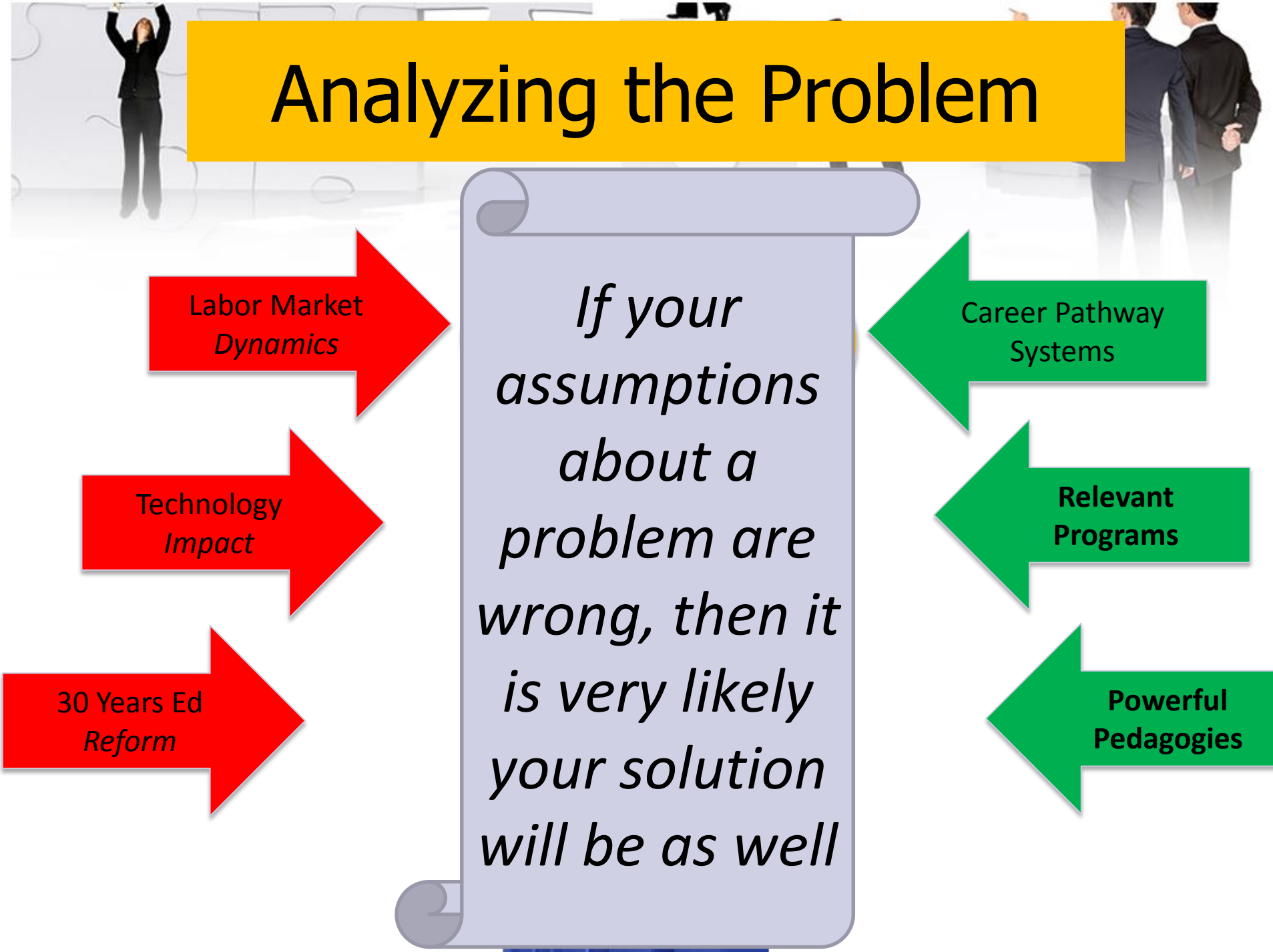
Building a College & Career Ready System By Building Collaborations

James R. Stone III

National Research Center for CTE at SREB

NRC CTE National Research Center for Career and Technical Education

Analyzing the Problem



Caveats 1

- Focus on K-12 CTE with reference to postsecondary
- Correlation is not causality
- The plural of anecdote is not data
- Alaska is unique

Caveats II

Public education serves multiple purposes, productive citizenry is but one of many:

- Engaged citizen
- Contributing community member
- “wise” consumer
- others

CTE also serves multiple purposes:

- Education about work
- Education through work
- Education for work (productive citizen)

The Audit: Labor Market & Economic Development

The raisons d'être for CTE

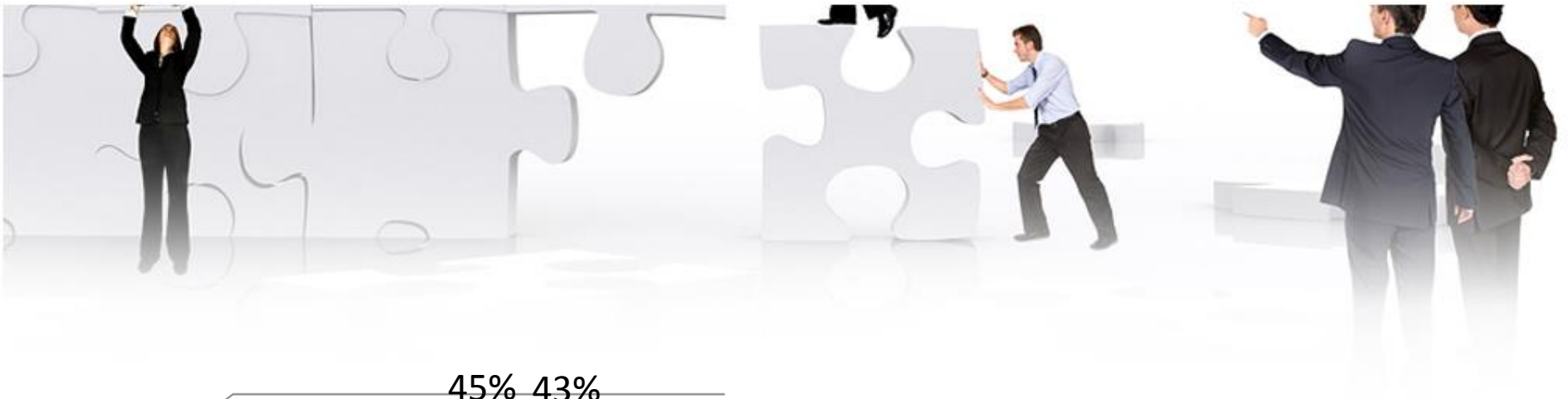
A Brief Labor Market Scan

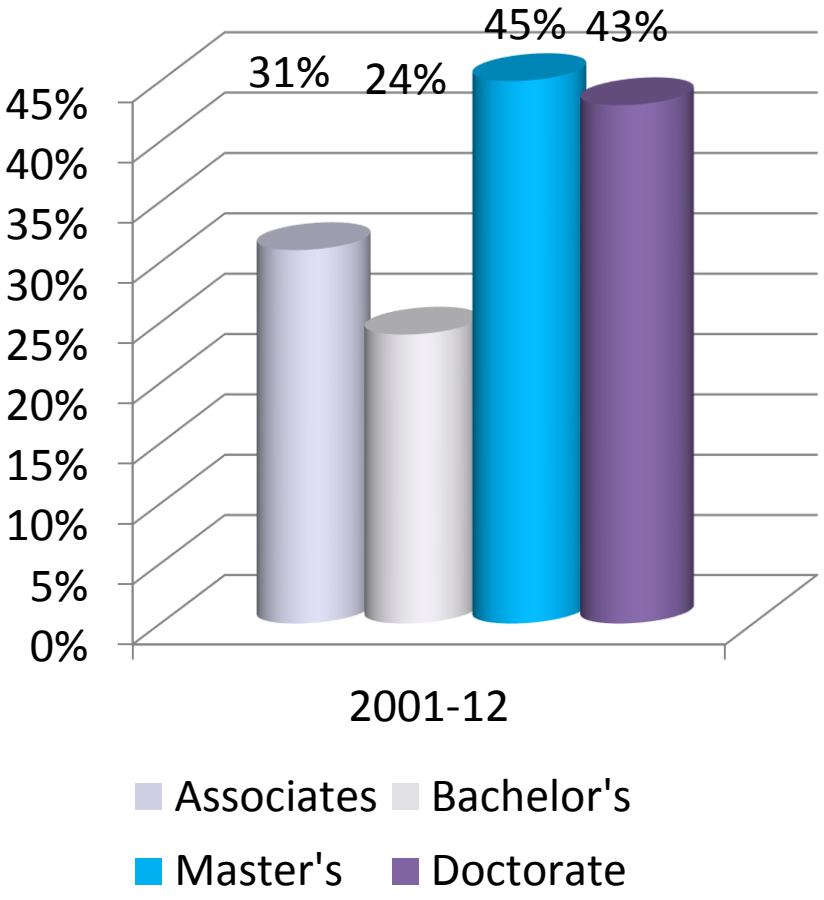
Three Perspectives:

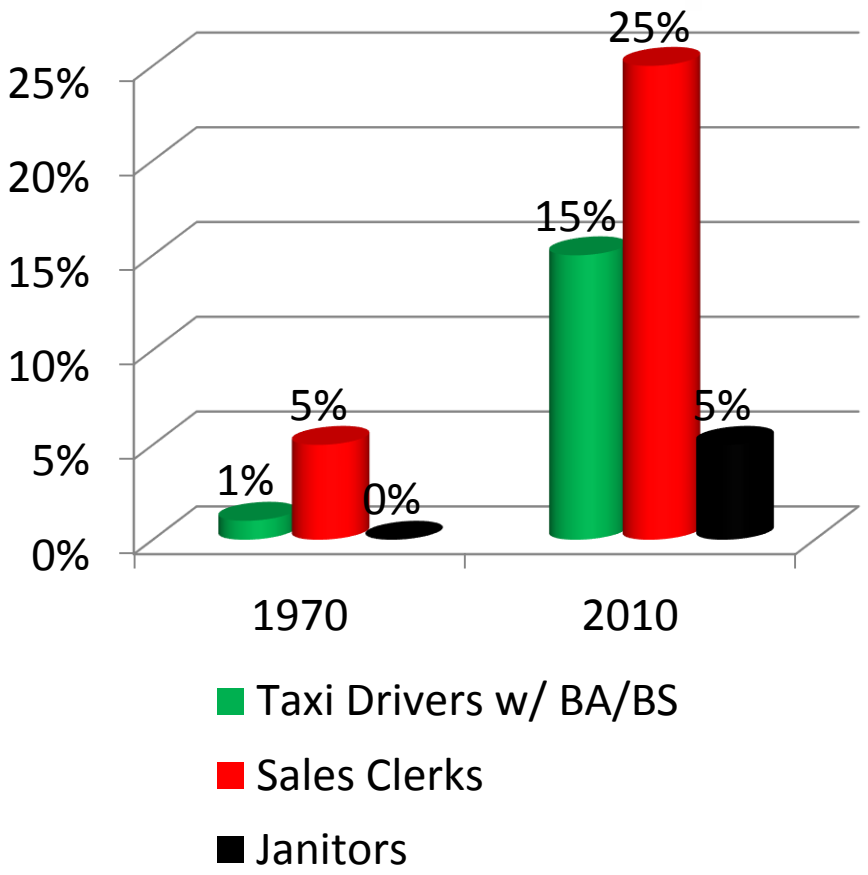
Worse, Worser and OMG!

National Perspectives (BLS)

Largest Growth Jobs Absolute Numbers		Fastest Growth Jobs (%) Denominator Bias	
1. Registered Nurse	(+712,000)	1. Personal Care Aides	(+600,000)
2. Retail Sales Person	(+707,000)	2. Home Health Aide	(+706,000)
3. Home Health Aide	(+706,000)	3. Biomedical Engineer	(+ 9,700)
4. Personal Care Aide	(+607,000)	4. Construction Helpers	(+ 17,600)
5. Office Clerks	(+490,000)	5. Carpenter's Helpers	(+ 25,900)
10. PS. Teachers	(+306,000)	6. VetTech	(+ 41,7000)
15. Elementary Teacher	(+249,000)	8. Physical Therapist Asst	(+45,7000)







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

Too Many College Grads?

