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College, and Career Readiness: Making High School Matter

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Context for the Conversation

- The future of jobs: Raison d'être for CTE
- How we turned HS into middle school
- Evidence of CTE's impact on student engagement, *achievement* and *transition* to careers and college

Starting Point for POS: The Labor Market

*Three Perspectives:
Worse, Worser and
OMG!*



The Labor Market

STEM: Let's clarify . . .

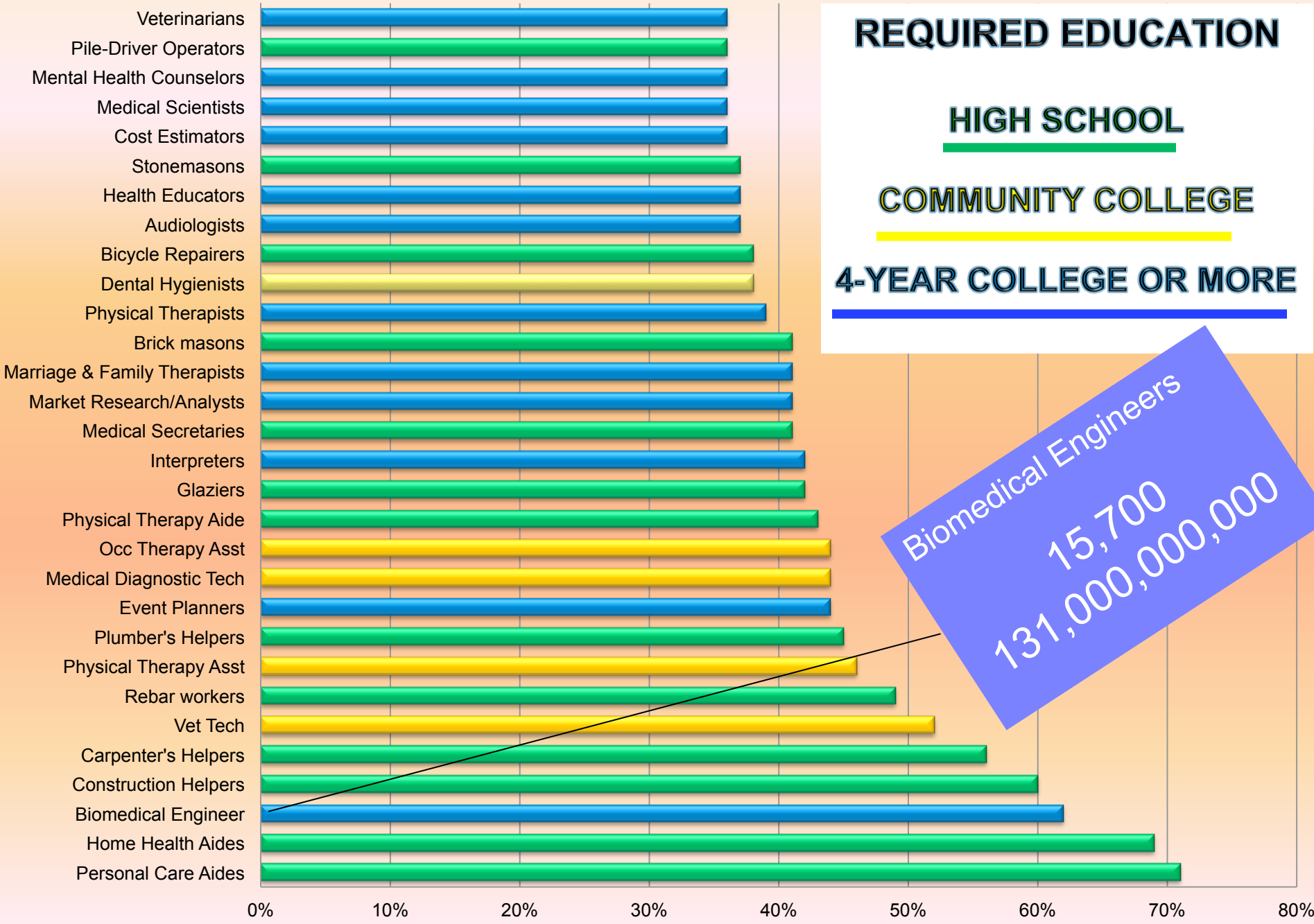
- S&E occupations make up only about one-twentieth (**5%**) of all workers (5.3% in 2018), Urban Institute, 2007
- **435,000** U.S. citizens and permanent residents **a year** graduated with bachelor's, master's, and doctoral degrees in science and engineering. Over the same period, there were about **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?

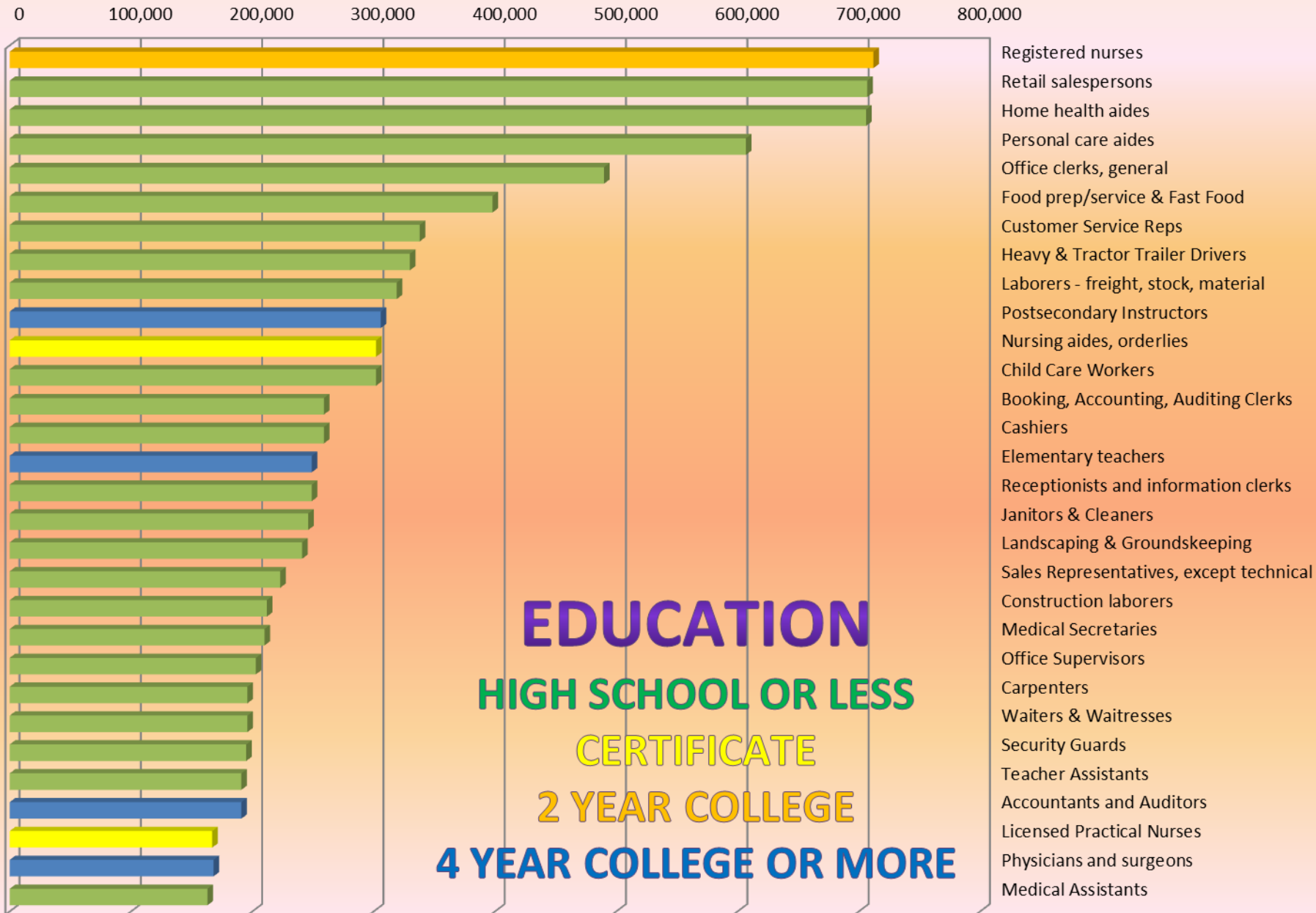
Murray said that none of the companies she has talked with has suggested that there is a shortage of qualified chemists or life scientists. She said that *employers' greatest concern "is not numbers, it is training."* She cited the example of managers who told her they could interview hundreds of candidates 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."

