Preparing Our Students for the 21st Century Economy:

Constructing Career Pathways For Hot Jobs in Advanced & Green Technologies

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Preparing Our Students for the 21st Century Economy:

Today's high paying careers are increasingly impacted by changes in technology
• Global competition requires businesses to become high performing organizations
• Businesses require a thinking, social and technically skilled, continuously learning workforce to stay in business

• Businesses have flattened, eliminating layers of middle managers and OJT supervisors
• Our graduates need knowledge, work experience, soft skills, and the ability to analyze a problem and apply a technology to solve it
• Earn and learn postsecondary education is no longer an option for most students and businesses

• During his/her lifetime, the average 20 year old will have five to six careers and will need to access postsecondary education to do so
• Businesses must continually retrain workforce
• Businesses and students are asking colleges to make use of technology to deliver this education anytime, anyway, anywhere

New and accelerated career pathways are needed to prepare both our youth and adults for entry and continuous advancement in the changing STEM advanced technology and green production careers of today and tomorrow.

New career pathways will be constructed and like road systems to and throughout our major cities…

…the will appear, expand and even change direction.
A Career Pathway is only as good as the availability of quality jobs, the understanding of the skills needed and the capability and capacity of the regional education system to prepare and retrain the workforce needed.

The Peninsula Challenge
- 5 advanced technology firms announced expansions that will create 5,000 jobs
- 15,000 skilled workers in precision manufacturing are slated to retire in the next five years

The Peninsula Challenge
- 35,000 residents seek work annually
- 10,000 more military vets
- 50,000+ lack HS credential

The Peninsula Challenge
- 80% of new hires are under-qualified
- Lack one or more skills
  - Applied Math
  - Literacy
  - Technical Skills
  - Work Skills

The Peninsula Challenge
- Different levels of skills required.
- No sense of just how much math, literacy, or technical skill is needed for each career.
- No pathway defined for entry and advancement.
- Under-shooting-under-prepared worker, turnover.
- Over-shooting =closed access, choked pipelines, wasted time and money, lost business, lost opportunity

The Peninsula Career Pathways Strategy for Jobs of the Future
1. Identify competencies for the new jobs, demand and supply, and the skill gaps.
2. Develop pathways for entry and advancement.
3. Create a strategic plan to align secondary, postsecondary, and workforce training systems
   - Fill skill gaps for target populations
Peninsula Career Pathways Initiative

Partnership: Peninsula Council for Workforce Development
Thomas Nelson Community College
Old Dominion University
6 Manufacturers
6 School Districts

Funding: VCCS and Ford Foundation
Project Technical Advisors: Center for Workforce Strategies
Researcher: SOAR-Successful Options for Achieving Results

Industry Sector:

- Target: 20 top manufacturers
  28,000 jobs
- Participation Rate: 14 top manufacturers (70%)
  25,062 jobs (89.5%)

Data Gathering

- Virginia - ONET – VOS Data: Demographic data
- Survey I-Part I (On-Line)
  Job title/category, number each year, forecast
- Interviews- (One on One) Company Executive
- Survey I-Part II (On-Line) job competencies
- Survey II – (On-Line) Projection of advanced and new occupations

FINDINGS: Operations

- Sector is strong and getting stronger
- 8 will maintain operations at least the same level next five years
- 6 predict expansions of ranging from 8% to 25% of their business

FINDINGS: Business Challenges

1. Acquiring skilled workforce
2. Advancing skills of current workforce
3. Improving production processes

FINDINGS: Primary Work Function

1. Plant operation and production
2. Engineering
3. Management
4. Welding
5. Maintenance and repair
FINDINGS: Openings
3,000 positions per year require postsecondary
- Fitters: 100-500
- Welders: 100 to 500
- Electricians: 50 to 500
- Pipefitters: 50-750
- Production machinists: 100-250
- Surface treatment technicians: 100-250
- Engineers: 20-50
- Operations managers: 10-50

FINDINGS: Major Skill Gaps
- Job readiness
- Problem solving/decision making
- Technical skills
- Teamwork
- Math skills
- Communication/listening/interpersonal
- Automation/technology skills
- Quality assurance
- Supervisory skills

FINDINGS: Hiring Difficulty
1. Skilled production workers
2. Product developers/designers
3. Quality control improvement supervisors
4. Engineers
5. Logistics

FINDINGS: New Careers
1. Modeling and simulation technician
2. Nuclear energy technician
3. Non-destructive testing technician
4. Materials science technician
5. Green engineering technician
6. Logistics process technician