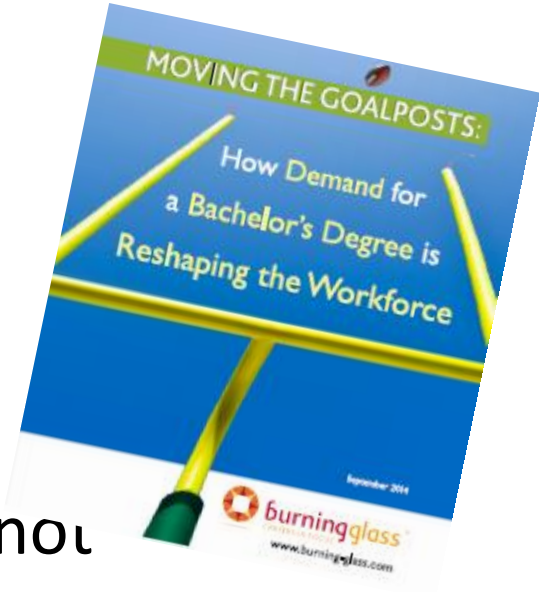
- …turning out vastly more college graduates than there are jobs in the relatively high-paying managerial, technical and professional occupations to which most college graduates traditionally have gravitated.

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

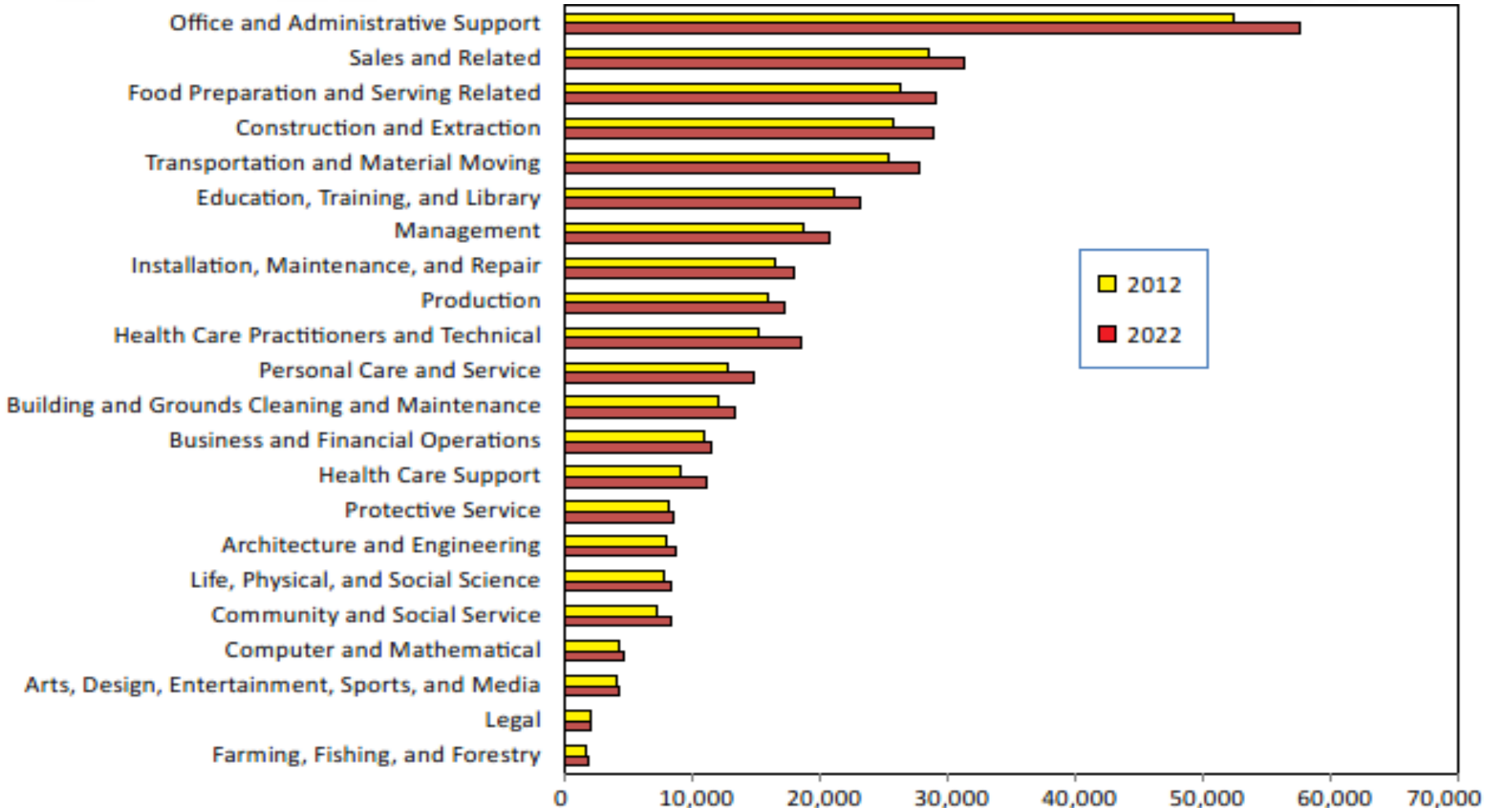
Richard Vedder, director of the Center for College Affordability and Productivity WSJ 6/21/2012

Problem: Credential Inflation

- Jobs resist credential inflation when there are good alternatives for identifying skill proficiency.
- Health care and engineering technician jobs show little sign of upcredentialing.
- When governed by strict licensing or certification standards, well-developed training programs, or by measurable skill standards such that employers do not need to look at a college degree as a proxy for capability.



The Shape of Alaska to Come?



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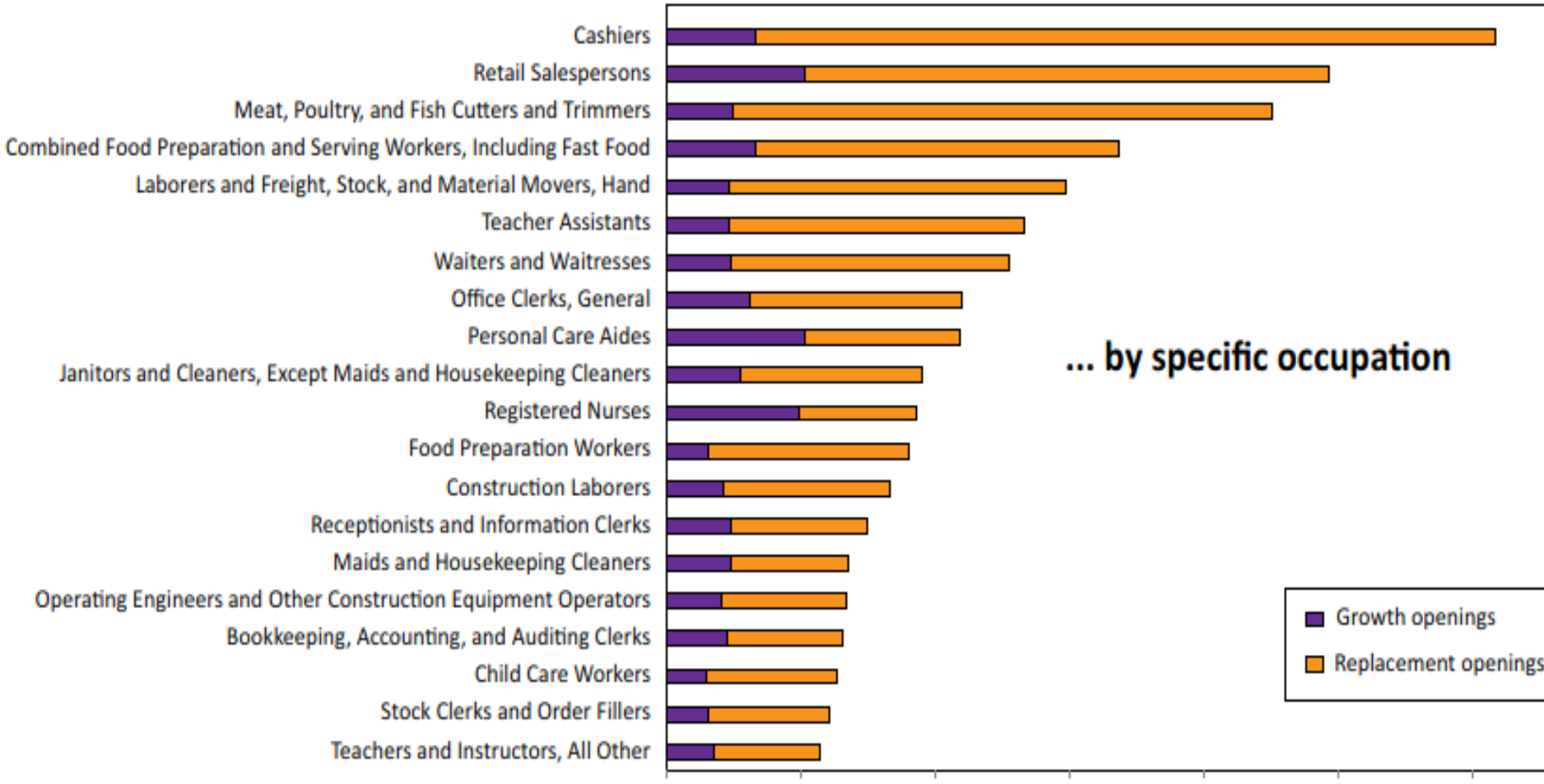
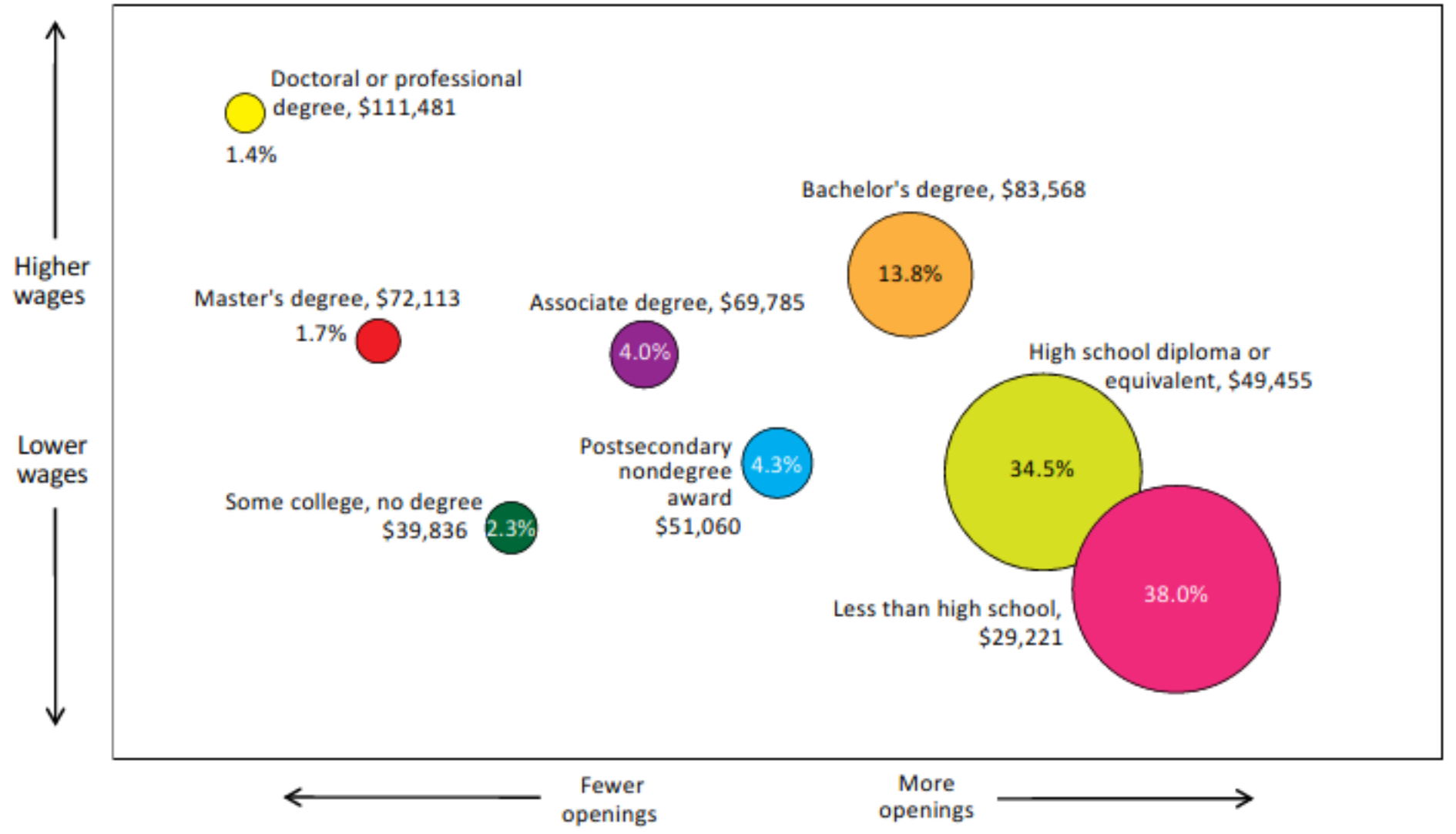


