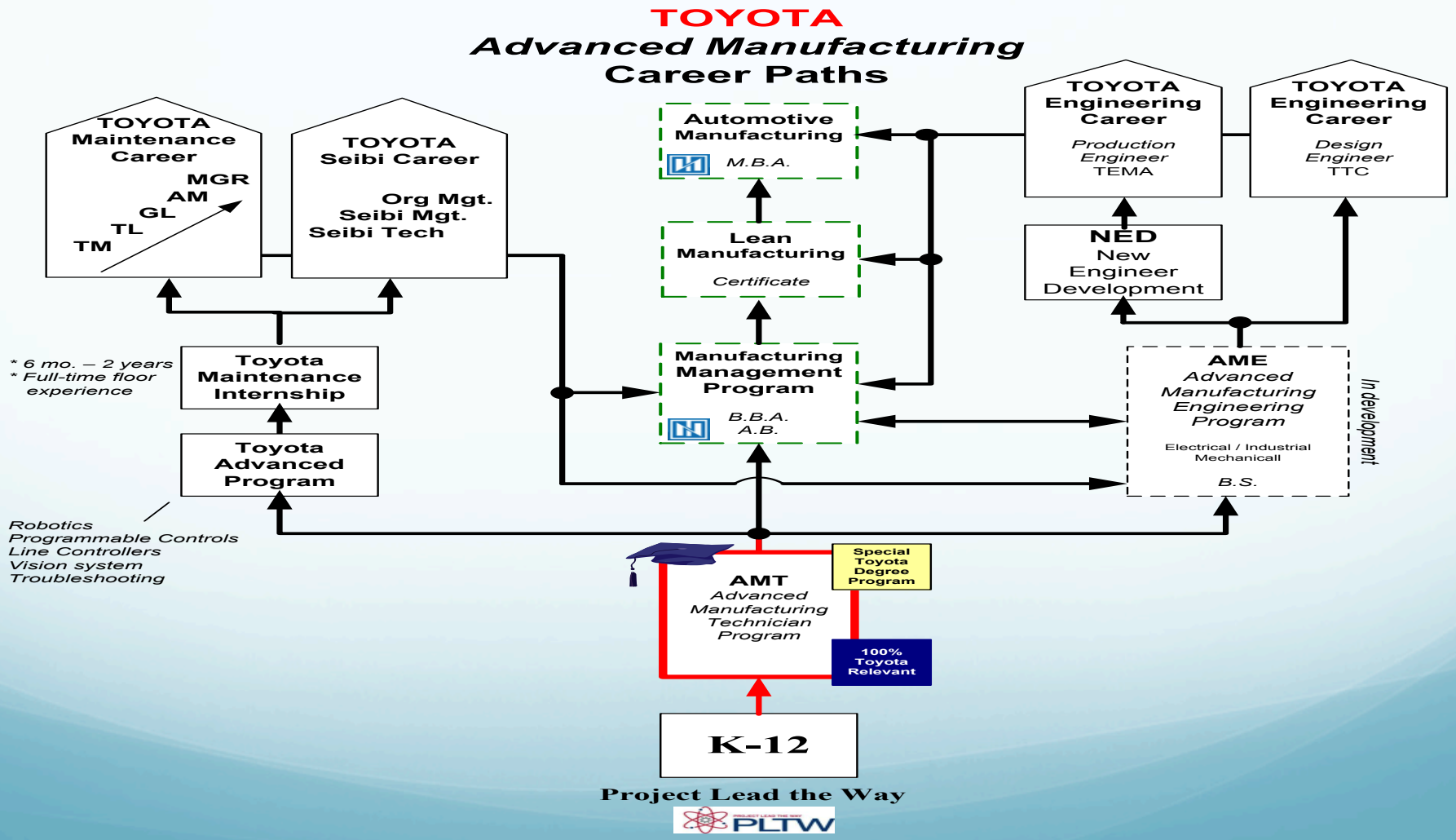
The U.S. community college system produces less capable graduates than parallel systems in competitor nations

Intentional preparation consists mostly of academic education only, i.e. pass technical courses and get a degree.

Schools do not produce graduates with vital preparation for workplace success, such as a highly developed safety culture, skills in workplace organization, lean work skills, and problem solving.

