

WORKFORCE 2030

“Innovations in the Workplace and How They Will Impact Career Pathways”

Hans Meeder
CEO of NC3T



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TOPICS

- Introductions
- Why Career Connected Learning
- General Workforce and COVID-related Trends
- Sector Specific Workforce Trends
- Sector Specific Innovations
- Implications for Educators



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HANS MEEDER

- President of National Center for College and Career Transitions since 2012.
- Served as Deputy Assistant Secretary of Vocational and Adult Education in the U.S. Department of Education and was education policy analyst in U.S. House of Representatives.
- Author of *The Power and Promise of Pathways*, *The Pathways Design Suite*, *The STEM Leader Guide*.
- Hans has worked in over 30 states, providing coaching, technical assistance, conducting strategic analysis, best practice research



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NATIONAL CENTER FOR COLLEGE AND CAREER TRANSITIONS

Our Vision:

*Every Learner with a Dream and a Plan,
Every Community with a Capable, Ready Workforce*

Our Mission:

Make Career-Connected Learning widely available through tools, resources, technologies, coaching and technical assistance.



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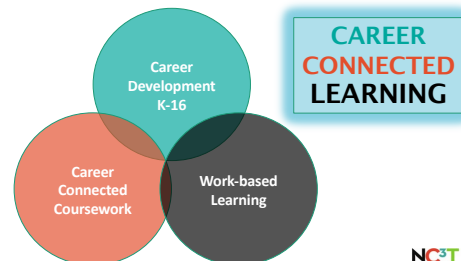
Career Connected Learning Concepts

CAREER CONNECTED LEARNING



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THREE KEY COMPONENTS OF CCL



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BENEFITS OF CAREER CONNECTED LEARNING

Better choices lead to ...

- Better career fit,
- Lower college expenses,
- Less college debt,
- Smoother transition into adult life,
- Stronger social and economic mobility,
- A more productive & effective workforce

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CONNECTED
LEARNING**

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**CAREER
CONNECTED
LEARNING**

CORE PREMISE:

Career exploration and career-relevant learning is good for ALL students



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THE BIG SHIFT

CAREER PREP
FOR SOME

COLLEGE PREP
FOR MOST

BECOMES...

**CAREER CONNECTED
LEARNING FOR ALL**



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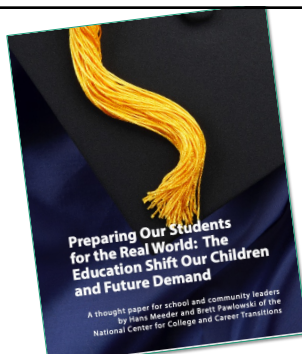
THE BIG SHIFT

**CAREER CONNECTED
LEARNING FOR ALL**



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NEW

Position Paper on
Career Connected
Learning.
Available now at
NC3T.com

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Part 1 General Workforce Trends

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Trend:
Worker Shortages and Career Migration

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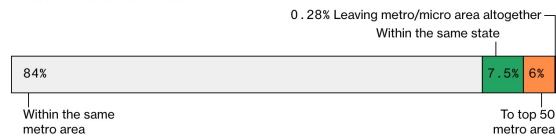
Americans Are Changing Locations

- 29% of Americans surveyed either moved since the coronavirus outbreak or plan to within 12 months.
- U.S. migration has fallen significantly, as low as 9.3% in 2019, before the pandemic, lowest ever.

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**Americans Are Changing Locations
But most not going too far**

Most Movers Didn't Go Far



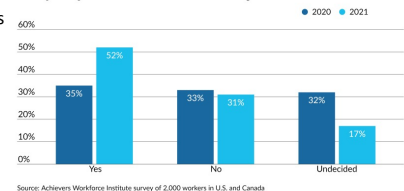
Percentages are calculated as an average of top 50 most populated metro areas. "To top 50 metro area" represents moving to another one of the most populated metros.
Source: USPS, U.S. Census Bureau

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Workers Looking for New Work

- During 2021, more than half of all workers said they plan to look for a new job.
- Compensation, benefits and work-life balance are the top reasons.