High Growth Occupations 2010-2020



High Demand Occupations 2010-2020

The BLS Perspective

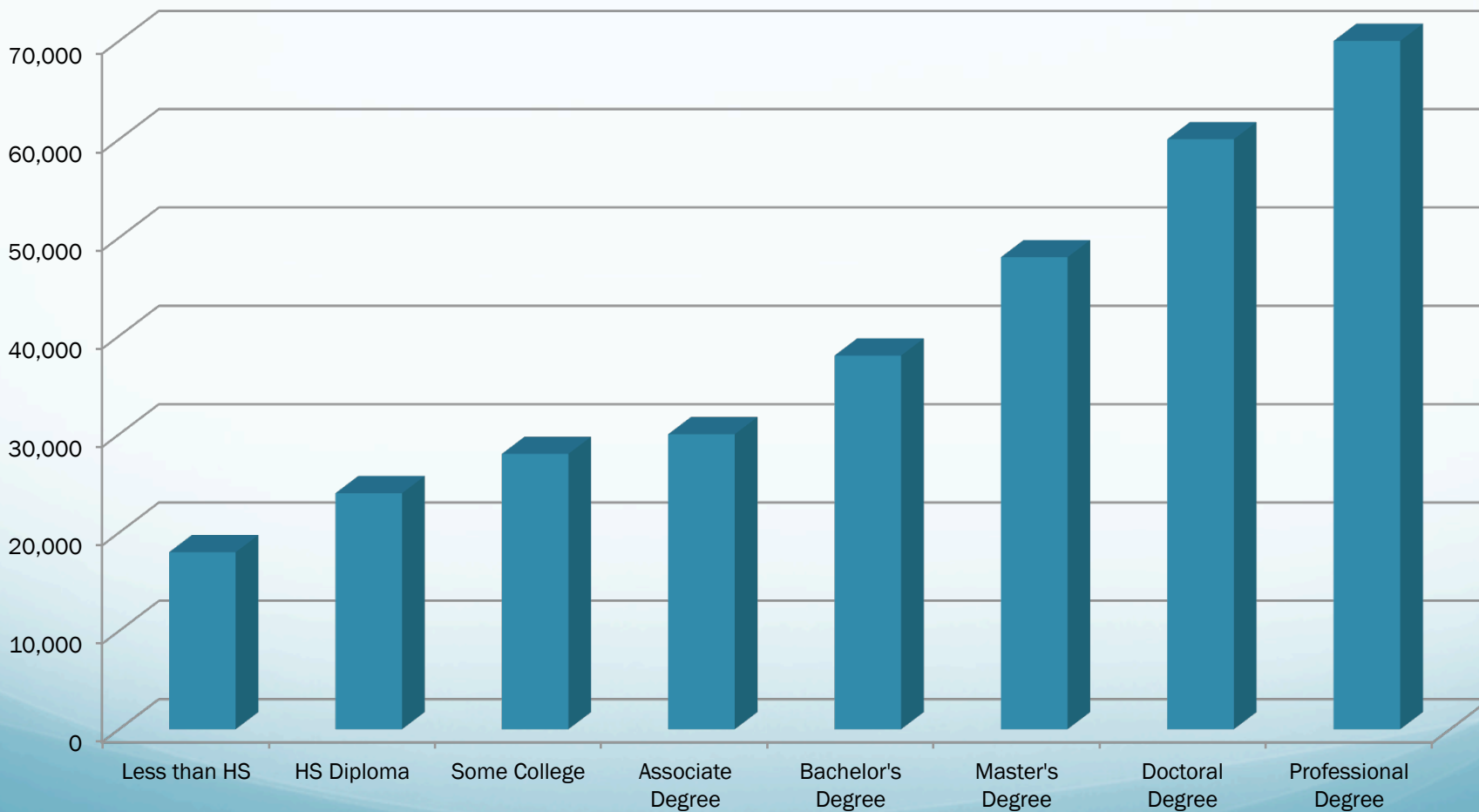


Another Perspective

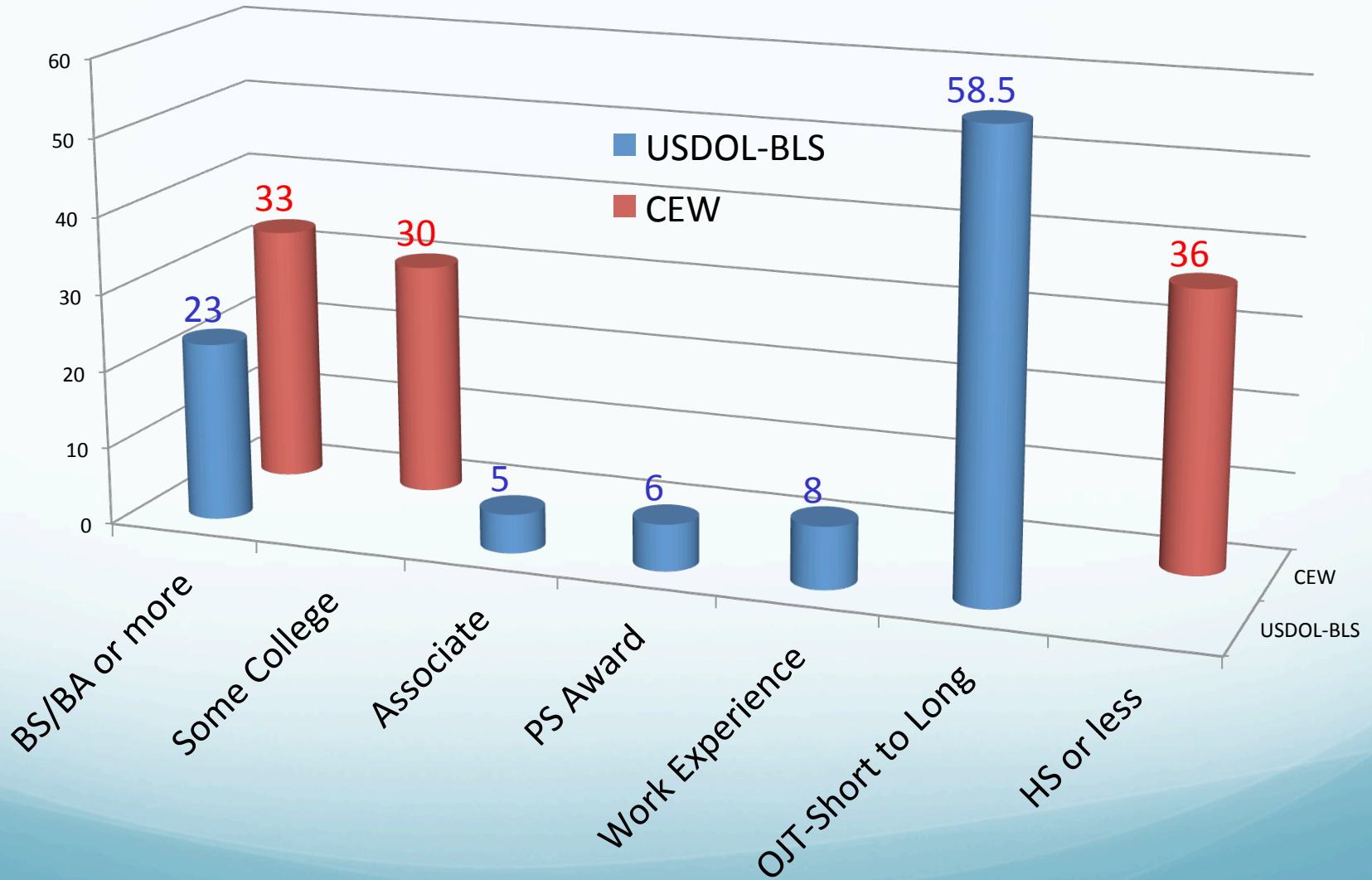


The USA Today Version of Reality