FINDINGS: Skill Sets-Rosetta Stone
- Foundation Skills-Computation (7 levels)
- Foundation Skills-Communication (7 levels)
- Foundation Skills-Science (3 levels)
- Workplace Skills – (5 categories)
- Technology Skills (5 categories)
- Professional Skills (9 categories)
- Technical Skills (18 categories)

FINDINGS: Locating Workforce
1. Entry Level – Word of Mouth, Contract first, One Stop/VEC, Promote from within, TNCC Career Center, News, HS, University Career Center, others...
2. Technical- Promote from within, One Stop/VEC, Word of Mouth, Internet, TNCC Career Center, Contract first, News, Search Firm, Employer Assoc, University Career Center, others...
FINDINGS: Current Partnerships

- Work with TNCC - 10/14 (71%)
- NHREC – 7/14 (50%)
- HSs – 5/14 (36%)
- Employer Associations - 4/14 (29%)
- WIB - 4/14 (29%)
- ODU - 3/14 (21%)

FINDINGS: Willingness to Partner

- Will pay co-ops or internships 10/14
- Visit classrooms/meet with students 10/14
- Participate in joint pipelines/pathways 9/14
- Review national models/certifications 9/14
- Serve on curriculum committee, advisory board 9/14
- Provide subject matter experts 8/14
- Mentor students/career cafes 7/14
- Establish apprenticeships 7/14
- Participate in career fairs 7/14
- Customize and pay for pre-hire training 5/14
- Pay for scholarships 1/14

Participating Companies

- Advex
- Alcoa Howmet
- Anheuser Busch
- Avid Medical
- Ball Metal
- Canon Virginia
- Continental (Siemens)
- Davis Boatworks
- Liebherr Mining
- NASA Langley
- Newport News Shipbuilding
- Printpack

The Mission of the Comprehensive Community College

<table>
<thead>
<tr>
<th>20th Century Community College</th>
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<tbody>
<tr>
<td>Associate Degree Granting Two Year College meeting the Postsecondary Needs of the Region</td>
<td>Community's College for Continuing Professional and Technical Education and Career Pathways</td>
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<tr>
<td>Access Mission: 18-40 year olds for transfer, occupational technical, developmental, continuing education/workforce</td>
<td>Opportunity Mission: 18-64 year olds; integrated career pathways, stackable credentials for earn and learn advancement, career lattices: degrees, certificates, credentials, industry certifications</td>
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The Peninsula Pathways Strategy

- 125 year history designing, building, overhauling and repairing ships for the Navy, the Coast Guard and commercial trade
- Sole supplier of U.S. Navy aircraft carriers, the world’s largest and most complex warships
- One of two builders constructing the Virginia-class nuclear submarines
- Exclusive provider of refueling services for nuclear-powered aircraft carriers
- Largest non-governmental provider of fleet maintenance services to the Navy
- Immense capability –
  - 550 acres on the James River at Hampton Roads
- Largest industrial employer in Virginia—more than 20,000 employees
- Large “order book” and work backlog
We are Shipbuilders

- Many are third, fourth and fifth generation shipbuilders
- Over 500 Master Shipbuilders (40 years or more)
- All varieties of careers are available in the Shipbuilding business
  - Engineers
  - Business Management
  - Electricians
  - Welders
  - Pipefitters
  - Facilities
- We are part of a proud legacy of building “always good ships” and recognizing that our products protect the nation and our men and women who serve on them.

The True Key to our Success

The changing workforce

- The workforce is aging
  - National demographic / local impact
    - Retiring workers will leave significant gaps in knowledge, skills, and experienced craftsmanship
- Workforce training is costly
  - $8000 / employee in the first year alone
- Most workers we hire need additional training
  - Workforce ready ≠ Shipbuilder ready
  - Craft work requires high level skill sets
  - Technology is constantly evolving
- Newport News Shipbuilding will hire over 10,000 new employees in the next five years

Meeting the challenge

- Job postings – Shipbuilder ready – the real truth
  - Candidate must be proficient in Math/Algebra/Physics: understand summation of moments to determine center of gravity for crane lifts
  - Candidate should also be able to use trigonometry: evaluate potential lift load and determine proper sling angle. The length of the sling or distance between lift points is calculated to determine the sling angle
  - Candidate should be able to use geometry to calculate load weight
- Valid planning
  - Multiple pathways to advance shipbuilding as a career choice – Career Pathways
  - Education collaborates to prepare curricula to meet knowledge and skill gaps
- Continuing Education
  - Meet changing technology requirements – retooling
  - Support advancing leadership within organizations