Looking Ahead:

Workforce Development for Transportation & Logistics in the 4th Industrial Revolution

Dr. Ian Roark, V.P. of Workforce Development
For I-NUF on October 16, 2019
Topics

1. Introduction/Context
2. Technology and “Skills”
3. Demographics
4. Current Strategies
5. Looking Forward
Pima at a glance

- 50,000 students
- 69% part time
- 23% of courses offered online
- 28 Average Age
- HSI 45% Hispanic
Workforce Development circa 2005

PimaCommunityCollege

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Keep striving.
Workforce Development circa 2015
Workforce Development circa 2019
(How We Feel)
Workforce Development circa 2030
(The Great Displacement)
Technology and “skills”
The Skills Gap (Outdated Model?)

Employability Skills
- Critical thinking
- Integrity
- Works in teams
- Dependability
- Initiative

Technical Skills
- Industry standards
- Demonstrated competencies
- Technology
- Math in context
- Technical writing

Talent Supply
- Experience
- Quantity
- Reliable pool
- “Fit”
Jobs and Workers by Skill Level, Arizona, 2015

<table>
<thead>
<tr>
<th>Skill Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Skill Jobs</td>
<td>30%</td>
</tr>
<tr>
<td>High-Skill Workers</td>
<td>30%</td>
</tr>
<tr>
<td>Middle-Skill Jobs</td>
<td>50%</td>
</tr>
<tr>
<td>Middle-Skill Workers</td>
<td>50%</td>
</tr>
<tr>
<td>Low-Skill Jobs</td>
<td>20%</td>
</tr>
<tr>
<td>Low-Skill Workers</td>
<td>20%</td>
</tr>
</tbody>
</table>

Jobs and Workers by Skill Level, Arizona, 2015

- **High-Skill Jobs**: Traditional transfer
- **High-Skill Workers**: Workforce/CTE
- **Middle-Skill Jobs**: More of these need to go to Middle Skill
- **Middle-Skill Workers**
- **Low-Skill Jobs**
- **Low-Skill Workers**

Independent Task Force Report No. 76

The Work Ahead
Machines, Skills, and U.S. Leadership in the Twenty-First Century

John Engler and Penny Pritzker, Chairs
Edward Alden, Project Director
Laura Taylor-Kale, Deputy Project Director
“As technology disrupts industry after industry, the United States needs better ways to help Americans access the many new opportunities technology is also creating, in particular by strengthening the link between education and employment prospects.” —The Work Ahead
The (Real) Great Displacement

• By 2020, artificial intelligence will create 2.3 million jobs worldwide and eliminate 1.8 million.
• By 2030, 1 in 3 U.S. workers will need to learn new skills and find work in new occupations

McKinsey Global Institute, 2017
The (Real) Great Displacement

• “Any work tasks that can be routinized by even in part are subject to replacement by computers or robots, and advances in AI will steadily increase the number of occupations affected.”
The 4 Superpowers (+1)

- AI (and Automation): intelligence everywhere
- Mobile: unprecedented reach
- Cloud: previously unimaginable scale
- IoT: connecting the physical and digital worlds
- AR/VR: enhancing the physical and creating experiences

The World Economic Forum, January 2018
OH...HAVEN'T YOU HEARD?—
THE INDUSTRIAL REVOLUTION
IS OVER... WE WON....
A Learning Model for the Future

• The New Literacies:
  – Technological literacy
  – Data literacy
  – Human literacy

• The Cognitive Capacities
  – Critical thinking
  – Systems thinking
  – Entrepreneurship
  – Cultural agility
Demographics: Labor “Pools”, Mobility, and Age
The Declining Labor Participation Rate

• Today’s unemployment rate of 3.5% shows the United States near “full employment.”

• However the labor force participation rate has declined to 62.9% from 67.3% in the 1990s.