Annual Salary

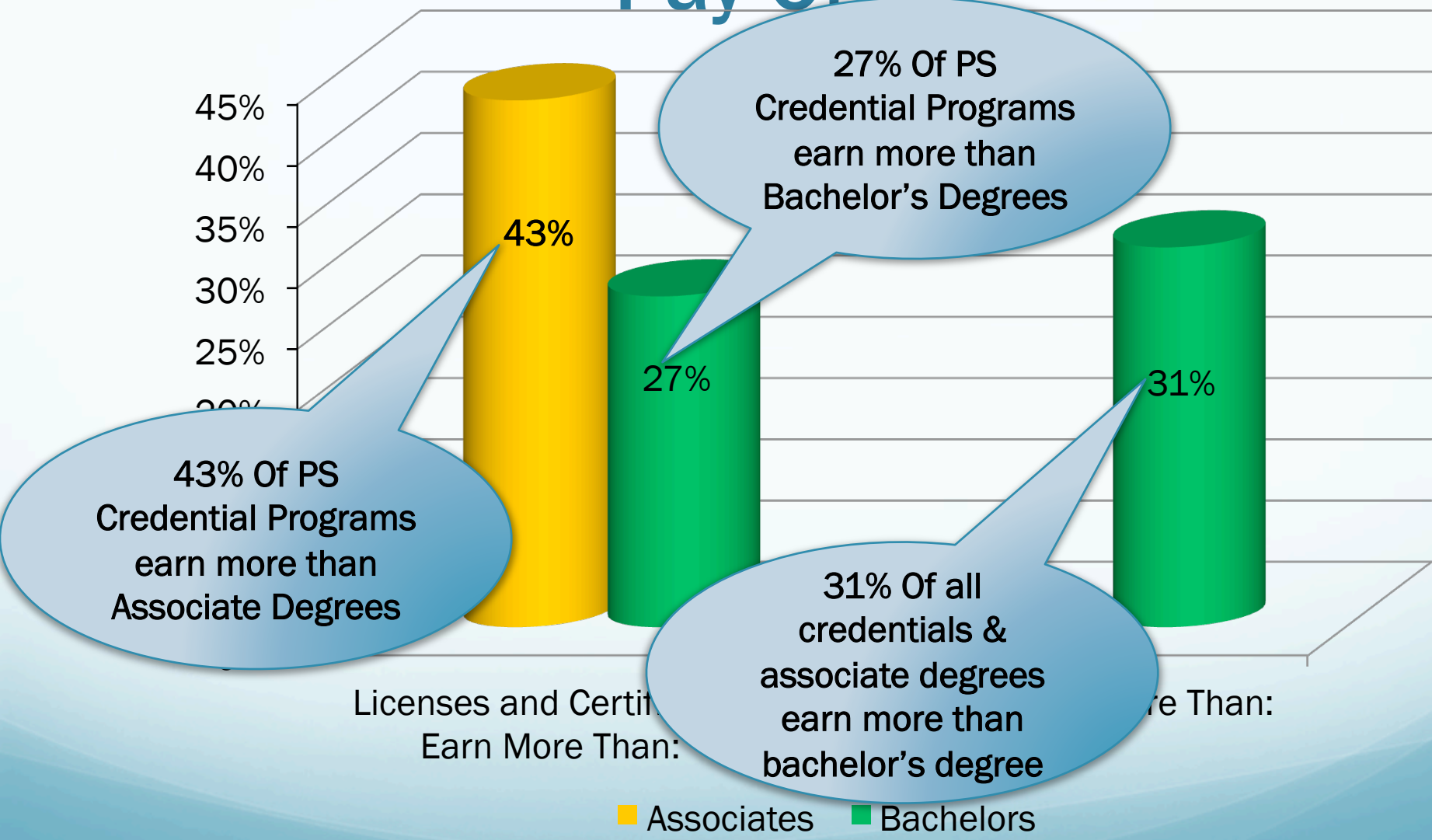


Education and Future Work: BLS & CEW



Sub-Baccalaureate Credentials

Pay Off



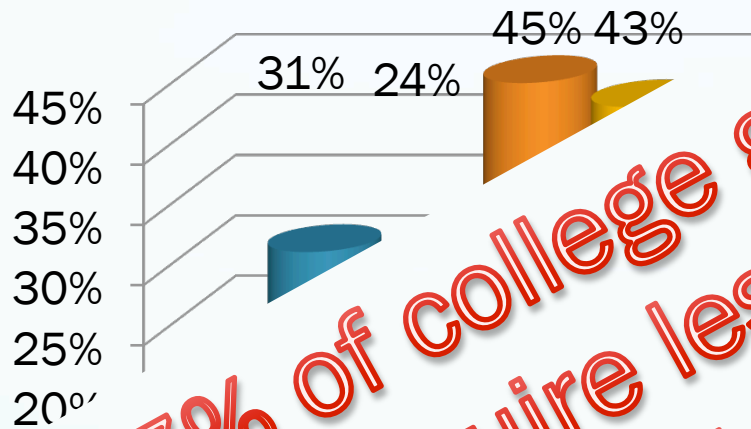
Middle Skill Occupations (B.A./B.S. NOT Required)