The Toyota Solution

Seamlessly Connect Paths for Career Long Growth and to Strengthen the Whole Company



The Solution

Totally Redesign the Learning Environment

The New Model School

For Manufacturing

MORE REALISTIC
Looks Like a Factory
Feels Like a Factory

MANUFACTURING SIMULATOR
Central Focus
Reason for Learning
Toyota Troubleshooting

TOYOTA LEARNING
Safety, TPS, 5S
Learning Lab

Make the
Place of Learning
look and feel like the
Place of Work

ORGANIZED BY FUNDAMENTAL SKILL
Electricity / Fluid Power
Mechanics & Fabrication

PROCESS LEARNING
Students learn in a structure sequence

Students Learn the *Right* Way the *First* Time

USDOL: Career Pathways (POS)

- The term "career pathways" refers to a clear sequence of education coursework and/or training credentials that:
  - Is aligned with the skill needs of regional industries
  - Includes the full range of secondary, adult education, and postsecondary education options
  - Includes curriculum and instructional strategies that contextualize learning
  - As appropriate, integrates education and training that combines occupational skills training with adult education services, gives credit for prior learning, and adopts other strategies that accelerate advancement

NOTE: USDOL focus is on adults and community-college level postsecondary education

The Answer: Career Pathways (cont.)

- Leads to the attainment of an industry-recognized degree or credential
- Includes academic and career counseling, and support services
- Is organized to meet the particular needs of adults, with flexible and non-semester-based scheduling, and the innovative use of technology
- Examples (I-Best in Washington State)

Three POS Perspectives

A Summary

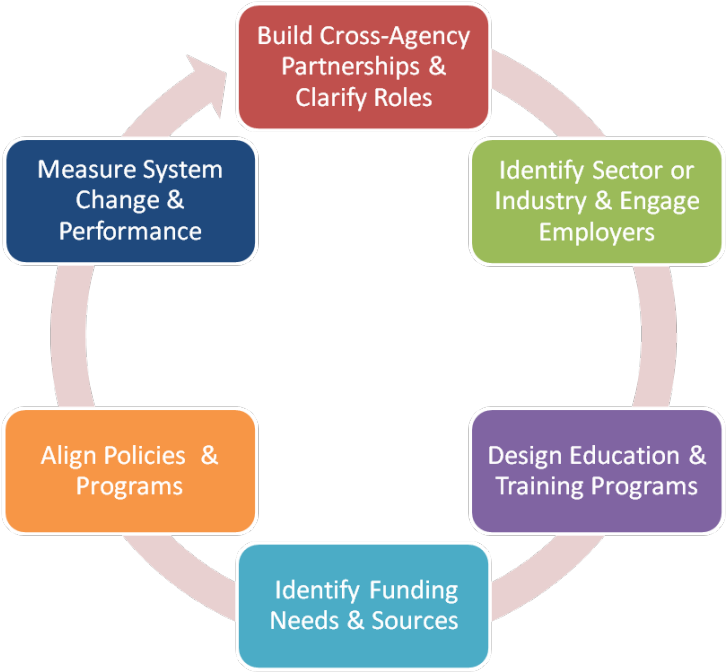
The OVAE Thinks You Need (OVAE, 2010)

- Legislation and Policies
- Partnerships among Education, Business, and Other Community Stakeholders
- Sustainable Leadership and Shared Planning
- Rigorous Academic and Technical Standards Aligned with Curriculum and Assessments
- Aligned Secondary and Postsecondary Education Elements
- Credit Transfer Agreements
- Accountability and Evaluation Criteria
- Guidance, Counseling and Advisement
- Professional development
- Innovative Teaching and Learning Strategies

The DOL Thinks You Need:

- Career pathway systems provide a clear sequence of education coursework or training credentials and have the following elements:

1. Build cross-agency ***partnerships*** & clarify roles
2. Identify industry sector or industry & engage employers
3. Design education & training programs
4. Identify funding needs & sources
5. Align policies & programs
6. Measure system change & performance



