Building Rigorous Programs of Study: Evidence from the Field

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POS is part of . . .

Career & Technical Education

Programs of Study

College and Career Ready

High Quality CTE
Urban Myths Driving Education Reform

- *India & China are producing more engineers than U.S.*

  US=222,000; India=215,000; China=352,000*

- *We are not graduating enough engineers*

  S&E wages have actually declined in real terms and unemployment rates have increased**

* Duke University Study, 2006; **Rand, 2006;
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.”

Missed the lecture or . . . ?
Sub-Baccalaureate Credentials Pay Off

43% Of PS Credential Programs earn more than Associate Degrees

27% Of PS Credential Programs earn more than Bachelor's Degrees

31% Of all credentials & associate degrees earn more than bachelor’s degree

Licenses and Certificates Earn More Than:

- 43% of PS Credential Programs
- 27% of Bachelor's Degrees
- 31% of all credentials and associate degrees

Associates Earn More Than:

- 43% of PS Credential Programs

Bachelors Earn More Than:

- 27% of Bachelor's Degrees

- 31% of all credentials and associate degrees
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*
One solution?

Be born to smarter parents!
Sometimes Math is not the Answer

Steve is driving his car. He is travelling at 60 feet/second and the speed limit is 40 mph. Is Steve speeding?

He could find out by checking his speedometer.
A failure to communicate . . .

DROP YOUR PANTS HERE
AND YOU WILL RECEIVE
PROMPT ATTENTION
Not Just Kids who Struggle with Literacy...
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
A System’s Approach
To Career & College Readiness
Programs of Study
Ghosts of Past Reforms...

School-to-Work 1994-2001

Career Education 1970-1980

Youth Apprenticeship 1980s

Tech Prep 1990-?
What is a POS?

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.
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
Research points toward:
Early Findings

- Some evidence of academic achievement effect
- Mandate did not appear to have much effect on POS implementation (e.g., % of students engaged in POS, use of dual credit)
- 10 elements are not equally important or too costly to employ (e.g., TSA)
- Other elements may be more important (e.g., external funding)
Early Findings 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)
- What will POS success mean?
  - Enrolled in any college?
  - Pursuing same POS pathway?
  - Student sense of contribution of POS?
Strong Findings: The Need For:

K-5: Career Awareness
Introduction to health careers

6-8: Career Exploration
Discovering interest in health careers - Begin Individualized Graduation Plan

Grade 8: Transition
Choosing a health career focus (can change easily at any time later)

9-12: Career Preparation
Academics and technical courses, intensive guidance, individual graduation plans

Postsecondary: Career Preparation
Achieving credentials: college, certification, apprenticeship, military

Employment: Career Advancement
Continuing Education and Lifelong Learning

Program Choice & Student Course Assignments
A Developmental ACP that Drives
Programs of Study Require a Career Development Framework:

- **Elementary**
  - Students begin CD by heightening their awareness of career opportunities

- **Middle School**
  - Focus: Exposure to and exploration of careers

- **High School**
  - Students investigate and prepare for their future careers through experience based work opportunities (IL State Board of Education, 2000)
A Compelling Argument for Career Development

[Diagram showing the contrast between intended and actual career paths over time, emphasizing the importance of career development.]
Your Turn
3-Way Integration

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

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
- Teacher skill/performance
Other Approaches
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

TOYOTA
Advanced Manufacturing
Career Paths

TOYOTA Maintenance Career
- MGR
- AM
- GL
- TM

TOYOTA Seibi Career
- Org Mgt. Seibi Mgt.
- Seibi Tech

Toyota Maintenance Internship

Toyota Advanced Program

Automotive Manufacturing
- M.B.A.

Lean Manufacturing Certificate

Manufacturing Management Program
- B.B.A.
- A.B.

TOYOTA Engineering Career
- Production Engineer
- TEMA

NED New Engineer Development

AME Advanced Manufacturing Engineering Program
- Electrical / Industrial Mechanical
- B.S.

TOYOTA Engineering Career
- Design Engineer
- TTC

Special Toyota Degree Program

100% Toyota Relevant

K-12

Robotics
- Programmable Controls
- Line Controllers
- Vision system
- Troubleshooting

Project Lead the Way

PLTW
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

The Solution
Totally Redesign the Learning Environment

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
Tech Ed and vocational programs, as they exist now, are not part of the solution. On they whole they do not produce graduates with the capabilities that give U.S. companies advantage over off-shore based competitors and they create too much cost to up-skill when hired.
Your Turn
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)
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.
Build a System Based on Labor Market and Student Needs (CLASP, 2013)

Multiple entry points:

1. **Academic Skills and Credentials** (Customizable based on labor market needs and target population):
   - Basic Skills Instruction: Adult Basic Education, English as a Second Language
   - Short-term certificates
   - Basic Skills Bridge Programs

2. **Employability Skills and Work Experience** (Customizable based on labor market needs and target population):
   - Basic Career Readiness
   - Employment in jobs that require basic occupational skills
   - Internships
   - Pre-Apprenticeships

3. **Multiple exit points at successively higher levels of education and employment**:
   - Long-term certificates
   - Employment in jobs that require intermediate occupational skills
   - Internships
   - Pre-Apprenticeships

4. **Two-Year Degree Programs and Above**
   - Employment in jobs that require high occupational skills and management skills
   - Pre-Apprenticeships

Supportive Services and Navigation Assistance

Family-supporting employment and further educational opportunities.
Your Turn
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
A Credentialed Pathway

From High School to Work and Continuing Education
Premise

The Labor Market

- Technology is affecting job growth in ways that are unknowable
- High skill, high growth, high wage are mutually exclusive
- Emerging emphasis on skills not education credentials
- 800% increase in occupational certificates (CEW, 2010)
- Record high youth unemployment (NEET)

Education

- High percentage not completing high school
- 30 years of education reform and no improvement
- High remediation rates in postsecondary
- Only 40% of young adults have 2,4-year college degree or grad/professional degree
- U.S. trails most of its economic competitors in key academic measures
- The same economic competitors have substantially more of their youth in intensive VET or TVET
- We have a “boy” problem in the education pipeline
What is a stackable credential?