Do you plan to look for a new job?



Source: Achievers Workforce Institute survey of 2,000 workers in U.S. and Canada

Source: the Society for Human Resource Management, March 2021

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82% of Employers are Hiring in 2021

- 5-6 million new jobs in 2021, the most in a single year since 1946
- 42% are hiring to replace or backfill open positions
- 40% will open up new positions
- 49% of IT companies plan to post new jobs



Sources: Wall Street Journal, Jan 10, 2021, Monster.com's Report on the "Future of Work 2021"

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Trend: The Skills Gap of People vs. Jobs

• **July 2021: 8.7 million persons in the U.S. are unemployed.**

• Unemployment down from 16 million in July 2020



• **June 2021: 10.07 million job openings in the U.S. (highest ever)**

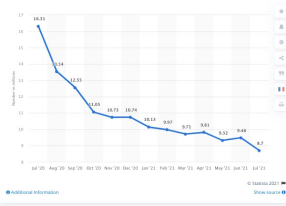
• Job openings increased from 6 million openings in June 2020

• 44% of businesses have jobs they cannot fill (highest ever)

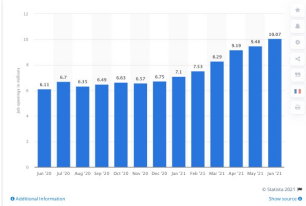
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The Skills Gap Mismatch

Number of Unemployed



Number of Job Openings



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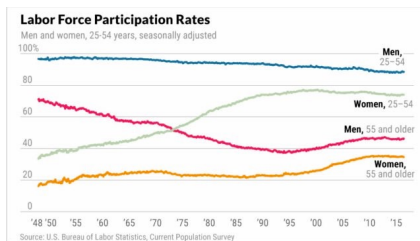
Ongoing Challenges in Filling The Skills Gap

Pre-COVID

- **Falling U.S. workforce participation** (even before COVID), 82% of workers ages (ages 25 to 54) -- below the rates of Germany, Japan, Canada, France and the United Kingdom.

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Slipping U.S. Workforce Participation

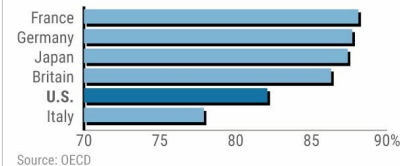


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Slipping U.S. Workforce Participation

U.S. Vs. G-7 Nations

Labor force participation rate for prime-age workers, 25-54



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Ongoing Challenges in Filling The Skills Gap

Pre-COVID

- **Falling U.S. workforce participation** (even before COVID), 82% of workers ages (ages 25 to 54) -- below the rates of Germany, Japan, Canada, France and the United Kingdom.
- Lack of training/prep for **in-demand jobs**
- **High college attendance BUT also high non-completion**
- **Confusing array of training** programs for adult workers

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Ongoing Challenges in Filling The Skills Gap

Pre-COVID

- **State-licensed workers** can't cross state lines easily to get similar jobs (lack of inter-state recognition)
- 20% of workers have **"non-compete contracts."**
- Opioid and painkiller **addictions** (5 percent of US adults)
- Difficulty for individuals with **felony convictions** to find work other than unskilled labor (19 million or 3 percent of population)

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Ongoing Challenges in Filling The Skills Gap

Post COVID –

- **Reluctance** to take jobs in service industries that require contact with the public for fear of contracting COVID-19.
- **Difficulty in finding childcare** (especially when children are at home learning online).
- Women participation in the workforce has fallen significantly.