Source: Pima County Workforce Investment Board
### Arizona's Labor Force Participation and Unemployment by County

<table>
<thead>
<tr>
<th>Area</th>
<th>Population Estimates</th>
<th>Labor Force Participation Rate</th>
<th>Age 25-64 Not in the Labor Force</th>
<th>Age 25-64 Unemployed (Est.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Pop.</td>
<td>16+</td>
<td>25-64</td>
<td>%</td>
</tr>
<tr>
<td>United States</td>
<td>314,107,084</td>
<td>63.9%</td>
<td>77.6%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Arizona, Statewide</td>
<td>6,561,516</td>
<td>60.1%</td>
<td>74.4%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Apache County</td>
<td>72,142</td>
<td>43.7%</td>
<td>56.7%</td>
<td>43.3%</td>
</tr>
<tr>
<td>Cochise County</td>
<td>130,807</td>
<td>52.2%</td>
<td>64.8%</td>
<td>35.2%</td>
</tr>
<tr>
<td>Coconino County</td>
<td>135,817</td>
<td>65.4%</td>
<td>77.1%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Gila County</td>
<td>53,242</td>
<td>47.6%</td>
<td>64.0%</td>
<td>36.0%</td>
</tr>
<tr>
<td>Graham County</td>
<td>37,311</td>
<td>49.3%</td>
<td>59.9%</td>
<td>40.1%</td>
</tr>
<tr>
<td>Greenlee County</td>
<td>8,800</td>
<td>57.3%</td>
<td>70.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td>La Paz County</td>
<td>20,348</td>
<td>42.5%</td>
<td>64.9%</td>
<td>35.1%</td>
</tr>
<tr>
<td>Maricopa County</td>
<td>3,947,382</td>
<td>63.7%</td>
<td>77.2%</td>
<td>22.8%</td>
</tr>
<tr>
<td>Mohave County</td>
<td>202,482</td>
<td>46.9%</td>
<td>63.5%</td>
<td>36.5%</td>
</tr>
<tr>
<td>Navajo County</td>
<td>107,489</td>
<td>50.0%</td>
<td>63.4%</td>
<td>36.6%</td>
</tr>
<tr>
<td>Pima County</td>
<td>993,144</td>
<td>59.5%</td>
<td>75.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Pinal County</td>
<td>390,160</td>
<td>51.0%</td>
<td>63.9%</td>
<td>36.1%</td>
</tr>
<tr>
<td>Santa Cruz County</td>
<td>47,250</td>
<td>57.1%</td>
<td>73.7%</td>
<td>26.3%</td>
</tr>
<tr>
<td>Yavapai County</td>
<td>213,689</td>
<td>50.7%</td>
<td>69.2%</td>
<td>30.8%</td>
</tr>
<tr>
<td>Yuma County</td>
<td>201,453</td>
<td>55.3%</td>
<td>72.1%</td>
<td>27.9%</td>
</tr>
</tbody>
</table>

Source: U.S. Census American Community Survey 2010-2014 5-Year Estimates. NOTE: Subject to a margin of error that varies by location and data point.

Arizona Commerce Authority | Office of Economic Opportunity
### Arizona’s Labor Force Participation by Age Group (2015)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>AZ Rank</th>
<th>Participating %</th>
<th>Unemployed %</th>
<th>Participation Top Rank</th>
<th>Participation Bottom Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>42</td>
<td>60.0%</td>
<td>6.0%</td>
<td>70.9% (ND)</td>
<td>53.0 (WV)</td>
</tr>
<tr>
<td>16 to 19</td>
<td>25</td>
<td>36.4%</td>
<td>17.9%</td>
<td>56.3% (IA)</td>
<td>19.7% (DC)</td>
</tr>
<tr>
<td>20 to 24</td>
<td>31</td>
<td>71.5%</td>
<td>10.0%</td>
<td>83.0% (NH)</td>
<td>62.9% (NY)</td>
</tr>
<tr>
<td>25 to 34</td>
<td>47</td>
<td>78.0%</td>
<td>6.4%</td>
<td>90.1% (IA)</td>
<td>74.0% (WV)</td>
</tr>
<tr>
<td>35 to 44</td>
<td>49</td>
<td>76.9%</td>
<td>4.4%</td>
<td>90.1% (IA)</td>
<td>74.4% (KY)</td>
</tr>
<tr>
<td>45 to 54</td>
<td>37</td>
<td>78.3%</td>
<td>4.3%</td>
<td>88.7% (IA)</td>
<td>69.4% (WV)</td>
</tr>
<tr>
<td>55 to 64</td>
<td>38</td>
<td>62.3%</td>
<td>4.7%</td>
<td>72.2% (ND)</td>
<td>50.8% (KY)</td>
</tr>
<tr>
<td>65+</td>
<td>48</td>
<td>14.7%</td>
<td>5.9%</td>
<td>26.7% (DC)</td>
<td>13.7% (MS)</td>
</tr>
</tbody>
</table>