Part of a sequence of credentials that can be accumulated over time to build up an individual’s qualifications and help them to move along a career pathway or up a career ladder to different and potentially higher-paying jobs.

Career Pathway – Stackable Credentials

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*

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)
A General Model

- Work Readiness
- Level 1
- Level 2
- Level 3

Upper Secondary

Industry/Business

Post secondary
Your Turn
A General Model
Health

RN
(2-year PS)

EKG Technician Certificate
(10 weeks PS)

Medical Technician
(One Year PS)

LN
(HS/PS)

Patient Care Technician Certification
(HS/PS)

Certified Nursing Assistant
(HS/PS)

Phlebotomy Certification
(HS/PS)

Health Care Management
BS Degree

RN
BS Degree
Building the Model Health Care Education Program

- Health Care Providers
- Educational Institutions – secondary, postsecondary

Partnerships

- Integrated secondary curriculum
- Vertically integrated, sequential courses of study

Curriculum

- Career Development Framework
- Distributed Guidance

Counseling

- Developmental
- Increasing intensity
- Linked to industry recognized credentials

Work Based Learning
- Academically infused health care curriculum
- Mathematics, science and literacy taught in the context of technical health care content
- Vertically integrated curriculum
- Articulated HS/PS Curriculum
- Dual/Concurrent enrollment courses
Imagine this: A Robust I.L.P.

- **9th Grade**
  - Science
  - Social Studies
  - ELA
  - Math

- **10th**
  - Science
  - Social Studies
  - ELA
  - Math

- **11th**
  - Science
  - Social Studies
  - ELA
  - Math

- **12th**
  - Science
  - Social Studies
  - ELA
  - Math
Unique Cognitive Skills-Health Care

**Academic Foundations**

- Use a knowledge of human structure and function to conduct health care role.
- Use a knowledge of diseases and disorders to conduct health care role.

**Systems Knowledge**

- Explain systems theory as it applies to the health care environment.
- Explain the health care delivery system.
- Health care workers will understand the existing and potential hazards to clients, co-workers, and self. They will prevent injury or illness through safe work practices and follow health and safety policies and procedures.
- Explain the concept of system change as it applies to the health care environment.
More Unique Skills: Safety & Environmental Knowledge in Health Care

- Explain infection control practices and procedures.
- Employ personal safety practices.
- Use techniques to insure environmental safety.
- Identify common safety hazards.
- Use emergency procedures and protocols.
- Describe healthy behaviors.
Career Development

Counseling

Employment: Career Advancement
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Grade 8: Transition
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A Developmental ILP that Drives Program Choice & Student Course Assignments
• Academically infused health care curriculum
  • Mathematics, science and literacy taught in the context of technical health care content

• Vertically integrated curriculum
  • Articulated HS/PS Curriculum
  • Dual/Concurrent enrollment courses
Level 1
Work Readiness Credential

**ACT**
- WorkKeys battery
  - Reading for information
  - Locating information
  - Applied mathematics

**NOCTI**
- Communication
- Problem solving
- Critical thinking
- IT applications
- Systems
- Safety, health and environment
- Leadership and teamwork
- Ethics
- Employability
Ohio Stackable Certificates for Health Care

High School

Community College

RN

LPN

Patient Care Tech

STNA

STNA Prep
Ohio Stackable Certificates for Welding Technology

- AAS Welding Technology
- Advanced Welding Certificate
- Welding Tech Certificate
- Precision Cutting Certificate
- Welding Prep
ManufactureNJ aligns with providers of stackable credentials

National Career Readiness Certification (ACT)
Manufacturing Skills Standards Council (MSSC)
National Institute of Metalworking Skills (NIMS)
American Welding Society (AWS)
Society for Manufacturing Engineering (SME)
International Society of Automation (ISA)
Packaging Machinery Manufacturing Institute (PMMI)
Fabricators & Manufacturers Association, International (FMA)
International Fluid Power Society (IFPS)
American Society of Transportation and Logistics (ASTL)
Association for Operations Management (APICS)
POS Challenge: Build a System

Programs of Study & Multiple Pathways

High School

Academics

Technical

Occupational

Include all Necessary Skills

Careers

Workplace

Post Secondary
Build A System

Career Pathway

Academic Skills
Employability Skills
Technical Skills

Employer Engagement

Labor Mkt Info
WBL
CTSO
CTE Class

Career Guidance

State Policy
Build a System to Answer this Question:

**WHY DO WE HAVE TO LEARN THIS STUFF ANYHOW?**

**IT'S GOOD FOR YOUR MENTAL DISCIPLINE, SKYLER.**

**AND IT'LL HELP YOU IN LATER LIFE...**
Your Turn