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Women's Workload Takes a Toll

During COVID, a survey by Deloitte clarified that:

- Women's workloads — at home and on the job — have grown
- Women's mental health has suffered,
- Women don't feel supported by employers



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Trend: *Remote Work*

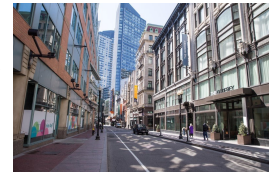
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Remote Work – The New Reality For Many?

- Prior to COVID, about 5% work from home
- In April 2020, 70% of US workers worked from home.
- Business leaders expect this to **level off at 20 - 30% of the workforce.**



Source: BFI WORKING PAPER, 2021, SLATE, April 2021

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Work from Home? Return to the Workplace?

- Of remote workers, **44% want to keep working at home.**
- Many Americans Would Take a Pay Cut to Keep Working From Home
- **39% want to return** to an office (an increase from 28% in July 2020)
- 7% no preference



Source: U.S. News, Feb. 2021, Gallup

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Remote Work In the Tech Industry

Apple - Tim Cook announces hybrid work plan for Apple employees, three days per week in-person



Microsoft -- Changes it's made to enable its employees to work both at home and in the office



Sources: 9to5 MAC (June 2021), CNBC (May 2021)

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Remote Shopping Behaviors Will Stick

- **56% of consumers expect to shop online** after the pandemic;
- 39% online shoppers **BEFORE** the pandemic.
- Online shopping will continue the need for delivery drivers, as well as truck and transportations, and warehousing jobs.



Source Wall Street Journal article February 2021

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Trend: *Sector-Specific Worker Shortages*

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Aviation Workers in High Demand After COVID Restart

- In 2021, U.S. aviation industry hiring and training hundreds of pilots, maintenance workers and avionics technicians.
- Pilots in regional airlines, earning range from \$50,000 - \$131,500
- For major airlines, pilots earn \$90 - \$400K



Source: AOPA Foundation, May 2021 & analysis of Airline salaries by ATP

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Doesn't Help: Angry Passengers in the Skies

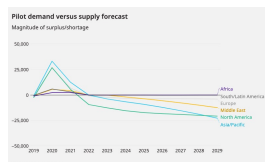
- 4000 reports of in-flight disturbances in 2021.
- \$1 million in FAA fines to passengers
- Almost half of incidents relate to reaction against mask mandates
- Fines as high as \$52,500 and up to 20 years in prison, but still hundreds of incidents per month.
- Flight workers turning to self-defense training



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Aviation - Global Pilot Shortage Predicted

- By early 2022, global supply of pilots may be 316K, but that's 10,000 short of the need.
- **By 2029, projected shortage for North America over 20,000 pilots.**
- Global shortfall of 60,000 pilots.
- Chronic shortfalls threaten working conditions, and ultimately, passenger safety.



Source: global management consulting firm Oliver Wyman, AIOnline, March 2021

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Child Care Worker Shortage

- There's a massive child-care worker shortage
- 20,000 childcare centers closed during the pandemic
- Low wages, just average of \$11.65 and hour
- Major factor for women returning to work



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Cyber Security Workers in High Demand

- 879,000 current Cybersecurity workers in U.S.
- **465,000 open jobs right now in U.S.**
- Global shortage of over 3 million workers



Source: CNN, May 5, 2021, ISC2 Survey from 2020, CBS News, US Dept of Commerce

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Farm- and Ranch Worker Shortages

- Most rural areas lost population, according to latest Census.
- Movement within states from rural to larger areas.
- Farm and Ranch worker shortages highlights debate over immigration policy.
- Legal immigration also impacted by COVID-19 pandemic.