Occupation	Salary
Air Traffic Controller	102,300
Storage and distribution manager	66,600
Transportation manager	66,600
Non-retail sales manager	59,300
Forest fire fighting/prevention supervisor	58,920
Municipal fire fighting/prevention supervisor	58,902
Real estate broker	58,720
Elevator installers and repairer	58,710
Dental hygienist	58,350
Immigration and Customs inspector	53,990
Commercial pilot	53,870

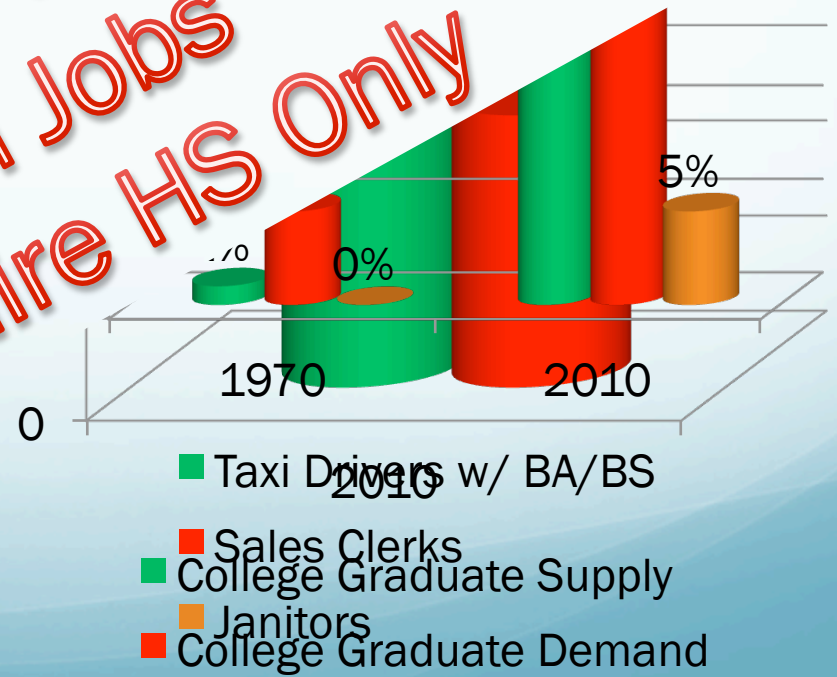
Farr, M. & Shatkin, L. (2006) *The 300 Best Jobs That Don't Require a Four-Year Degree*.
(US Department of Labor, Bureau of Labor Statistics)

Why Technical Education Matters

Credential Growth



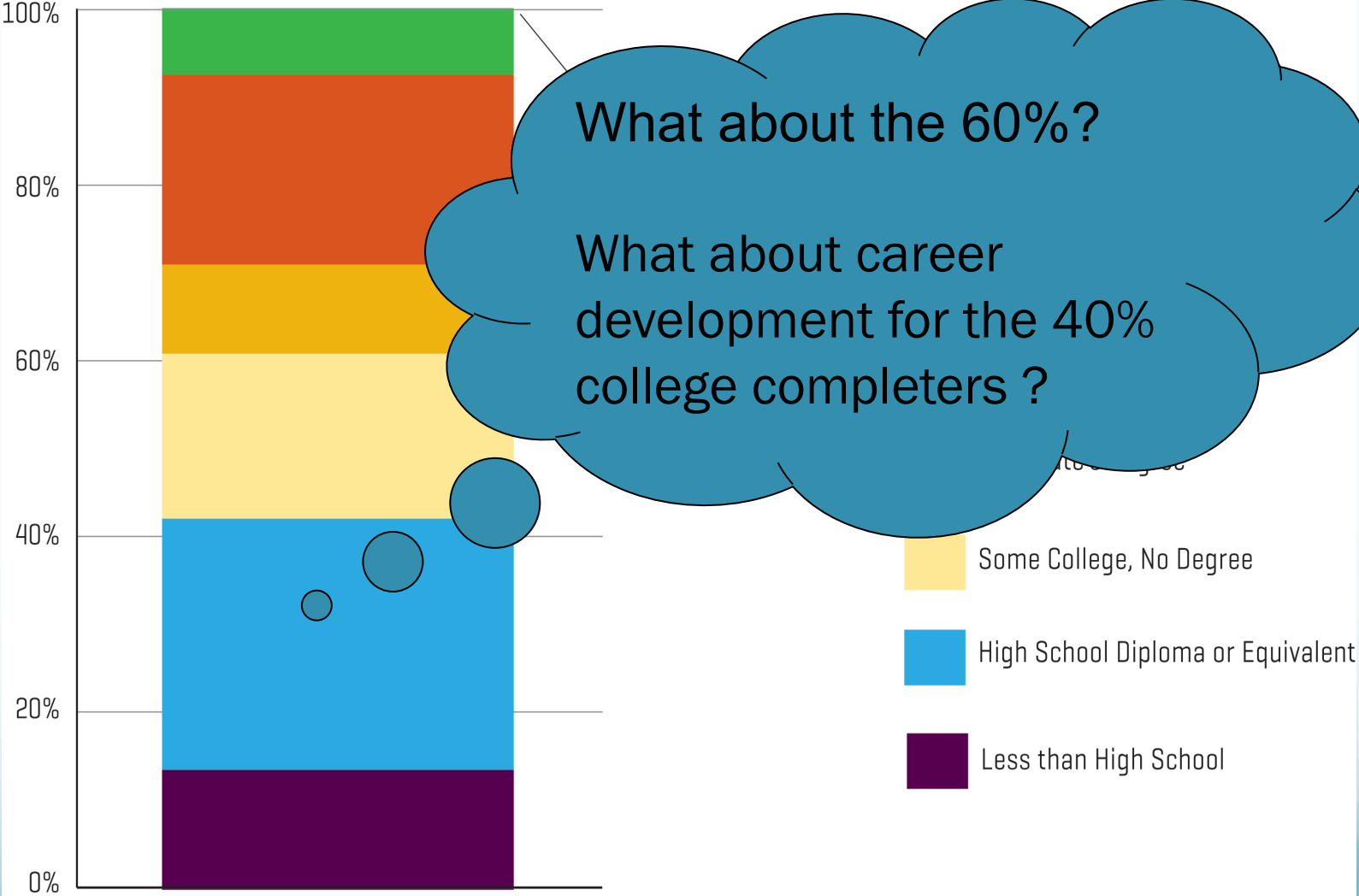
47% of college grads in jobs
 That require less than BA/BS;
 37% in Jobs
 that require HS Only