Alaska's Top 10

Registered Nurse	1887	Associate's
Operating Engineer/ Construction Equipment Operator	1344	HS + Training
General & Operations Managers	1005	Bachelor's
Carpenter	956	HS + Training
Elementary Teacher	867	Bachelor's
Supervisor of Office & Admin	822	HS
Electricians	791	HS + Training
Plumbers, Pipefitters	627	HS + Training
Airline Pilots	597	Bachelor's
Accountants/Auditors	522	Bachelor's


Higher wages
Lower wages
Doctoral or professional degree, $111,481
1.4%
Bachelor's degree, $83,568
13.8%
Master's degree, $72,113
1.7%
Associate degree, $69,785
4.0%
High school diploma or equivalent, $49,455
34.5%
Postsecondary nondegree award
$51,060
4.3%
Some college, no degree
$39,836
2.3%
Less than high school, $29,221
38.0%
Fewer openings
More openings

Unmanned Aircraft Systems: An Economic Development Strategy for Alaska

Alaska is Unique: Also Consider State Economic Development Plans

STEMania

- STEM accounts for 11% of all jobs requiring a college degree.
- STEM is the second highest group of jobs advertised online — 28%.
- STEM jobs take more than twice as long to fill as other openings.

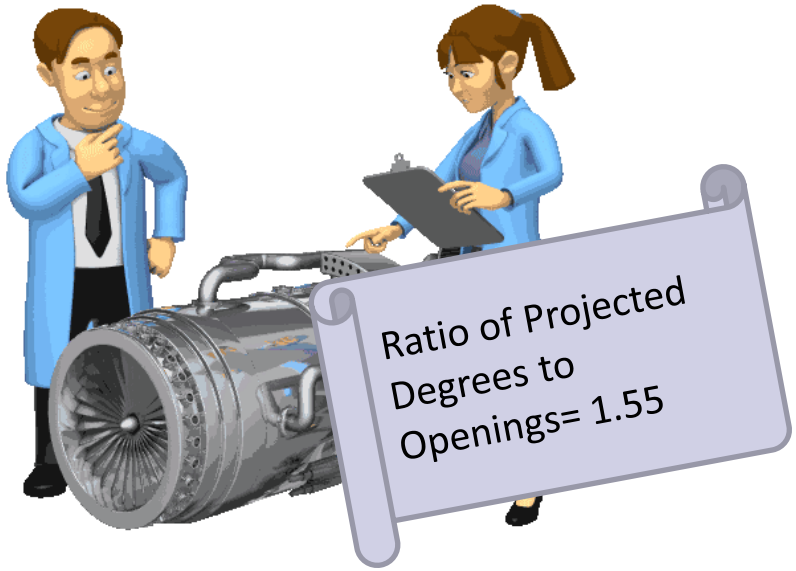
Is CTE STEM? Or STEAM? Of STEMM?

Sources: *The Online Labor Market: Where the Jobs Are*. Center on Education and the Workforce, Georgetown University, April 2014; *Still Searching: Job Vacancies and STEM Skills*, Brookings Institute, June 2014.

STEM: To 2020

Projected STEM Openings

- 2,537,060



Projected STEM Graduates

- Associates 440,000
- Bachelors 2,652,000
- Master's 569,000
- PhD's 258,000
- Total **3,919,000**

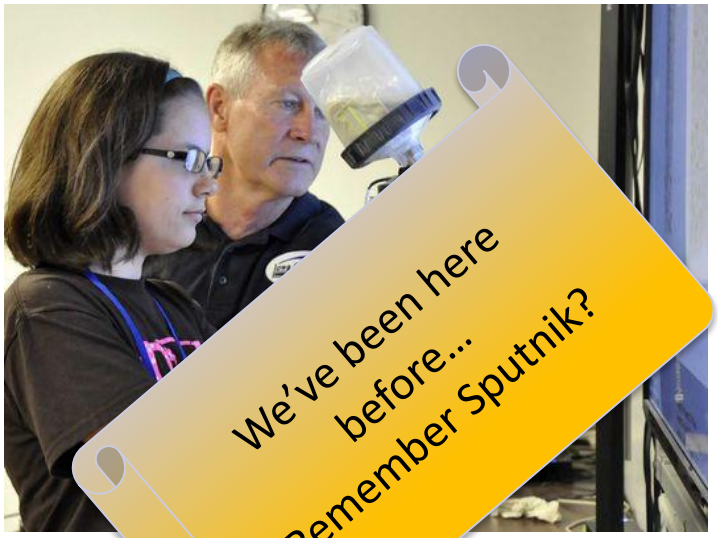
http://www.printfriendly.com/print?url=http%3A%2F%2Fcis.org%2Fmore-us-stem-grads-than-jobs&partner=a2a#

If STEM Jobs are so hard to fill:

Most with bachelor's degrees in science, technology and math don't get STEM jobs.

Amid a U.S. push to get more students interested in science, technology and math, often called STEM, the Census Bureau reported Thursday that 74% of those with a bachelor's degree in these subjects don't work in STEM jobs. (Census Report: July 14, 2014)

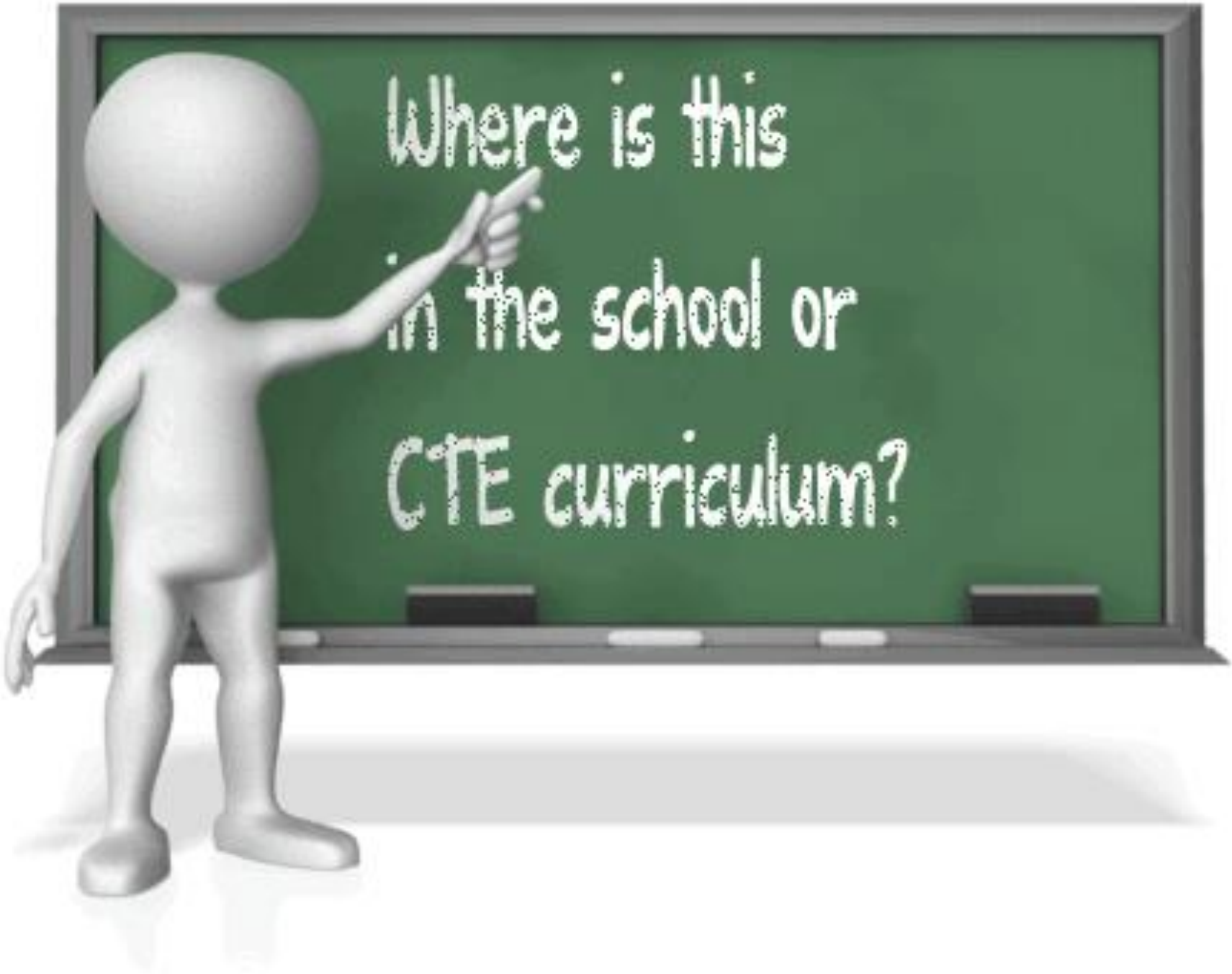
Engineering majors and majors in Computer, Math and Statistics	**50%**
Physical Science	26%
Psychology	10%
Social Science	7%



USA TODAY

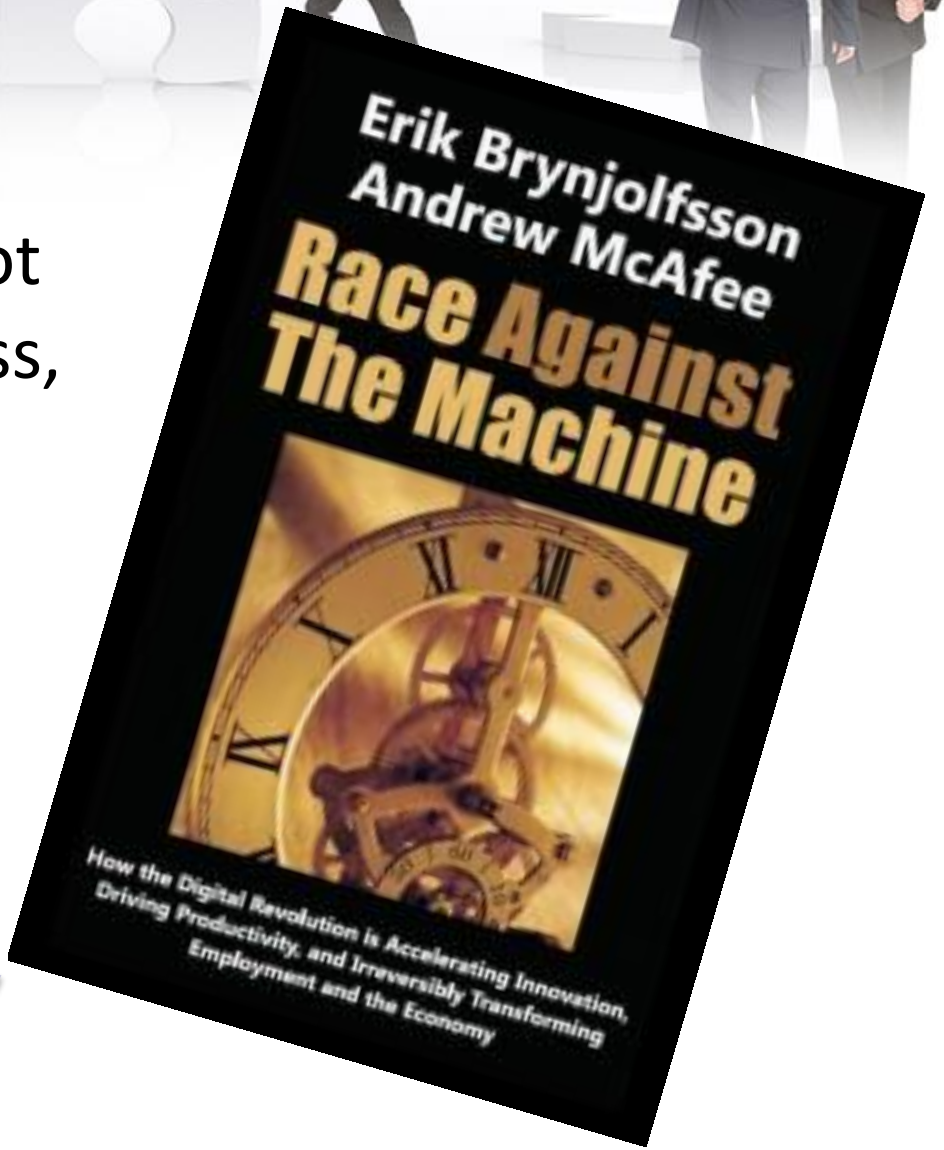

USA HAS SKILLS GAP
NEWS

Mfg tell us most adults cannot pass a 4th grade math test


Where is this
in the school or
CTE curriculum?