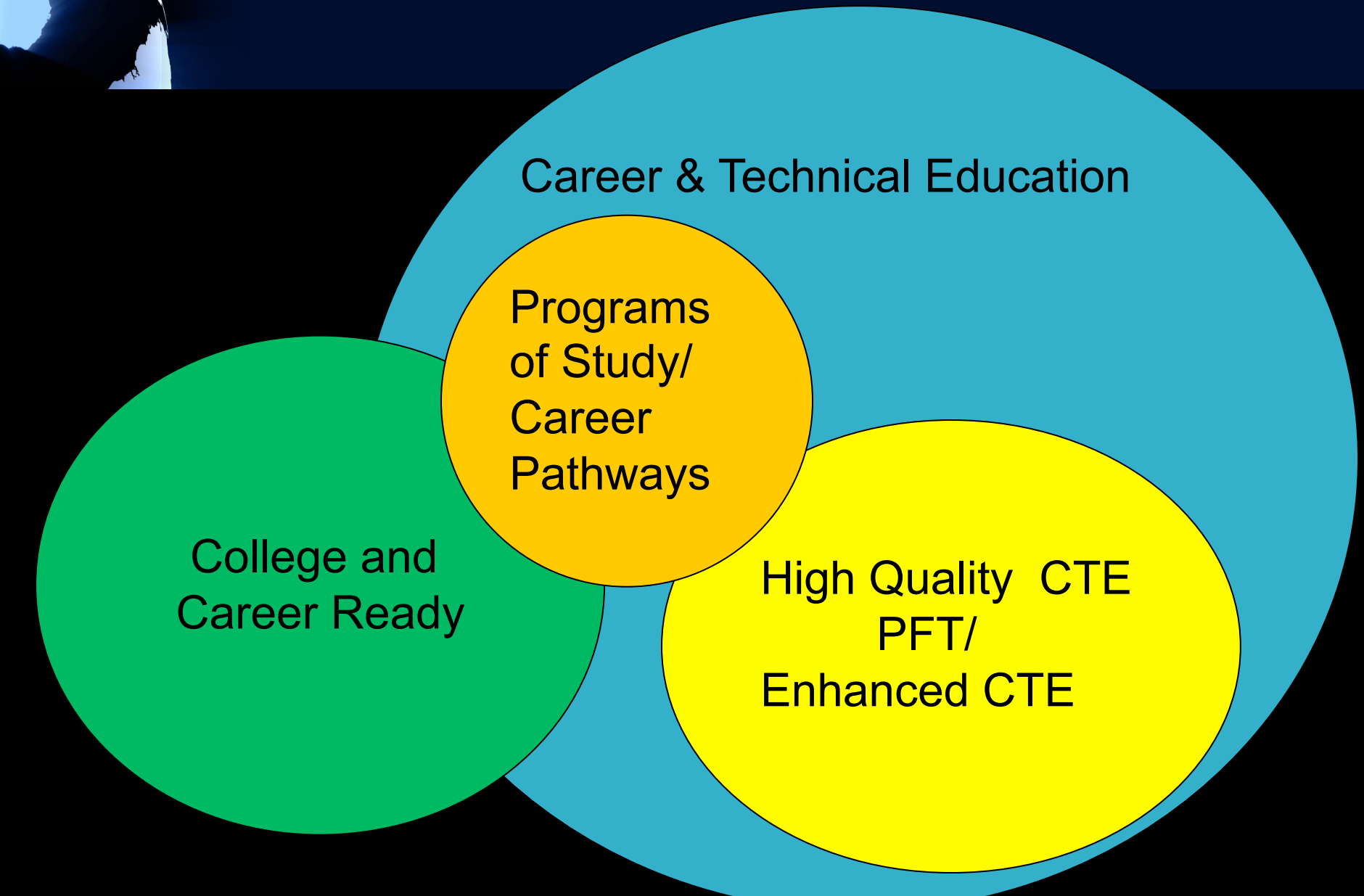
Career Pathway Principles (CLASP, 2013)

- Adopt and articulate a ***shared vision*** of the career pathway system and a governance
- Demonstrate ***leadership and commitment*** to institutionalizing career pathways (K-12, Adult Ed, Workforce Agency, CC & Higher Ed)
- Ensure that career ***pathways are demand-driven***, focus on sectors/occupations, and engages multiple employers within a sector or occupational area
- ***Align*** policies, measures, and funding
- Use and promote data and ***continuous improvement strategies*** focusing on continuously improving efforts by measuring participants' interim and ultimate outcomes as well as process indicators.
- Support robust ***professional development*** for career pathways practitioners and administrators.