Source: 2015 Geographic Profile Survey from the Bureau of Labor Statistics

Arizona Commerce Authority | Office of Economic Opportunity
<table>
<thead>
<tr>
<th>County</th>
<th>Not in Labor Force #</th>
<th>Not in Labor Force %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache</td>
<td>3,060</td>
<td>46.3%</td>
</tr>
<tr>
<td>Cochise</td>
<td>4,366</td>
<td>39.3%</td>
</tr>
<tr>
<td>Coconino</td>
<td>2,697</td>
<td>20.9%</td>
</tr>
<tr>
<td>Gila</td>
<td>1,248</td>
<td>33.5%</td>
</tr>
<tr>
<td>Graham</td>
<td>1,803</td>
<td>45.8%</td>
</tr>
<tr>
<td>Greenlee</td>
<td>304</td>
<td>28.3%</td>
</tr>
<tr>
<td>La Paz</td>
<td>291</td>
<td>23.6%</td>
</tr>
<tr>
<td>Maricopa</td>
<td>99,443</td>
<td>22.8%</td>
</tr>
<tr>
<td>Mohave</td>
<td>5,922</td>
<td>37.0%</td>
</tr>
<tr>
<td>Navajo</td>
<td>2,919</td>
<td>32.3%</td>
</tr>
<tr>
<td>Pima</td>
<td>22,057</td>
<td>23.8%</td>
</tr>
<tr>
<td>Pinal</td>
<td>15,715</td>
<td>34.5%</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>1,098</td>
<td>25.8%</td>
</tr>
<tr>
<td>Yavapai</td>
<td>3,657</td>
<td>23.9%</td>
</tr>
<tr>
<td>Yuma</td>
<td>4,732</td>
<td>25.98%</td>
</tr>
</tbody>
</table>


Arizona Commerce Authority | Office of Economic Opportunity
The Birth Dearth

• The number of births in U.S. down nearly 13 percent since the 2008 recession

• There are more households with dogs than with children, 43 million vs. 33 million

“Demographics and the Demand for Higher Education”; Forbes, Sept. 6, 2018
Aging in America

• 20% of all people in the US are 60 and older (63 million)

• By 2020, 25% of Arizona residents will be 60+

• 24.6% of Pima County residents were already 60+ in 2015 (248,475)

Pima Council on Aging
The Labor Force is Aging

<table>
<thead>
<tr>
<th>Year</th>
<th>16 to 24</th>
<th>25 to 34</th>
<th>35 to 44</th>
<th>45 to 54</th>
<th>55 and older</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>12.4</td>
<td>23.8</td>
<td>27.3</td>
<td>20.6</td>
<td>15.9</td>
</tr>
<tr>
<td>2008</td>
<td>15.9</td>
<td>21.6</td>
<td>22.7</td>
<td>23.3</td>
<td>22.7</td>
</tr>
<tr>
<td>2018</td>
<td>14.3</td>
<td>22.7</td>
<td>20.7</td>
<td>20.6</td>
<td>12.9</td>
</tr>
<tr>
<td>Projected</td>
<td>11.5</td>
<td>21.6</td>
<td>22.4</td>
<td>19.3</td>
<td>25.2</td>
</tr>
</tbody>
</table>

Source: BLS
Pima County
Census 2010
Total Population 980,263

Hispanic 338,802 34.6%
Male 165,575 16.9%
Female 173,227 17.7%

Non-Hispanic 641,461 65.4%
Male 315,862 32.2%
Female 325,599 33.2%

Under 17 211,872 21.6%
Age 17-24 121,235 12.4%
Age 25-34 126,176 12.9%
Age 35-44 115,795 11.8%
Age 45-54 131,528 13.4%
Age 55-64 122,367 12.5%
Over 64 151,293 15.4%
Pima County
Census 2010
Total Population 980,263