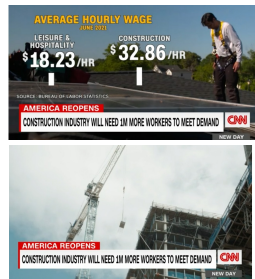


Source: CBS News, August 16, 2021

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Construction Workforce Shortages

- 80% of 1 million jobs lost during 2020 (COVID-19 shutdown) have been restored.
- Industry is **still down 238,000 workers** from before COVID



Health Care Workers

- **1.5 million opening in June 2021**, up from 978,000 in June 2022
- In July 2021, there was an increased health jobs in ambulatory health care services (+32,000) and hospitals (+18,000).
- During 10 years, **health care may add about 2.4 million new jobs.**



Source: Healthcare finance news

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Manufacturing Worker Shortage

- American factories are desperate for workers. It's a \$1 trillion problem
- Supply chain bottlenecks amid roaring demand slow U.S. manufacturing



Source: CNN Business, May 4, 2021

Mining and Extraction Worker Shortage

- Fossil fuels decreasing BUT Critical materials to be mined - lithium to power batteries or aluminum for wind turbines.
- 592,000 workers. Around 20% of workers in the mining, oil and gas sector are over 55, will be leaving the field SOON.
- Average earnings \$56 – 90K.
- Growth projected at 13% over 10 years.



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Truck Driver Shortage

- Truck transportation industry lost over 90,000 jobs (6%) out of 1.52 million workers.
- By July 2021, 63,000 of those jobs were back..
- Right now, 33,000 jobs short of employment levels in February 2020.**



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Truck Driver Shortage

- Drivers may prefer jobs with more family time -- manufacturing and construction competing with transportation.
- One company has raised driver wages by 25%, but thinks another 20-30% is necessary to attract the workforce.



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Trend:
Worker Shortages Driving Higher Wages and More Flexible Hiring

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Tyson Raising Wages Amidst Soaring Demand for Chicken

Tyson raising wages and implementing more flexible worker arrangements



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Chipotle and the Quick Food Industry

- Raising starting wage to average of \$15/hour (\$11-18)
- Opportunity for management role within 4 years, paying \$100K
- 200 new restaurants, hiring 20,000 workers



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More Skill-based Hiring

Some Employers Drop Degree Requirements To Diversify Staffs



Source; NPR, April 29, 2021

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Workforce Opening Up for Workers with Criminal Records

Manufacturers push to give workers with criminal records a second chance

Source: CNBC, May 7, 2021

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Part 2 Innovations Impacting the Workplace

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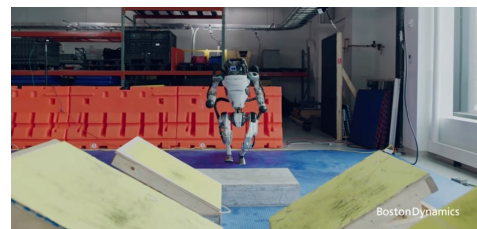
Innovations in *Automation & Robotics*

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What Can Robots Do? Atlas by Boston Dynamics



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RoboCop? -- Security Robot

- For public safety (neighborhood watch)...
- Or Surveillance and anti-freedom?



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Tally – The Shelf Scanning Inventory Robot

Robots that can scan store shelves, keep track of inventory

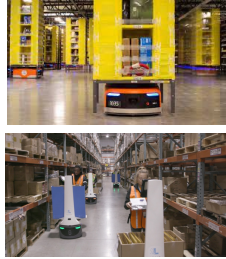
Walmart experimented with an alternate robot, ended the project in November 2020.



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Warehouse Robots

- Extensive use throughout Amazon and DHL Warehouses
- Human workers still needed, working alongside the robots



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Robots in Manufacturing Settings

- Manufacturing workforce still 50,000 fewer than pre-COVID
- How many will be replaced by robotics?



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Innovations in *Drone Tech*

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Delivery Drones – Amazon, Walmart, Kroger

- Amazon first announced delivery drones in 2016, nothing yet because of FAA complications
- Walmart invests in DroneUp
- Kroger testing drone delivery service for small order items in Ohio



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Drones for Delivery

El Pollo Loco is set to test drone delivery in Orange County



Source: Orange County Register, June 17, 2021

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Neighborhood Drone Delivery?