10

Doctorate

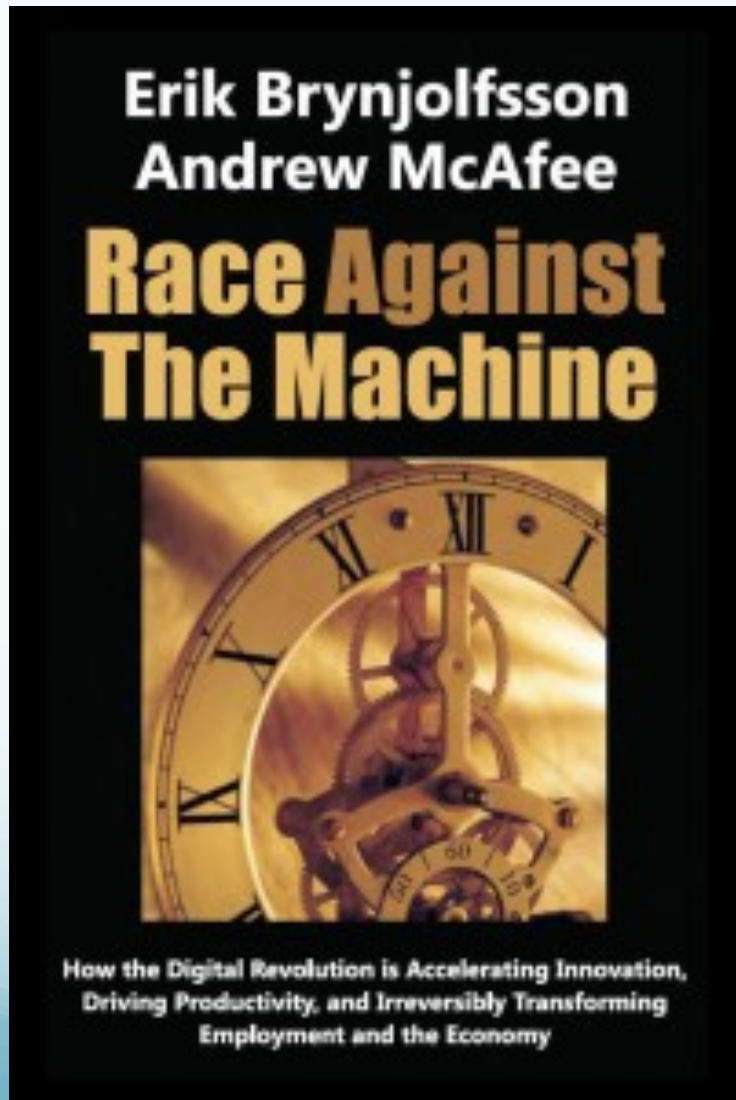
College for all? Only 40% of 27-year olds have earned an



Educational Attainment, by Age 26-27

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



Can People Win?

- Instructional methods
- Softer skills
- Instructional focus
- The Human Advantage (for now)
- Khan Academy
- CTSOs/WBL
- Hyperspecialists, entrepreneurs
- Physicality of work
- Advanced pattern recognition
- General problem solving
- Creativity

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

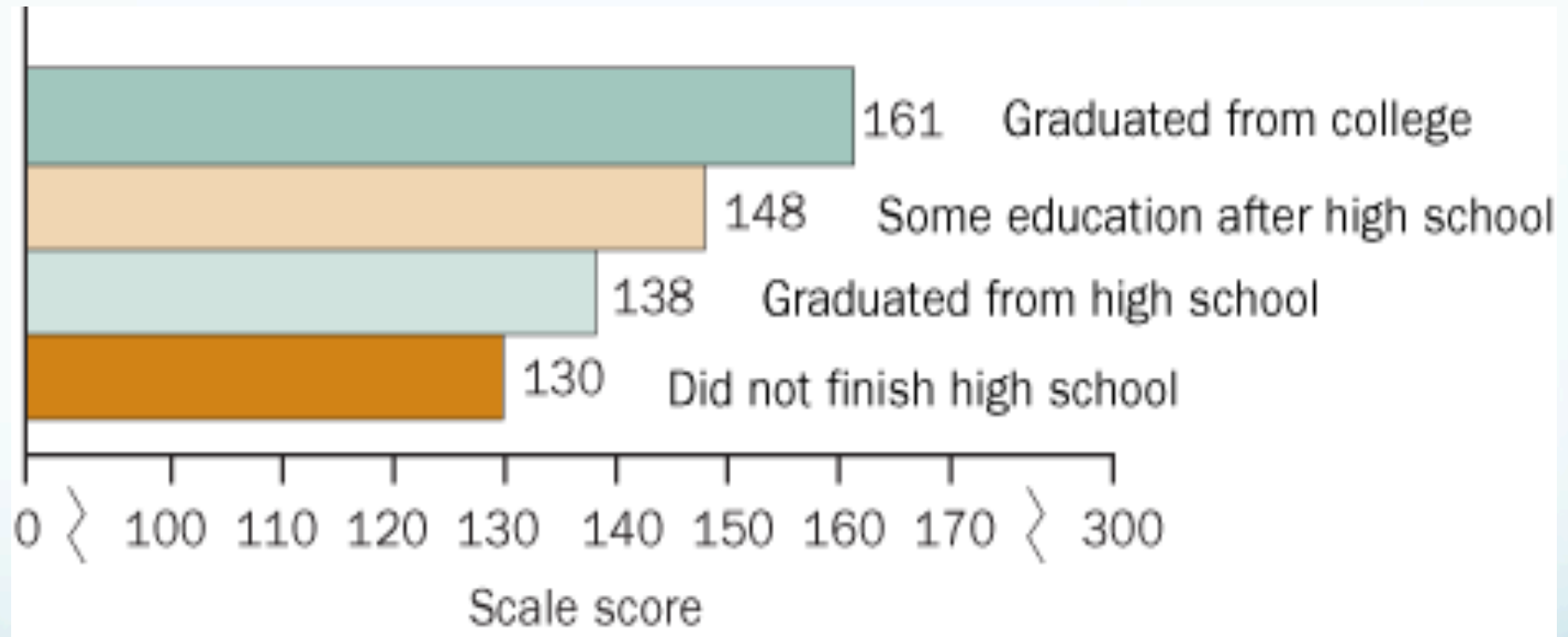
Taking more math is no guarantee

- Only 26% of students who took Alg I, II & Geometry scored a 22 (ACT Benchmark) on the ACT exam scoring an average of 17.7¹
- Adding Trig increases to the average score to 19.9¹
- Not until calculus is added, does the average score exceed 22 – 5 years of high school math.
- 43% of ACT-tested Class of 2005¹ who earned A or B grades in Algebra II did not meet ACT College Readiness Benchmarks in math²

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

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

One solution?



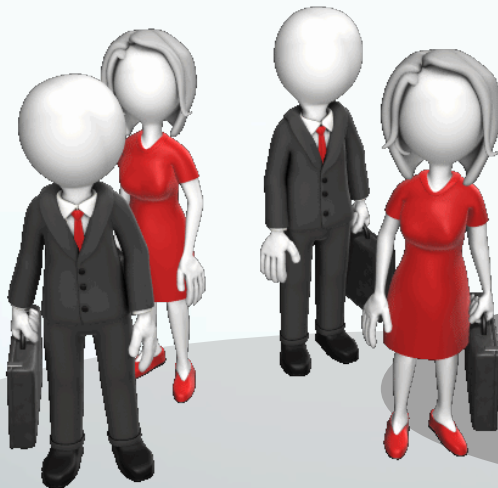
Be born to smarter parents!