An Evolving Disrupter

- 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)
- Jobs vs. Work



Technology *Impact*

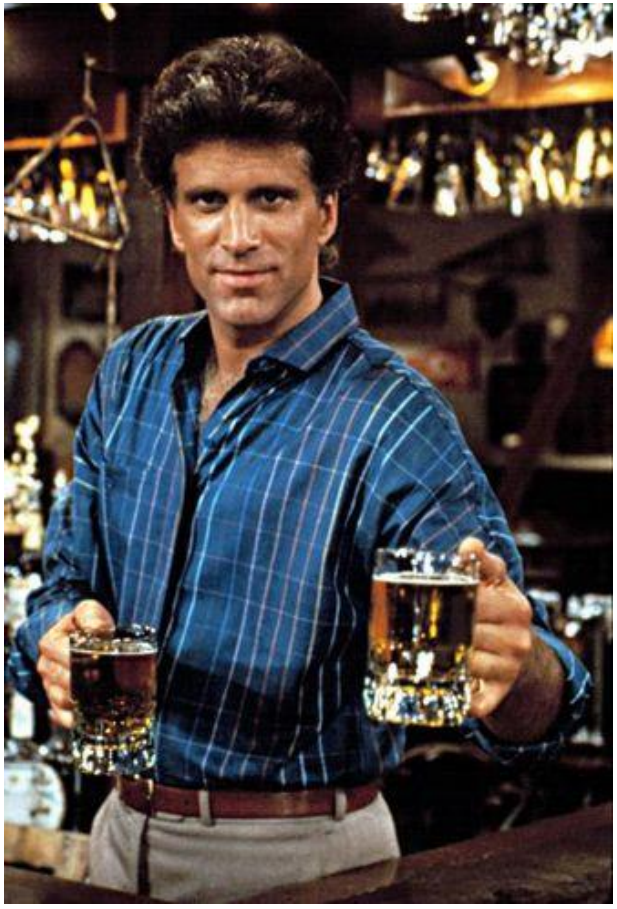
Technology's Impact on Jobs

(The Machines are Winning?)

- The Google car(truck?)
- IBM Watson (+240%)
- Deep Blue
- The "Square"
- Text readers/ Pattern recognition (goodbye legions of lawyers-only 60% accurate)
- Automated 'call centers' (goodbye India)
- Amazon Drone Delivery

"Everyone Knows Your Name"

Then



Now: A TEAM OF MIT BARTENDER ROBOTS SERVES BEER MORE EFFICIENTLY

But Wait ...

Then

The integrated system, which is referred to as FIREFLY, was cleared for use in robotic surgery by the FDA in February 2011 with initial use in applications ranging from urology to gynecology.

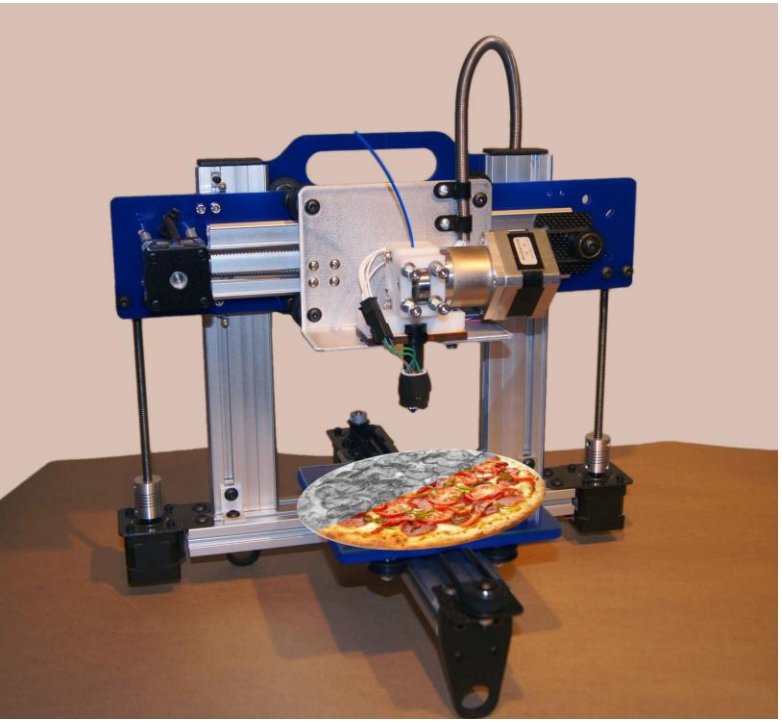
NOW & The Future

Dark (Lights Out) Manufacturing

- FANUC Robotics operates a lights-out factory employing robots to make other robots.
- Japanese camera giant Canon recently announced that it is phasing out human workers at camera factories
- And in the Netherlands, Philips produces electric razors in a facility with 128 robots and nine human quality assurance workers.

Future Manufacturing?

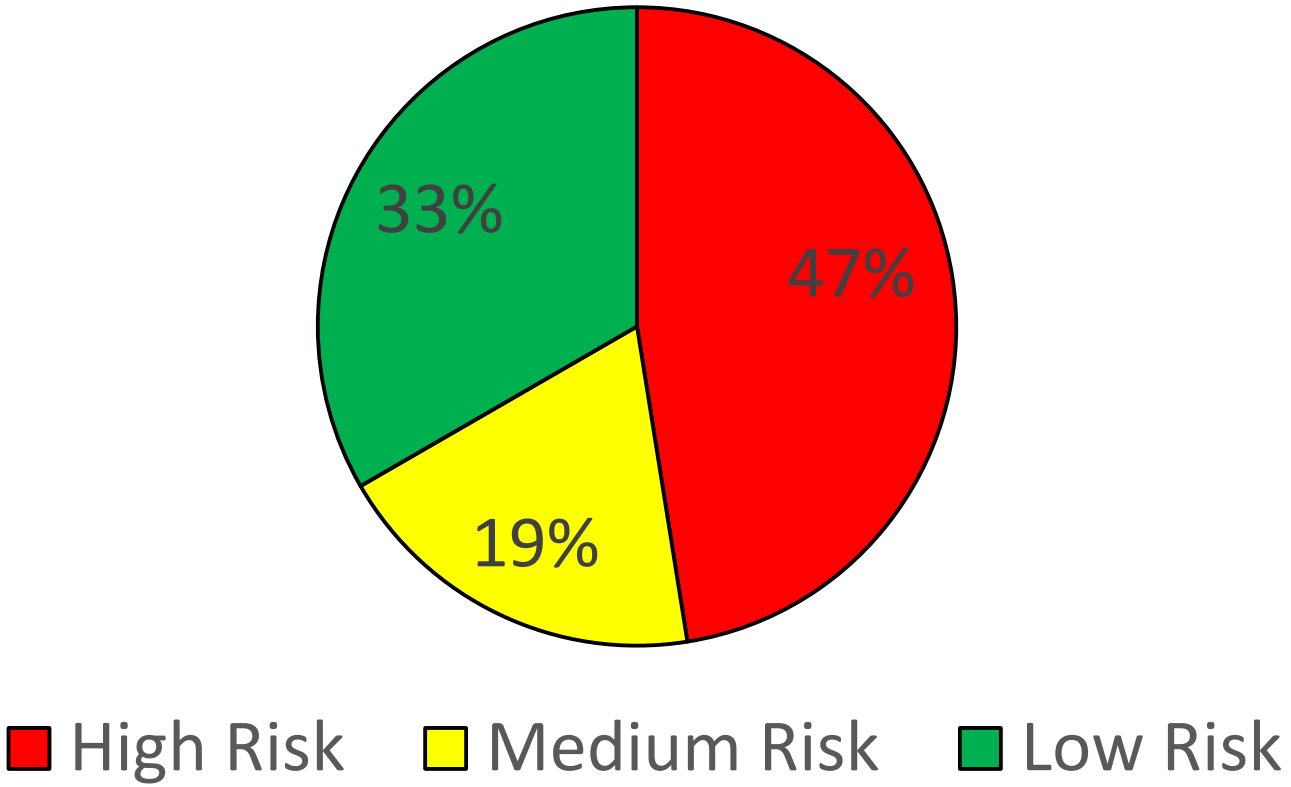
3D Printing



Manufacture Your Own Products

Risk of Jobs to Computerization

% of Jobs by Risk Level



Frey & Osborne, 2013

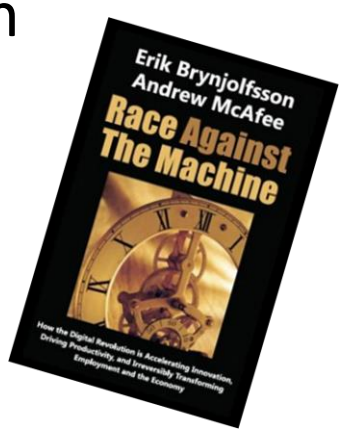
Can People Win?

- Instructional methods
- Softer skills
- Instructional focus

- The Human Advantage (for now)

*****THIS IS YOU!**

- Khan Academy
- CTSOs/WBL***
- ***Hyperspecialists, entrepreneurship****
- Physicality of work
- Advanced pattern recognition
- General problem solving***
- Creativity***



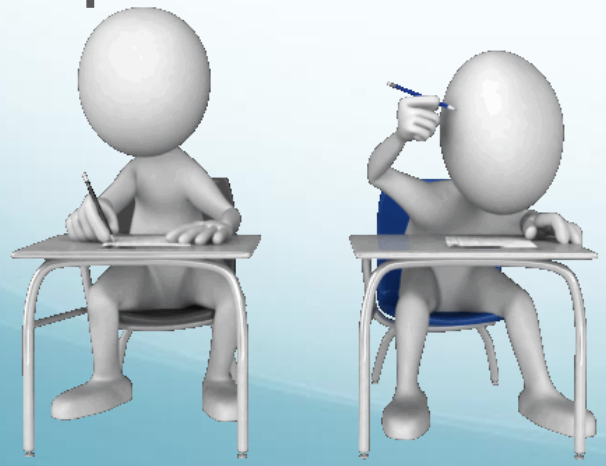
Education Solution?

Pile on more academics

30 Years Ed Reform

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

(ACT College Ready Math=22)

- Only 26% of students who took Alg I, II & Geometry scored a **22** (ACT Benchmark for CCR) on the ACT exam. (X=17.7)[1]
- Adding Trig increases to the average score to 19.9; ***37% are CCR***[1]
- Not until calculus is added, does the average score exceed 22; ***55% are CCR*** – 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*.