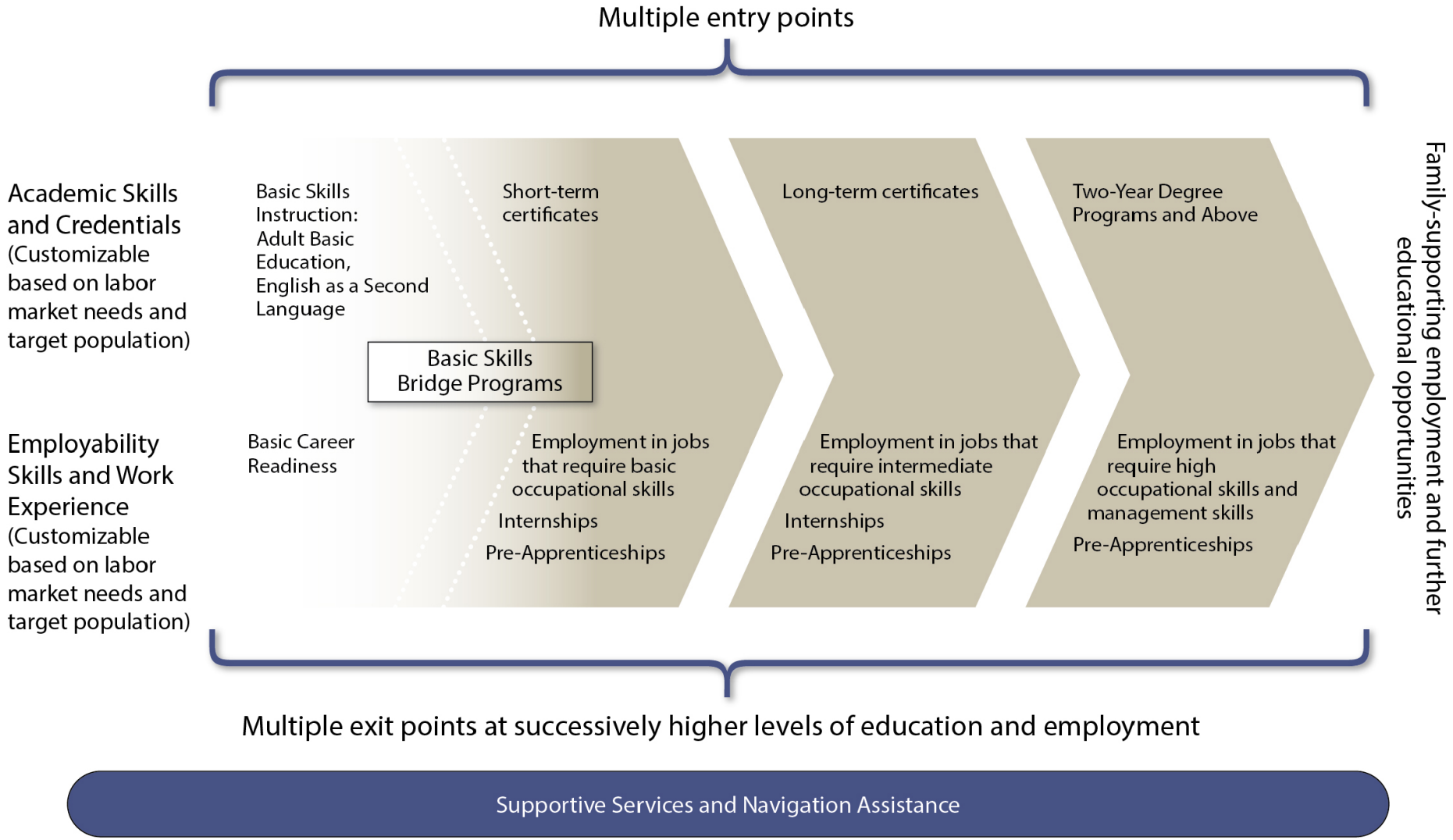
Commonalities: Labor, Education, Private Non-Profit Sector

- Partnerships
- Labor market demand focused balanced with individual focus (career development)
- Alignment – policies, measures, education programs
- Professional development
- Data driven: continuous improvement & accountability

The good news: This is CTE's Time



Build a System Based on Labor Market and Student Needs (CLASP, 2013)



Build a System: Curriculum & Pedagogy

- Classroom instruction

- Work based learning- WBL

- CTSOs

- *Project based learning*
- *Contextualized learning*
- *Labs, Shops*
- *PFT/High Quality CTE*
- *Job shadowing*
- *Internships*
- *School-based enterprise*
- *Cooperative education*
- *Apprenticeships*
- *Leadership development*
- *Professional development*
- *Service/social engagement*
- *Competitive events*

Building an Effective POS: Focus on Signature Features

Program of Studies

- Vertical integration; alignment of systems (HS, PS & Industry)
- Partnerships – true partnerships
- Credentialed based career pathways: K-12 - adult