Getting students ready for careers and college :

Their future

Academic
Mathematics
Science
Communications

Technical
Job specific
skills valued by
employers



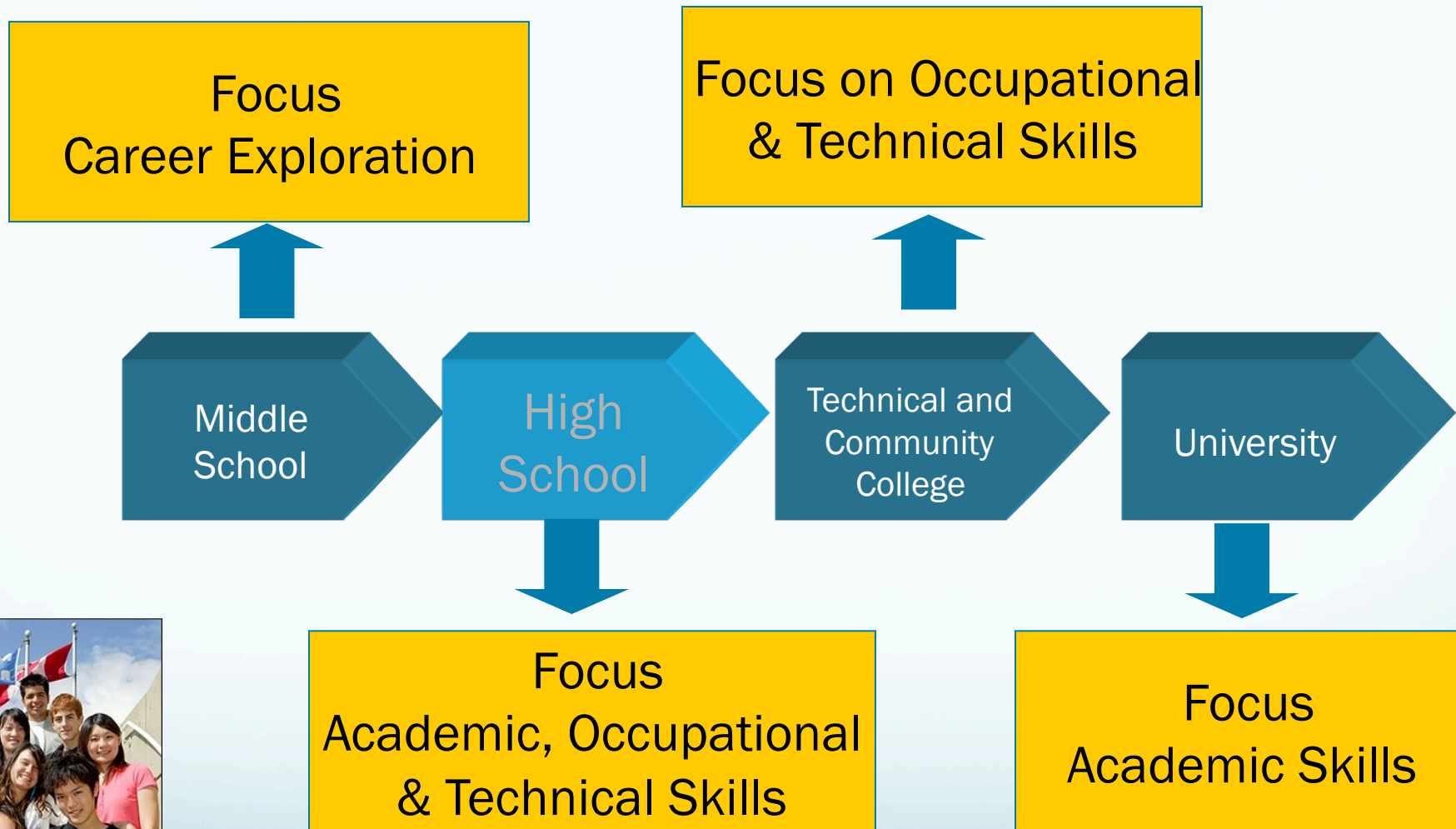
Occupational
SCANS

College & Career
Ready

21st Century Skills
“Soft” Skills
Employability Skills

• **Required skills**

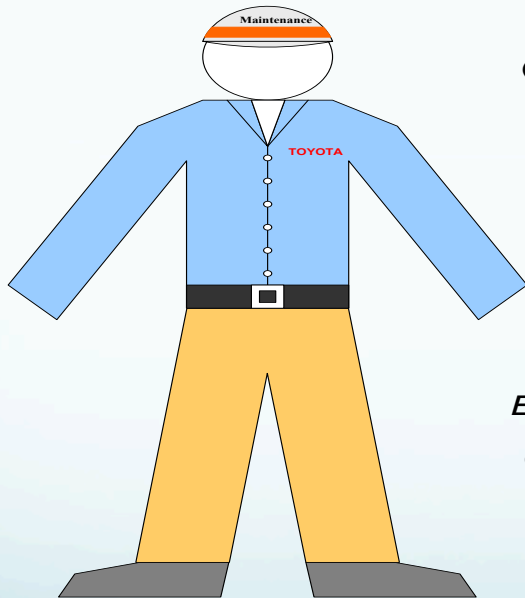
A Career Development Approach



Industry Knows This:

Toyota

Next Generation Skilled Team Member



Totally Multiskilled
(Electrical/ Fluid Power/ Mechanical/ Fabrication)

Strong Math Skill
(Upper 1/3 nationally)

Strong Reading Skill
(12th Grade level)

Fast Technical Learner
(Can learn, apply, improve, and learn again)

Uses and Learns With Digital Media

Strong Problem Solver

Effective Verbal & Written Communicator

(Comfortable in group and on-1 situations)
(Develops high quality processes manuals, guides)

Effective Interpersonal Skills

Natural Teamworker

Qualified for the Next Level



Target:

100% of Maintenance Workforce

Pedagogic Tools for World Class CTE

- Classroom instruction



- Work based learning-
WBL

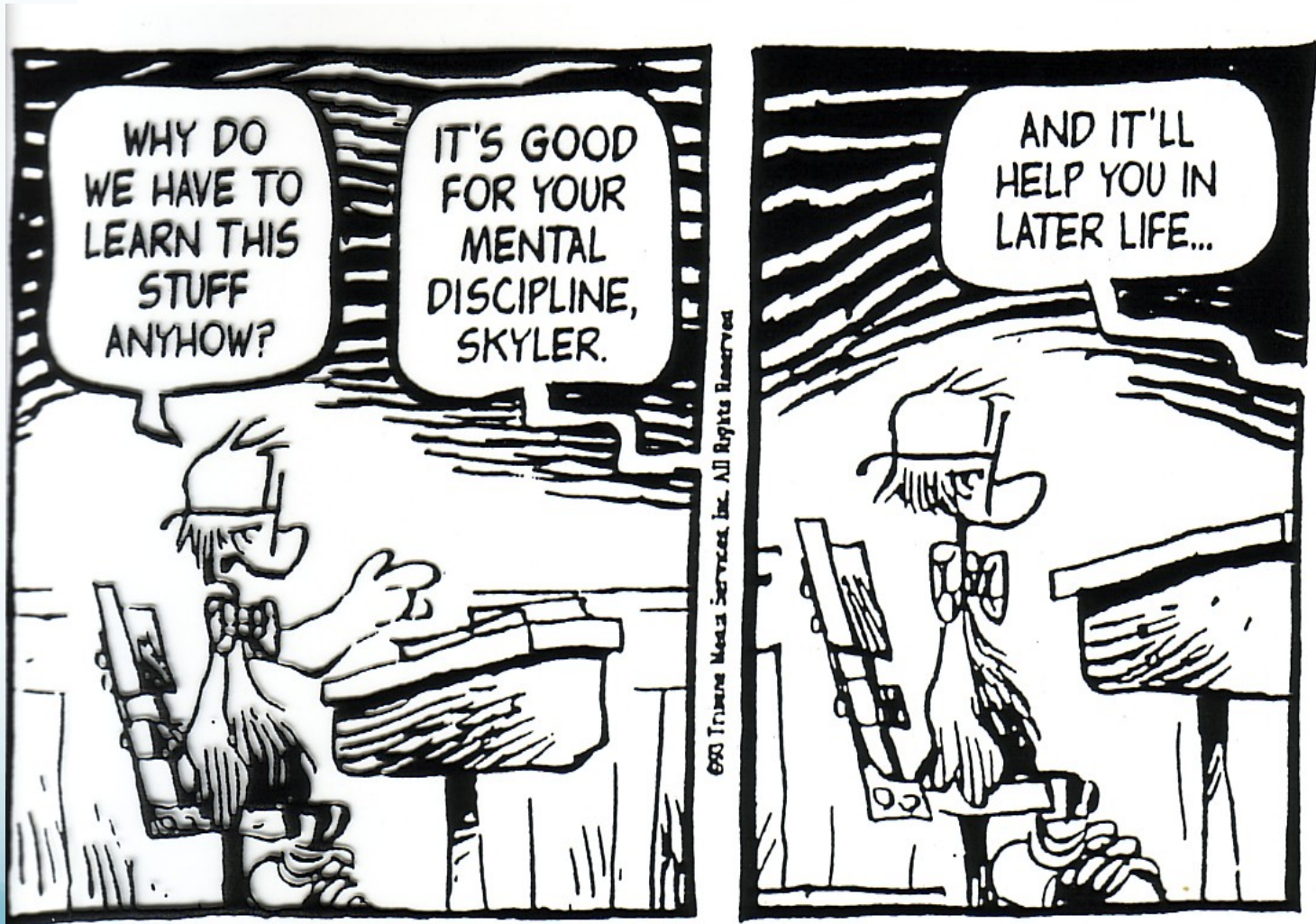


- CTSOs



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

Engaging Students through Relevant Classroom Instruction



Curriculum Integration Experimental Research *(Instructional)*

- Math-in-CTE: complete
 - Technical Assistance – 7 yrs
- Literacy-in-CTE: complete
 - Technical Assistance – 2 yrs
- Science-in-CTE:
 - Study recently concluded

Teachers Won't Do It,
unless . . .

Hell



What We Learned:

Experimental Test of Math Integration

- Students in the experimental classes scored significantly higher on Terra Nova and Accuplacer
- The effect: 71st percentile & 67th percentile
- No negative effect on technical skills
- 11% of class time devoted to math lessons



The Occupational Expression of Academics

A career ready person is proficient in the core academic subjects, as well as in technical topics. This foundational knowledge base includes competence in a broad range of academic subjects grounded in rigorous internationally benchmarked state standards... Career Readiness Council 2012

Math-in-CTE Curriculum Map: Health Science

CTE Course/Unit	CTE Concepts	Math Concepts	Common Core Math Standards Middle School	Common Core Math Standards High School
Patient assessment	Input/output; Vital signs; Height/weight; Conversions; Instrument reading	Reading measurement; Basic operations; Ratio/Proportion; Solving equations; Scales	6.NS.2; 6.NS.3; 7.NS.1; 6.RP.1; 6.RP.2; 6.RP.3; 7.RP.1; 7.RP.2; 7.RP.3; 6.EE.2; 7.EE.3	A.APR.1; A.APR.7; N.RN.3; N.Q.1; G.MG.3; A.CED.4



- Significant improvement from both approaches
- Teachers with two-years experience in method had greater effect



Experimental Test of Reading Interventions in CTE

Tools for College & Career Readiness

- Work based learning-
WBL



- *Job shadowing*
- *Internships*
- *School-based enterprise*
- *Cooperative education*
- *Apprenticeships*

WBL: Everywhere but in the U.S. . . .

- The % of youth in VET ranges from 5% (Ireland) to 80% (Czech Republic).
- More than 50% youth in VET: Austria, Belgium, Finland, Switzerland, Australia, Germany, Sweden, Denmark and others.
- Japan, United Kingdom, France, Korea and others exceed 20%
- The U.S. doesn't make the list!

Learning for jobs (OECD, 2010)

The Value of WBL

Nations enrolling a *large proportion of upper-secondary students in vocational programs that include heavy doses of WBL* have significantly higher:

- school attendance rates
- higher upper-secondary completion rates
- college attendance

Pedagogic Tools for World Class CTE

- CTSOs



- *Leadership development*
- *Professional development*
- *Service/social engagement*
- *Competitive events*

The CTSO: Building Occupational Skills



Function

- Competitive Events
- Leadership Development
- Professional Development
- Social Engagement