Math for College & Career Readiness

NCEE, 2013

- Math needed is ***mostly middle school***
- Alg II is not a prerequisite for CC success or most careers
- College ***reading requires 11th/12th grade skills***
- Students enter CC weak in needed math and reading skills

NRCCTE, 2013

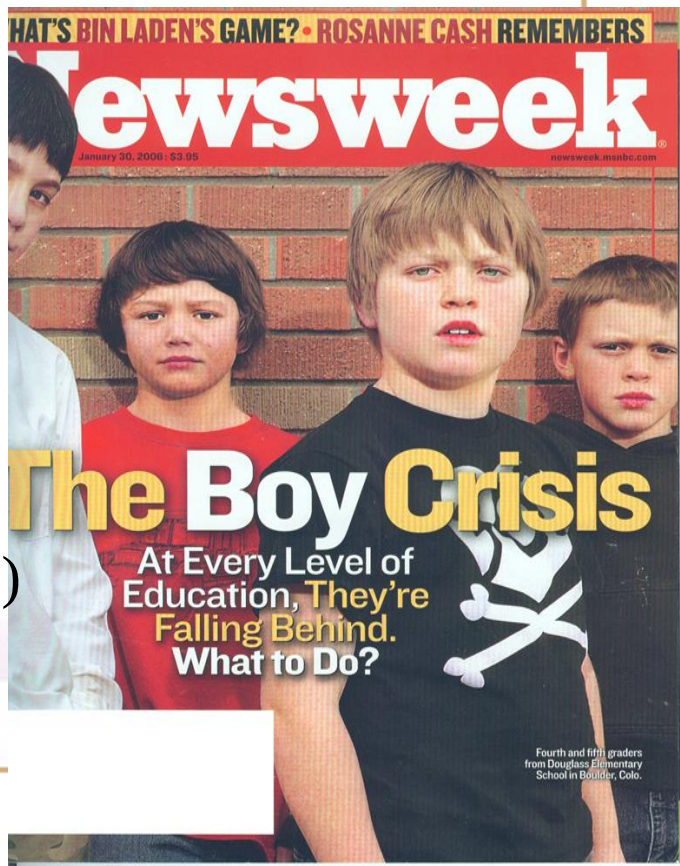
- Math associated with an ACT score of 22 is ***mostly middle school math***, Algebra I and some geometry.
- Math associated with ***middle skill job employment tests is higher*** than that required for an ACT score of 22 but still found in middle school math, Algebra I and some geometry

NRC CTE
National Research Center for Career and Technical Education

In the Meantime: We have a 'boy' problem

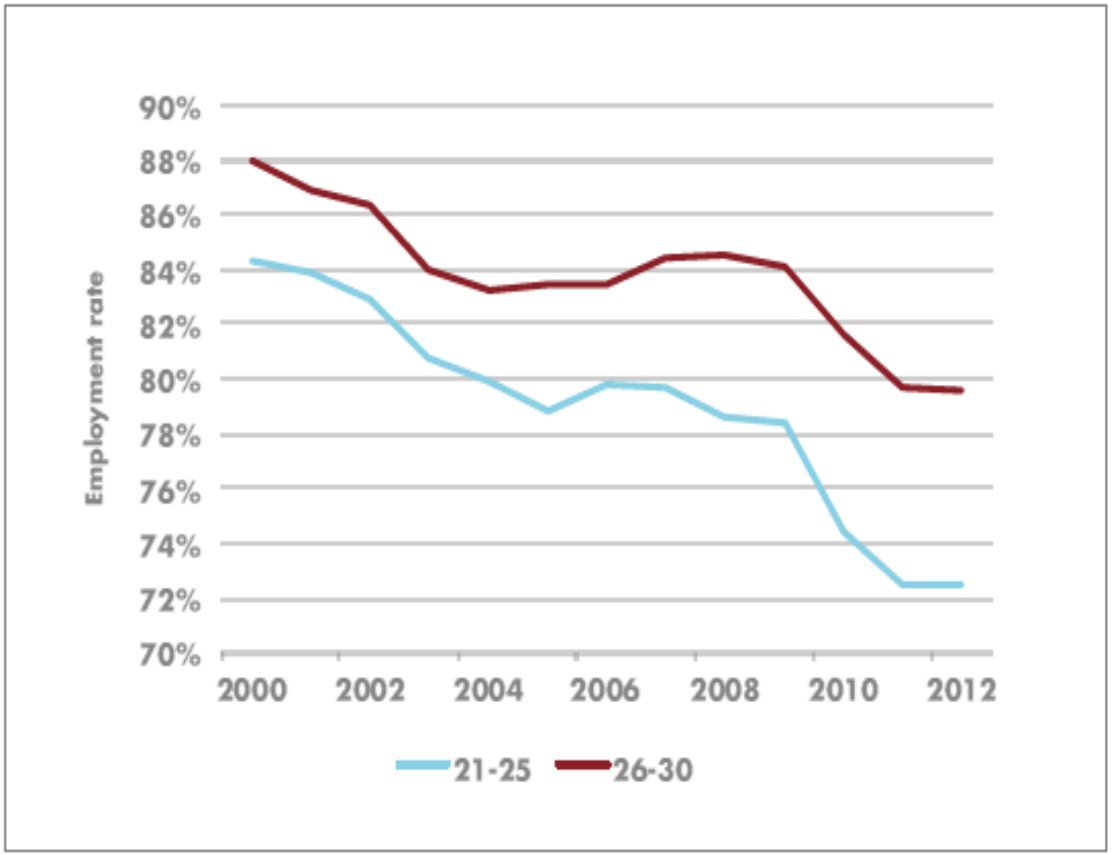
- By 12th grade, male reading scores are below females'
- 11th grade boys write at an 8th grade girl level
- Boys advantage in math and science is nearly gone.
- Boys are more likely to have discipline problems
- Boys account for ¾ all D's and F's
- Fewer boys than girls finish high school, start and finish college, start & finish grad school (Brooks,2012)

http://blogs.edweek.org/edweek/college_bound/2013/03/career_technical_education_linked_to_boys_high_school_survival.html



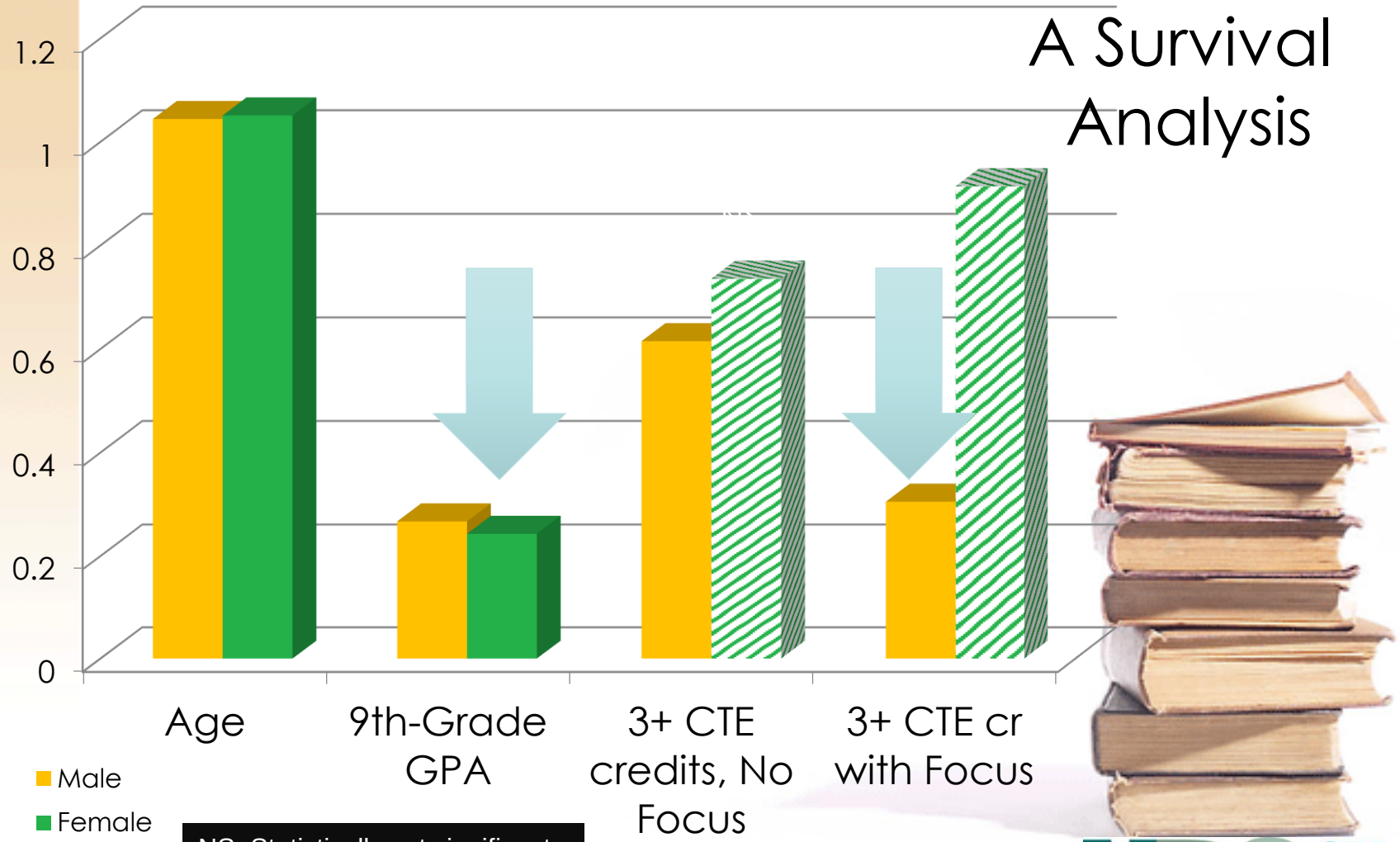
Employment of Young Men

SOURCE: GEORGETOWN UNIVERSITY CENTER ON EDUCATION AND THE WORKFORCE ANALYSIS OF CURRENT POPULATION SURVEY, MARCH, 2000-2012, CPS UTILITIES, UNICON RESEARCH CORP.



CTE Keeps Boys in School!

A Survival Analysis



National Research Center for Career and Technical Education

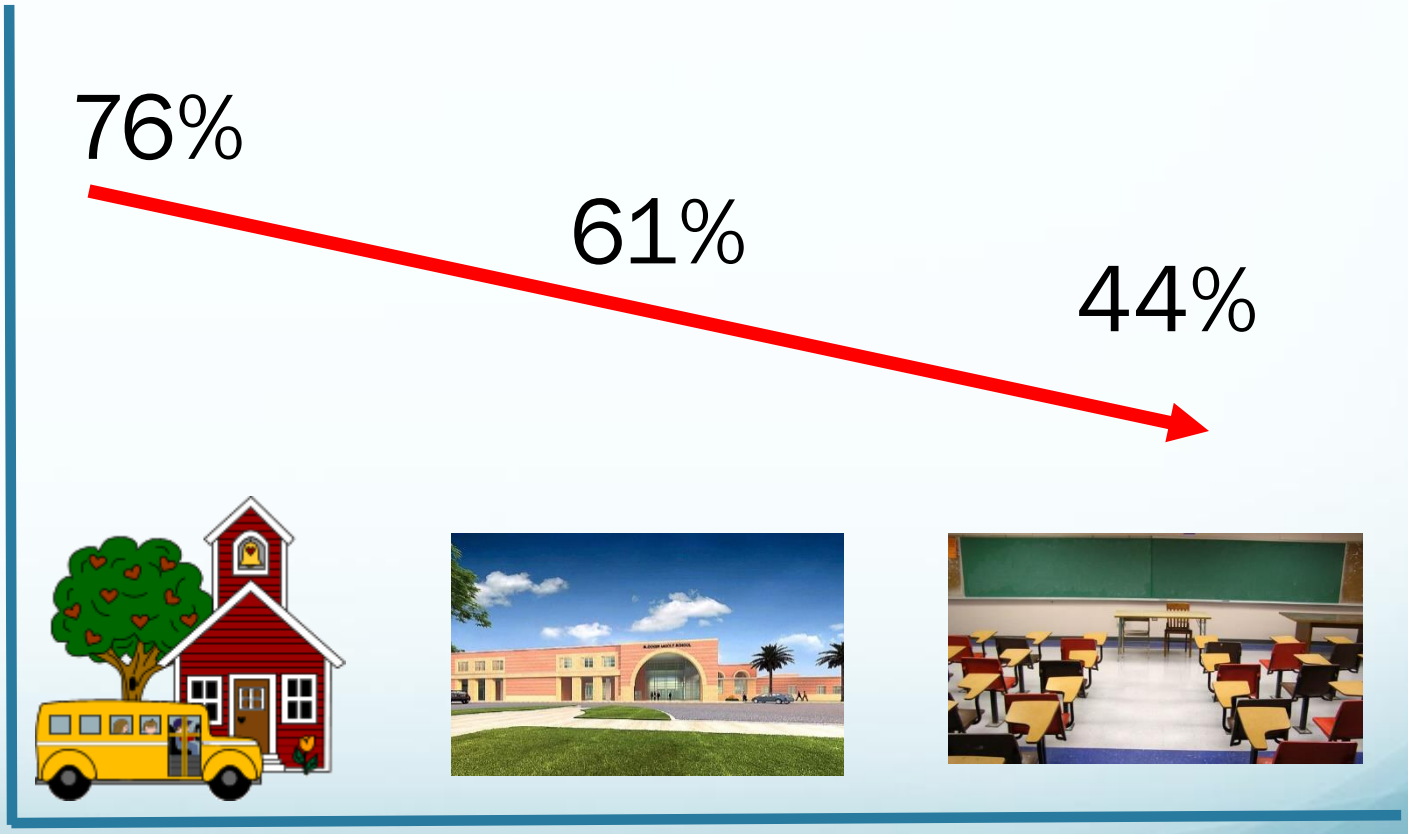
Not Just Our Work: Economists' Perspective

"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.