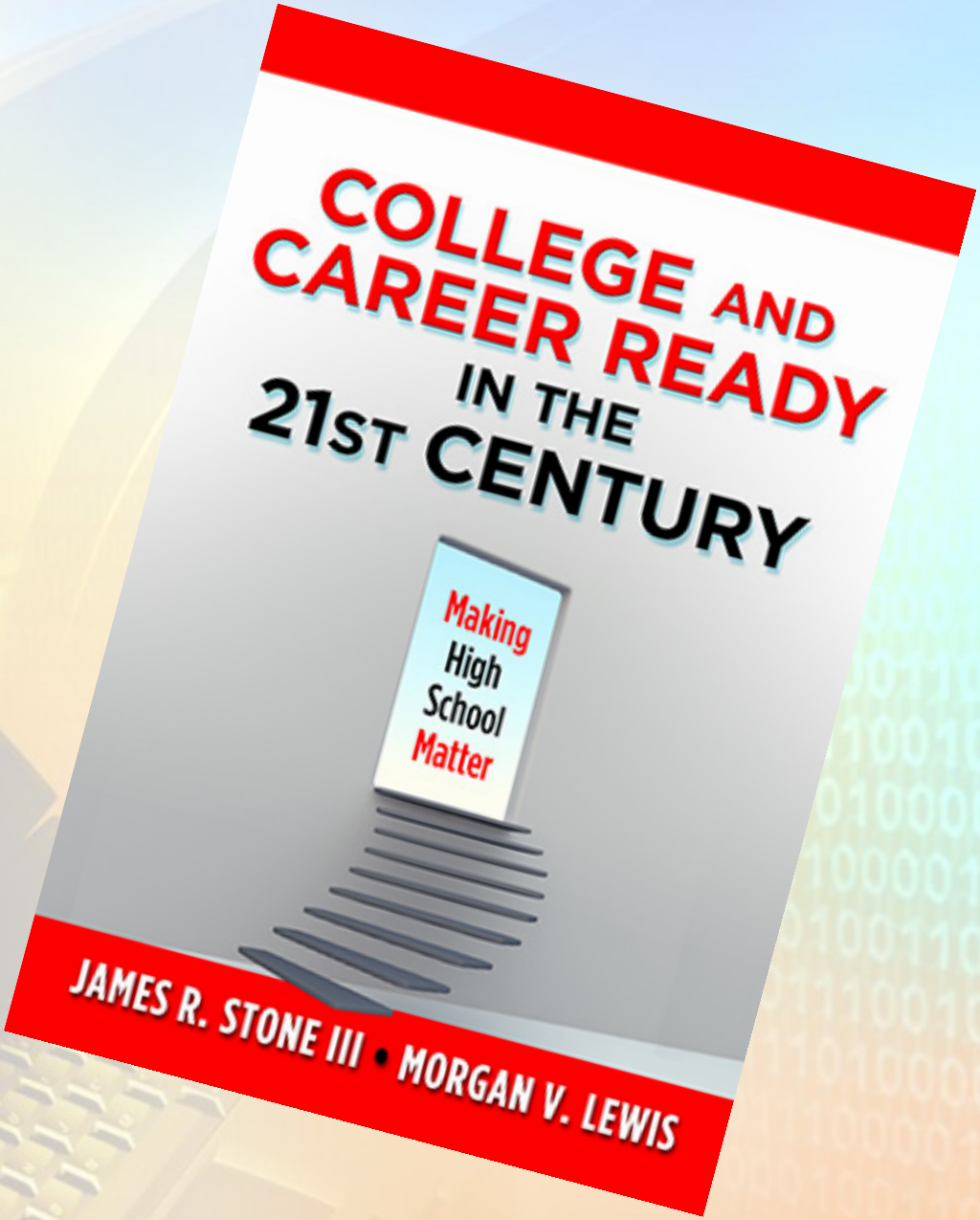
High Quality CTE

- Curriculum derived from industry requirements
- Curriculum delivered through authentic problems/projects
- Embeds related academics & 21st century skills
- Learning occurs in teams
- Highly qualified teachers (PD)
- WBL & CTSO

High school is the last education opportunity paid for wholly by the public. It's purpose has to be to do the best it can to provide all who leave it the foundation necessary to enter, or further prepare for, adult life.

Barton, 2006

Shameless Promotion . . .



If you remember nothing else

- There is no one solution to the challenges or preparing kids for the 21st century workplace in a global market place
- Career development is the keystone to any solution
- Employer engagement is the arch: public, private, non-profit
- A systems approach is required to build the bridge
  - Multiple pathways
  - 3-way integration
    - Vertical/systems
    - Programmatic
    - Curricular
  - Multiple pedagogies are required
  - YOU can make this happen

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