Pima County Population
- Hispanic Male
- Hispanic Female
- Non-Hispanic Male
- Non-Hispanic Female

Workforce/CTE

Traditional

Youth Programming and Early College

Keep striving.
The “Lost Decade”

- High School Graduation
- Unskilled Labor Participation
- Technical Enrollees’ Age
Centers for Excellence: Strategies for the Working Learner
Center for Excellence

Industry Standards & Thought Leadership

Partnerships: Industry, K-12, University, Community

World Class Instruction

Cutting Edge Facilities & Equipment

Comprehensive Workforce Development

Training to Degree to CEU Spectrum

Spectrum

Pima Community College

Keep striving.
Center for Excellence in Applied Technology

- Convergence
- Adaptability
- Speed

Transportation
- Automotive
- Diesel
- Autonomous Tech

Infrastructure
- Building & Construction
- HVAC
- Energy
- Utilities

Manufacturing
- Mechatronics
- Machine Tech
- Optics/Electronics
- Welding/Fab
- Design/Prototyping

Transferable Skills
PLA: The Next Disruption

Traditional Higher Ed.
- Classroom/Online
- Seat time/Carnegie Units
- Instructor-centric qualifications
- Instructor-determined standards
- Grades
- Semesters
- Debt

Prior Learning Assessment
- Industry certifications
- Work experience
- Life experience
- Student-centered qualifications
- Competency-based
- Not time-bound
- Not location bound
Build a career from what you already know.
Click here to learn more

PimaCommunityCollege
520.206.4500 | pima.edu/priorlearning

You’ve made a difference now make a career
Click here to learn more

PimaCommunityCollege
520.206.4500 | pima.edu/priorlearning

Get college credit for what you already know.
Click here to learn more

PimaCommunityCollege
520.206.4500 | pima.edu/priorlearning

You’ve made a difference, now make a career.
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Looking Ahead
<table>
<thead>
<tr>
<th>Traditional students</th>
<th>Post-traditional students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall-Spring-Summer</td>
<td>Non-standard terms</td>
</tr>
<tr>
<td>Academic/Workforce</td>
<td>Applied</td>
</tr>
<tr>
<td>Credit/Non-credit</td>
<td>Learning Outcomes</td>
</tr>
<tr>
<td>Lecture/lab</td>
<td>Real-world/work-based</td>
</tr>
<tr>
<td>Time</td>
<td>Competency</td>
</tr>
<tr>
<td>College ready</td>
<td>Integrated learning</td>
</tr>
<tr>
<td>Sequence</td>
<td>Multiple entry and exit</td>
</tr>
<tr>
<td>Campus</td>
<td>Community</td>
</tr>
</tbody>
</table>
PSR Themes

• Technology for improved mobility
  – UCI, USC, UCLA, Pima

• Improving mobility for disadvantaged populations
  – UCLA, USC, NAU, Pima

• Improving resilience and protecting the environment
  – UH, UCD, USC

• Managing mobility in high growth regions
  – USC, UCLA, CSULB
Pima UTC PSR Deliverables

- Wholly online version of the Logistics program with a work-based learning component;
- Hybrid variant of truck-driver training;
- GIS technology into Logistics and truck driver training;
- Integrate employ-ability or "soft skills" into these new models;
- Delivery to under-served and rural populations, with an emphasis on indigenous people in the American Southwest.
Investing in People

• Traditional labor “pools” and “pipelines” no longer exist (if they ever really did)
• Career Pathways are being supplanted by Career Lattices
• Beyond traditional tuition reimbursement
Lifelong Learning

Applied Technology Academy

Pima Community College

Keep striving.
CAT/PCC Project Implications

- One and Done is Done!
- Lifelong Learning
- Expanded Role of Community Colleges
- Revenue Funding Models and Policy
TuSimple/PCC Project
TuSimple/PCC Project Implications

- Autonomous Vehicle Driver of the Future
- Erosion of Occupational Specificity
- Research Potential for the Impact of Autonomous Vehicle Technology on Workforce Development (Displacement, Training, Mobility)
Questions?
Contact

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#PimaCCWorkforce

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