While test scores remain flat, Student Engagement plummets



Brandon Busteed, Executive Director of Gallup Education
Presentation at the NASDCTEc October 21, 2014

Drop Outs? Better, but

High school graduation in the US is at an all time high….

- about 80%;
- girls 84%, boys 77%.
- Minority and low income youth doing a bit better.
- That's the good news. But…

There is persistent problem with certain groups of youth who are still lagging way behind:

- urban youth,
- native American youth,
- youth from low income families, English Language Learners,
- and a disproportionate number of young males who are not graduating or participating in post secondary programs
- 69% of Blacks graduating;
- 73% Hispanic;
- 86% White; 33% of ELL in
- Louisiana and 24% in Arizona

Good News: Graduation Rates are up (81%)

19% of 9th Grade ??

And 63% Go Directly to College

49.4% of 9th Grade ????

Research Points Toward A Systems Response

- Partnerships
- Programs
- Pedagogies

Building Quality Career Pathways to CCR

Partners

- Align the College & Career Ready System Components

Programs

- Bring existing programs to standards & add new programs

Pedagogy

- Ensure all CTE faculty are highly skilled in pedagogy and in their professions

Support A Systems Approach

System Of Innovative Partnerships

- Vertical Integration: Secondary - Postsecondary – Business & Industry
- K-12 Career Development

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

Engagement
Completing HS
Completing PS/
Industry credential

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

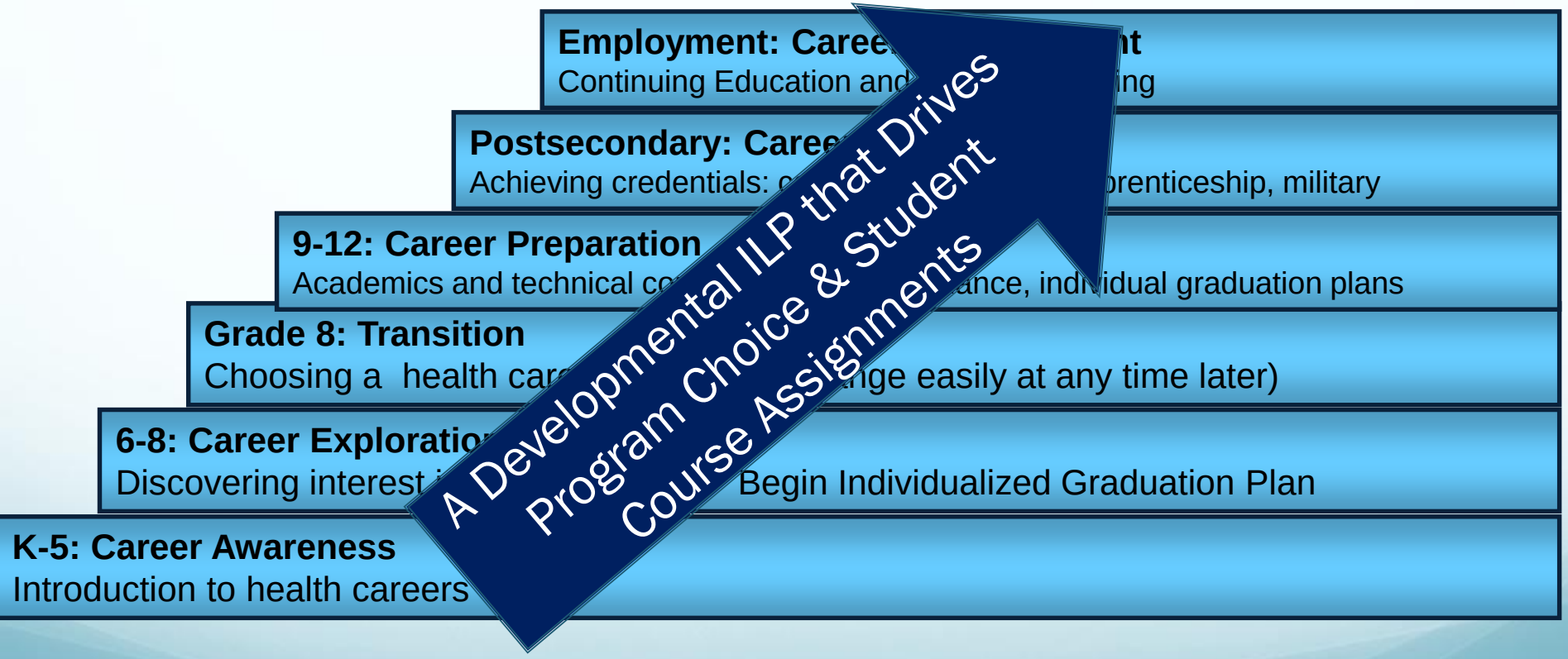
Improve Achievement
Academic
Occupational
Technical

Building the CCR system with High Quality CTE

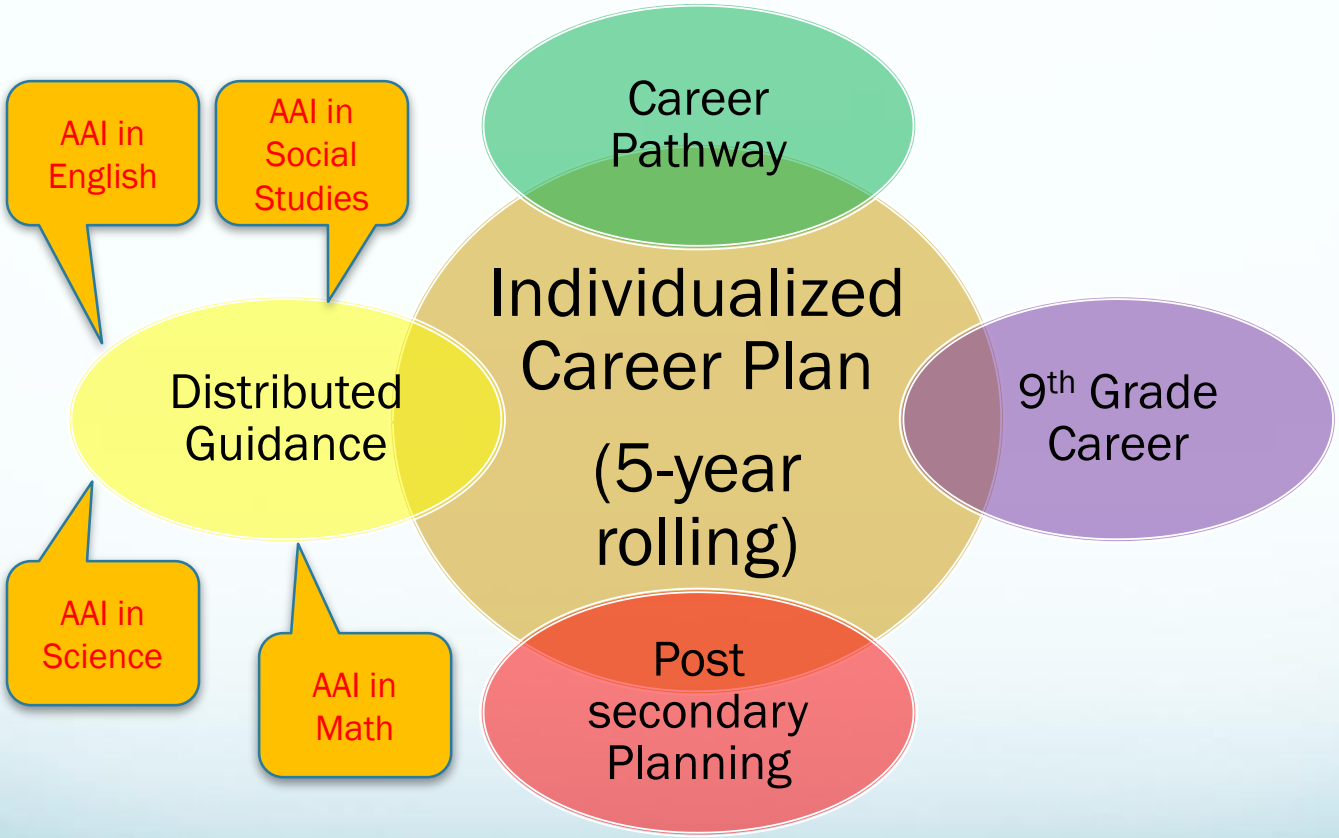
Audit The System

- What is working well?
- What is not working well?
- What is missing?

Effective CCR Requires a Career Development Framework



Imagine Involving All Faculty in Career Pathways



Distributed Guidance
Health Career Pathway

ELA: Write a paper explaining infection control practices and procedures documenting examples of when safety protocols were violated.

Science: Conduct a study of local health care facilities to determine how medical waste is disposed.

Social Studies: Study the impact of war-time medical care on the advancement of medical techniques.

Math: Compute the number of calories in the school lunch and then calculate how long a person would have to walk to burn off those calories to maintain body weight

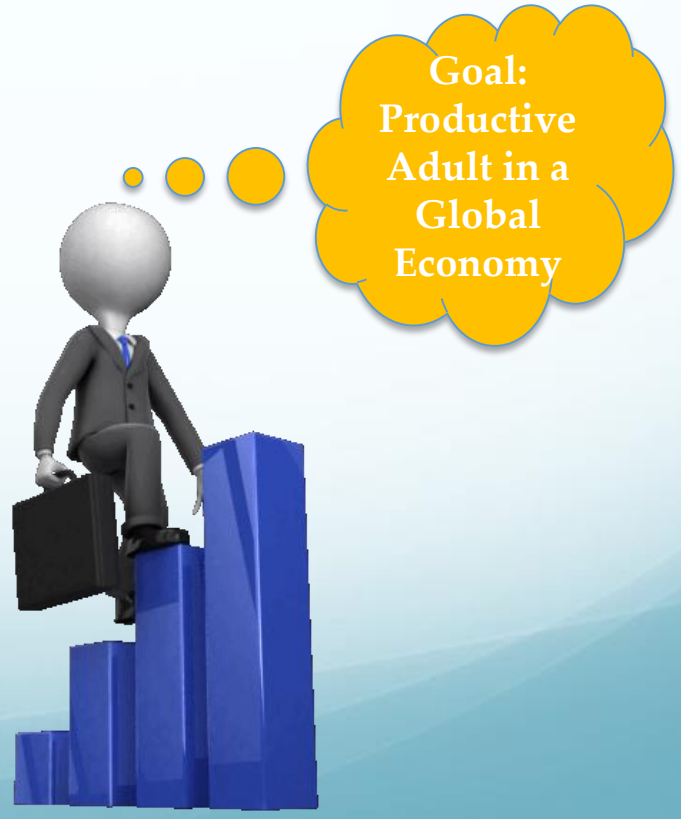
Systems Change

- Align the College & Career Ready System Components

A Credentialed Career Pathway

(*Pathway to Where?*)