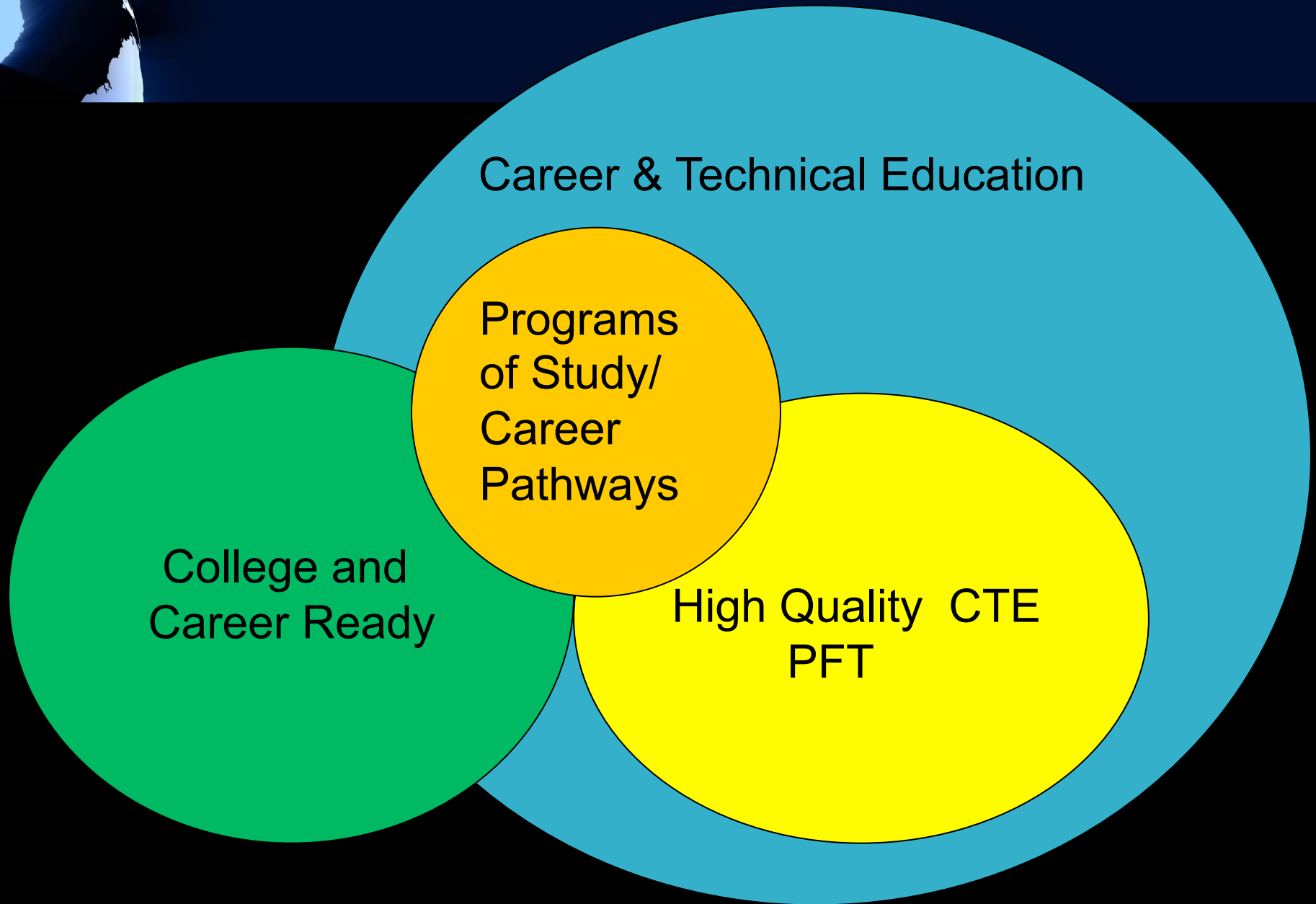
Effect

- Academic Engagement
- College Aspirations
- Grades
- Career Efficacy
- Employment Aspirations
- No Effect
- (-)Career Aspirations
- Employment Aspirations
- Career Efficacy



(Alfeld, et al, 2007)

The good news: This is CTE's Time



CTE makes HS Matter-It is not just our perspective: 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)”

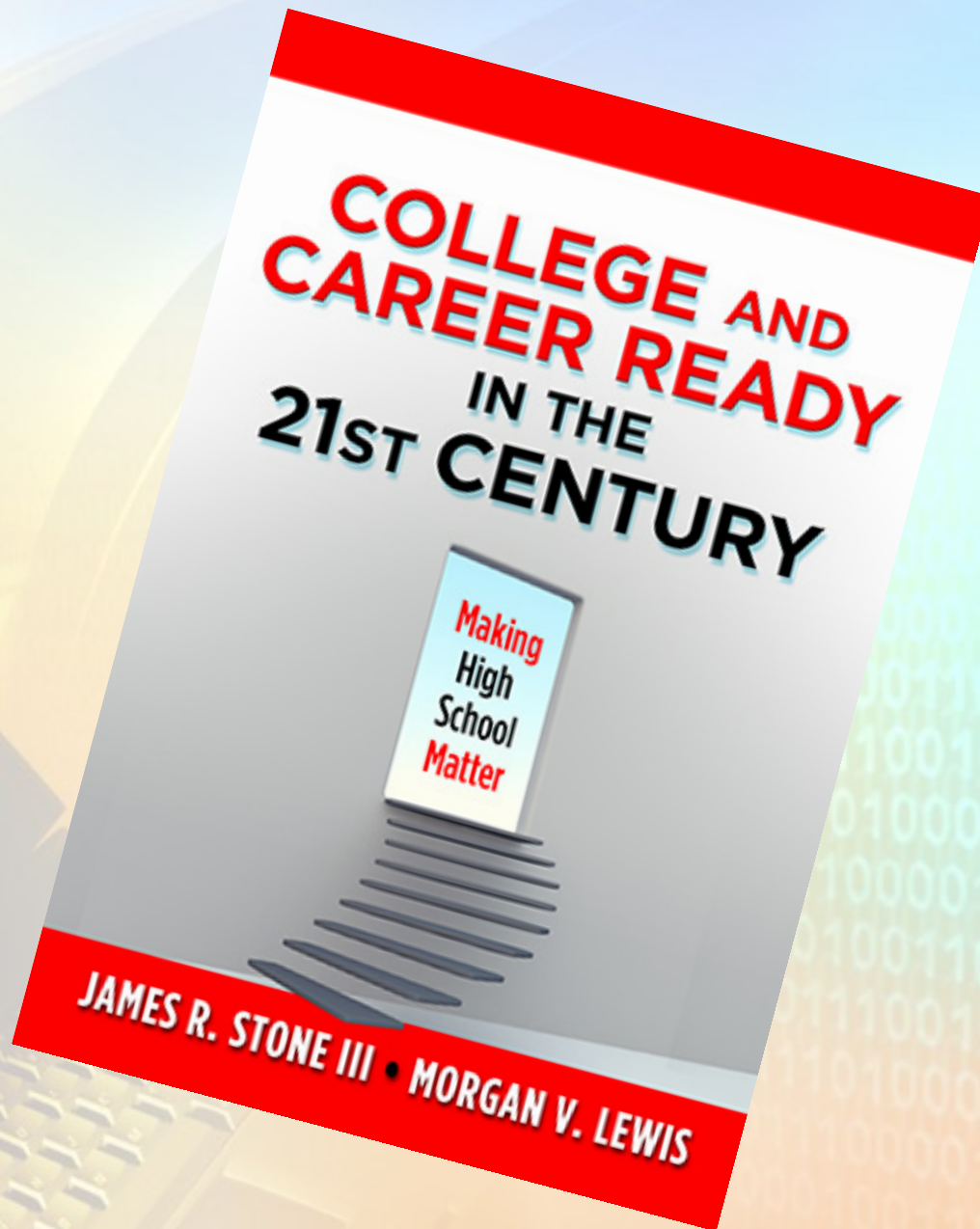
Holzer, H.J., Lane, J.I., Rosenblum, D.B. & Andersson, F. (2011). *Where are all the good jobs going.*



Key points

- Secondary CTE keeps kids in school, especially boys
- High quality, secondary CTE enhances academic achievement; can support CCSS; improves transition to postsecondary-Necessary for College and Career Readiness
- Effective CTE requires intensive and extensive career development beginning no later than middle school
- Effective CTE requires effective teachers; professional development
- Effective CCR preparation requires a systems approach:
 - Vertical integration: high school & postsecondary & employer
 - Horizontal integration: academic & CTE; CTE & academic
 - Internal integration: authentic, contextualized learning

Shameless Promotion . . .



VISIT OUR WEBSITE OR SEND ME A NOTE



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