- From High School to …
- Work ***and (NOT OR)***
- Continuing Education and Training



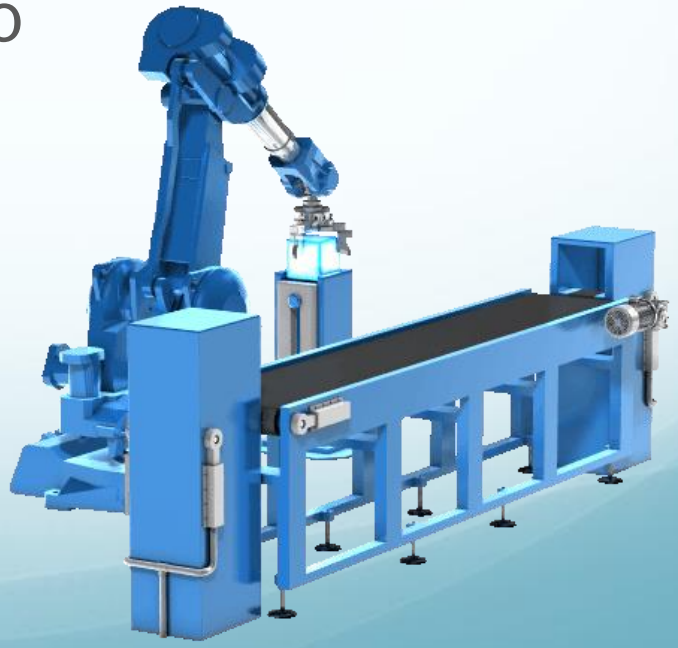
Career Pathway – Stackable Credentials

A recent McKinsey Global Institute study concludes, "policymakers and business leaders across the globe will need to find ways to vastly improve their capacity to provide job-relevant education and training. And, in both developing and advanced economies, new approaches to job creation for low and middle-skill workers will be required (Dobbs, et al, 2012)

- More than course credit pathways
- ***Portable:*** trusted by employers and institutions of higher education (external validation)
- ***Stackable:*** each credential has value (labor market signal) leads to another credential:
  - 51% of CC certificates require less than one year
  - Offer accelerated entry into the labor market
  - Credentialing process can begin in upper secondary education
- Part of a career pathway ***system***

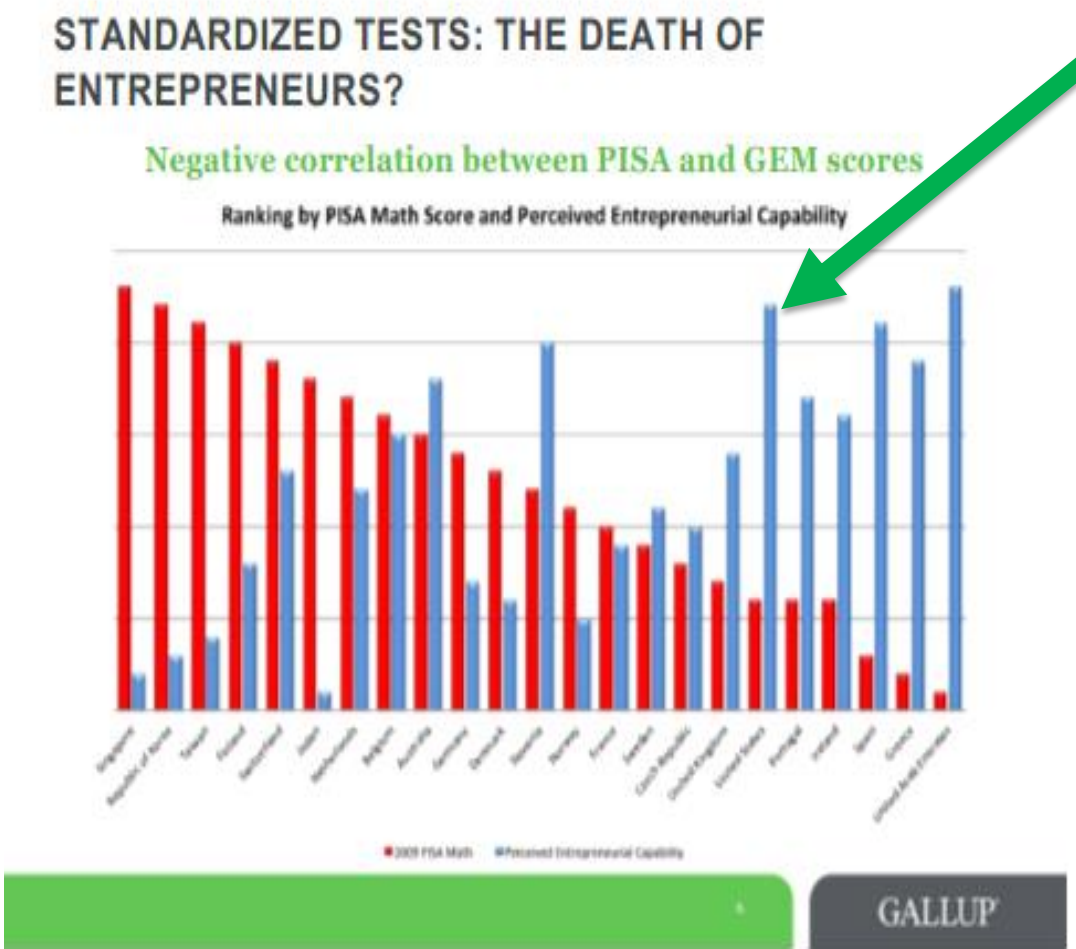
Middle Skill Pathways: Another Way of Winning (What you do!)

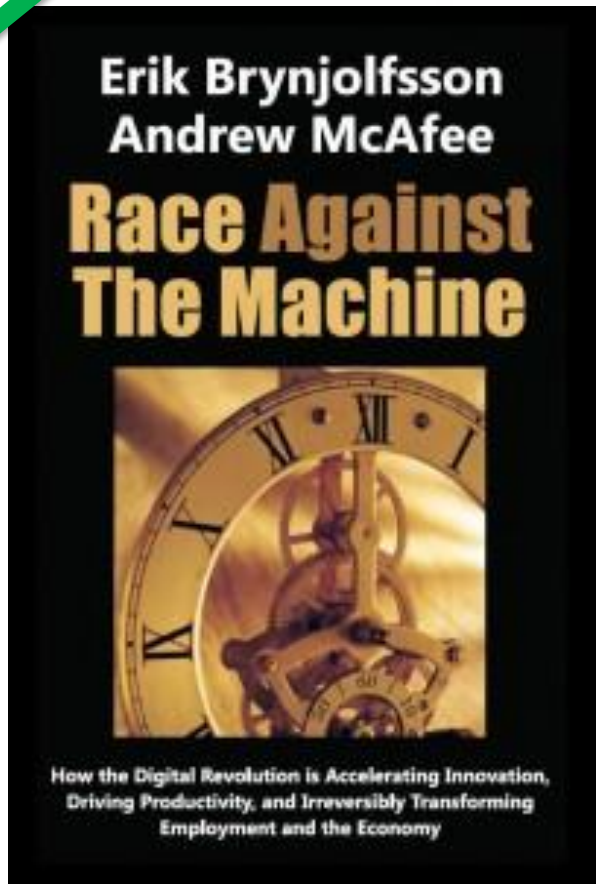
47% of all new job openings from 2010 to 2020 will fall into the middle-skill range



Source: Harvard Business Review, 2012/12,
Who Can Fix the "Middle Skills" Gap?

Teach Entrepreneurship





Designing the CTE/CCR Program: Evidence?

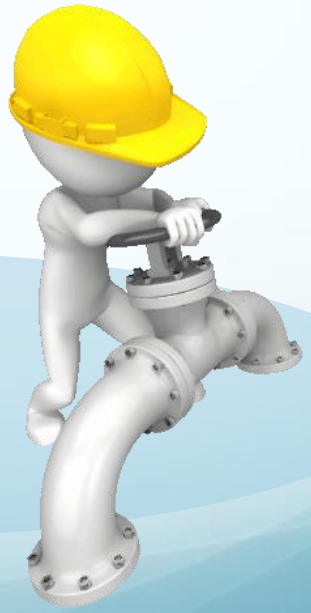
System Programs

- Linked to Industry Standards and skills in demand (***Audit***)
- Integrated Academic, Industry, Non-Cognitive Skills (***Curriculum Mapping***)
- Forward focused programs focused on emerging occupations (e.g., ***Advanced Career***)

CCR Requires 3 Skill Sets (Developed through HQ CTE)

Occupational Expression of Academics
Mathematics
Science
Communications

Technical
Job specific skills valued by employers



Personal Effectiveness & Foundational Workforce Competence
SCANS
21st Century Skills
"Soft" Skills

College & Career Ready

- *Required skills*

High Quality CTE Perspectives

Agency

- National Academy Foundation
- Linked Learning
- Southern Regional Education Board (SREB)
- AFT
- Georgetown Center for Law and Poverty
- Harvard University
- USDOL

Common Characteristics

- Career Pathways
- Project Based Learning
- Work Based Learning
- Robust Advisory Boards (HS & PS shared)
- Strong career guidance
- Contextualized Learning
- Industry Aligned Curriculum
- Rigorous Technical Skill Development

Improved Pedagogy-Evidence?

System Pedagogy

- CTE General Teacher Effectiveness
- Contextualized academics in CTE
- New pedagogies (e.g. ***PBL)*** Work-Based learning (**WBL**)
- Integrated **CTSOs**

Key CTE Pedagogies

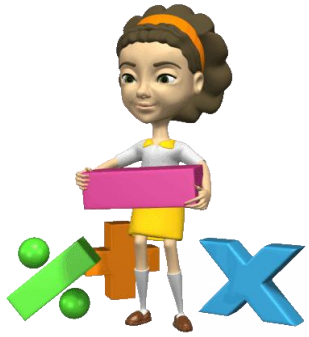
- **Classroom instruction**
  - *Contextualized learning*
  - *Quality of Assignments*
  - *Skilled Professionals*

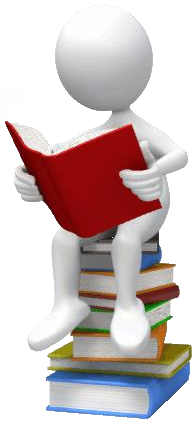
- **Work based learning- WBL**
  - *Job shadowing*
  - *Internships*
  - *School-based enterprise*
  - *Cooperative education*
  - *Apprenticeships*

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

Classroom Instruction: ***Contextualized Academics***

- Mathematics
- Literacy
- Science





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 enhanced math lessons

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

Focus on Reading

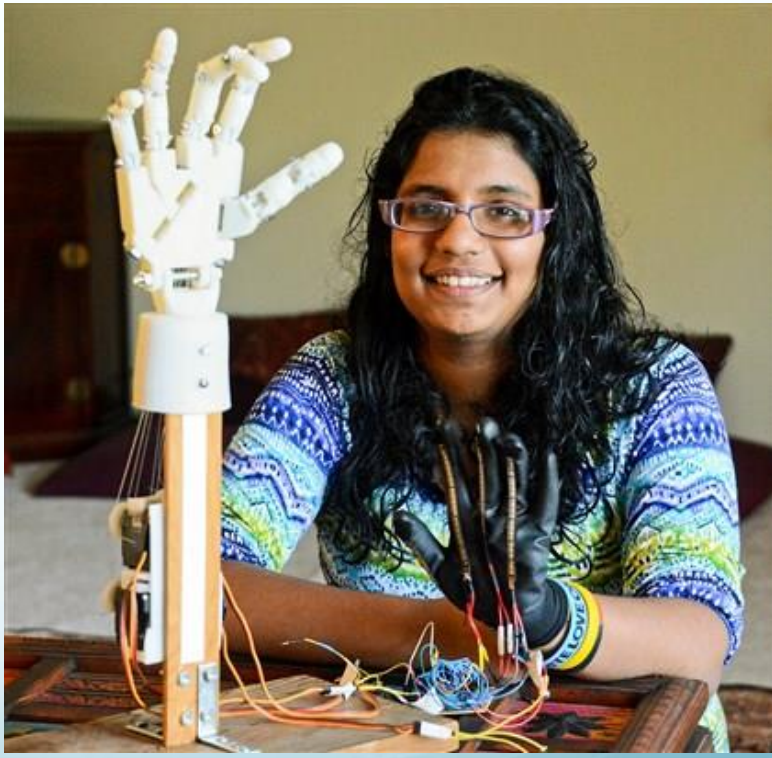
Science Integration: Experimental Studies

- Overall, no effect
- Significant effect for nonwhite males and females

Project Based Learning (PBL)

Two Strongest Predictors of Success in the Workplace

- *Worked on a long term project*
- *Project was based a real world (authentic) problem*



Brandon Busteed, Executive Director of Gallup Education
Presentation at the NASDCTEc October 21, 2014

Project Based Learning (PBL)

You are a (*insert a real workplace role*).

You are faced with (*insert an **authentic** problem*).

You must (*insert what must be done to solve the problem*).

Once you have decided on a course of action, you will (*insert an opportunity for presentation to an **authentic** audience*).

The SREB/NRCCTE Approach to PBL

- Built on authentic, work-based problems of practice
- Externships (Team)
- Integrates mathematics and literacy
- Embedded industry problem solving approaches
- Cohort model

81% of dropouts said “real world learning” may have influenced them to stay in school

Bridgeland, et al - Gates Foundation Report, 2005

Your challenge is to connect:

Skills in Every Lesson

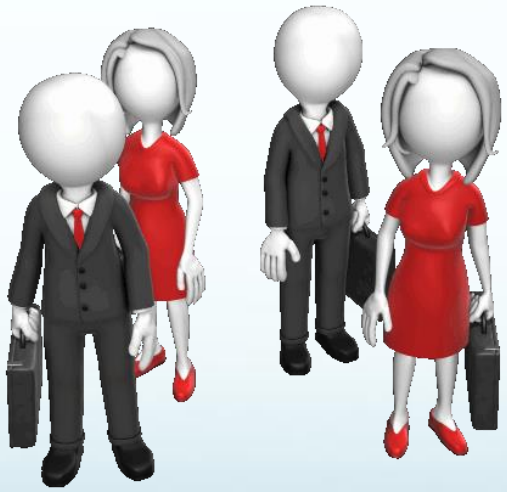
For Students:
A Developmental Approach to Work-based Learning

- *Job shadowing (Cross Curricular)*
- *Unpaid Internships (short)*
- *School-based enterprise*
- *Cooperative education or*
- *Paid Internships (extended)*
- *Apprenticeships (intensive)*

Skills Learned in the Workplace: Not in the Classroom

Non-Cognitive

- Deal with setbacks
- Stay on track
- Not easily distracted
- Consistency
- Hard worker
- Persistence
- 'Stick-to-it tivess'
- Diligence



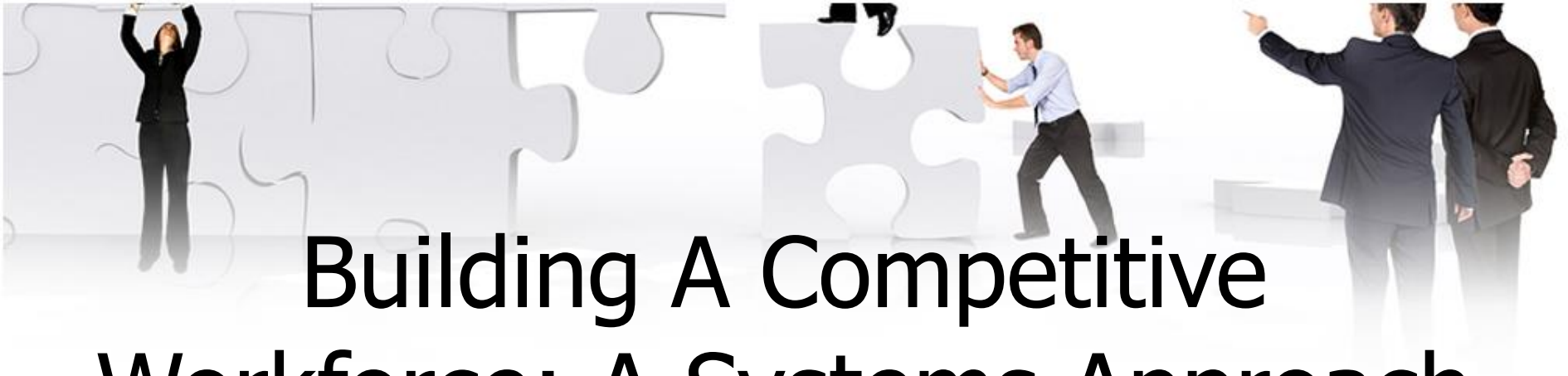
Personal Effectiveness & Foundational Workforce Competence

Employability

- Teamwork
- Oral & written skills
- Professionalism
- Ethics
- Creativity
- Problem solving
- Systems knowledge
- Responsibility

SCANS, 21st Century

Duckworth, 2011 "Grit"

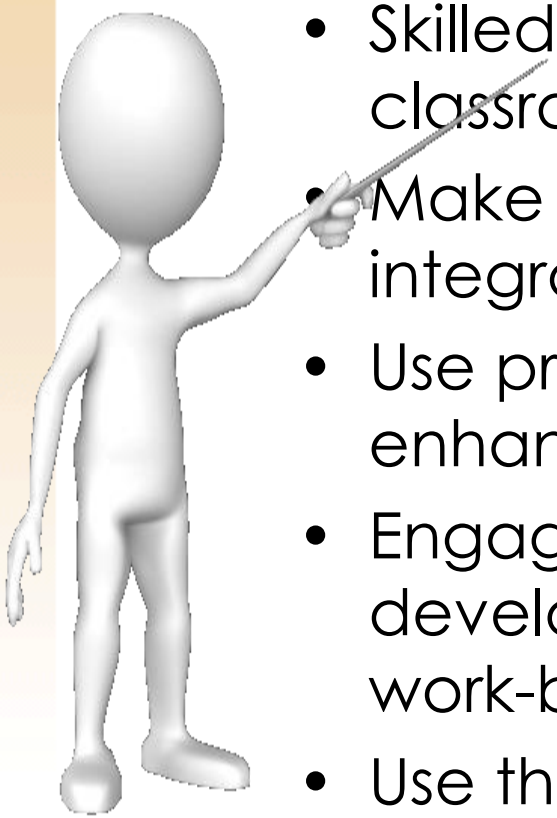


Building A Competitive Workforce: A Systems Approach

The system for students begins in the K-12 system and continues throughout a lifetime and includes:

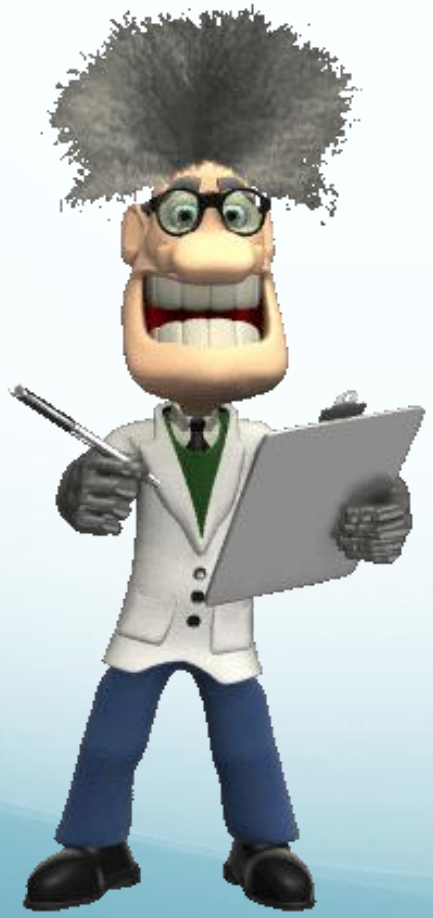
- Active and real partnerships that lead to real credentials that have meaning in the labor market
- A High Quality CTE that includes significant and meaningful career development, credential-based programs and work-based learning.

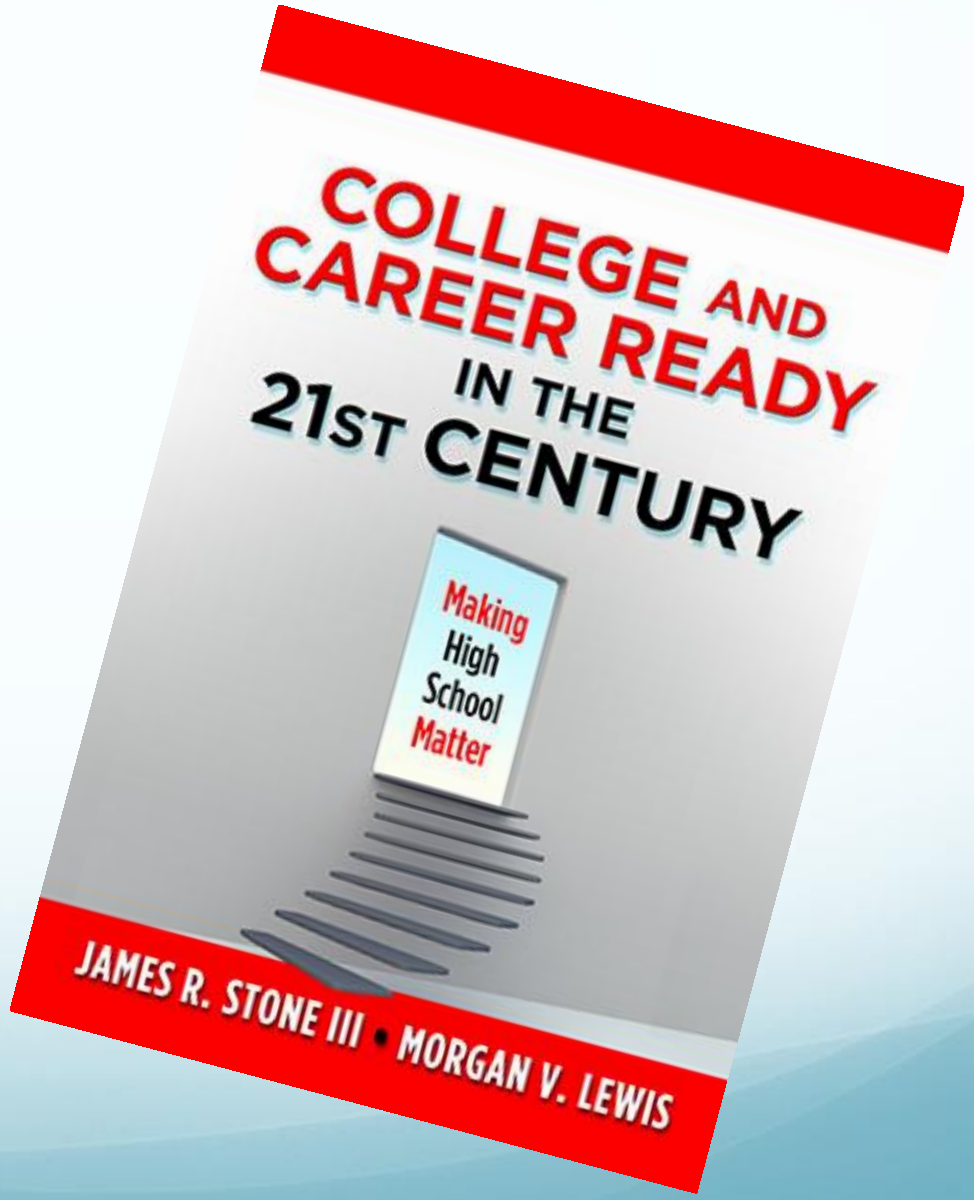
And CTE Teachers Who:



- Skilled at managing a standards-based classroom
- Make extensive use of curriculum integration opportunities
- Use project based learning to enhance the CTE classroom
- Engage all students in developmentally appropriate work-based learning
- Use the engaging power of CTSOs as another pedagogic tool for all students

Shameless Promotion . . .





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james.stone@nrccte.org

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