Possible strategy:
Deploy drones
within
neighborhoods
from Amazon
delivery truck

Source: DroneDJ web portal, Summer 2021

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Innovations in Autonomous Vehicles (AV's)

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Not "Self-Driving" Yet

- Waymo formed by Google in 2009 to test self-driving tech.
- Waymo stopped using the term "self driving" to describe its vehicles.
- Also includes Advanced Driver-Assistance Systems (ADAS) instead.
- The term "self-driving" can be dangerous. Tesla is being sued for using the term for its cars.



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AV Taxi Goes Rogue

Waymo AV Taxi Goes Rogue, Blocking Traffic & Evading Capture



Source: Cleantechnica.com, May 13, 2021

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AV Taxis, New Phase of Testing & Roll-out

- Lyft customers in Miami will be able to hail a robotaxi from Argo AI, an AV startup backed by Ford and Volkswagen.
- Argo has been testing its tech in Miami.



Source: www.Theverge.com, July 21, 2021

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Driver Shortage Fueling Push for Self-Driving Trucks

- Amazon announces order for 1000 self-driving trucks
- Waymo & J.B. Hunt Team Up testing self-driving Freight Trucks between Houston and Fort Worth
- Waymo (Google) is partnering with Ryder Trucks to build a hub in Dallas-Fort Worth



Source: Entrepreneur.com, Cleantechnica

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Driver Shortage Fueling Push for Self-Driving Trucks

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Source: Entrepreneur.com, Cleantechnica

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Driver Shortage Fueling Push for Self-Driving Trucks

- Tesla Designing all-electric Self-Driving Big Rig
- Cummins and “Plus” designing all-electric self-driving big rig
- Also partnering to for a rig that runs on Compressed Natural Gas big rig

Source: www.forbes.com, April 27, 2021



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Innovations in *Construction*

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3D-Printing Speeds up House Construction



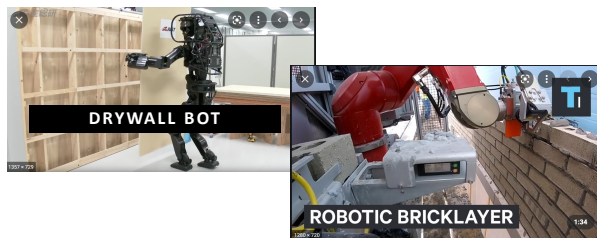
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3D-Printing Speeds up House Construction



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Robotics Coming to Construction Sites



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Innovations in *Electric Vehicles(EVs)*

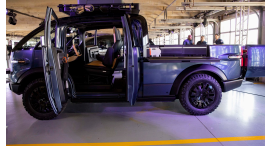
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Electric Trucks to be Manufactured in Oklahoma

- Electric vehicle company Canoo will build “mega factory” in Oklahoma
- Projected complete its assembly plant in Oklahoma by 2023.
- Canoo will manufacture and ship its first vehicles to U.S. customers from the Netherlands by the end of 2022.

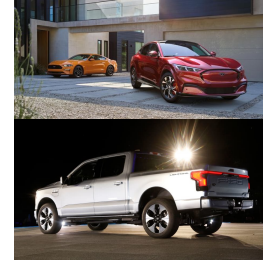


Source: www.dallasnews.com, June 17, 2021

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EVs – Ford & GM Going After the Mass Market

- Ford Building More Mustang Mach-E EVs Than Gas-Powered Mustangs
- Ford doubles output of electric F-150
- GM ups spending on EVs and autonomous vehicles by 30% to \$35 billion by 2025 on higher profits

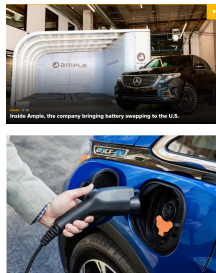


Source: Car and Driver, CNBC

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EV Infrastructure: Charging and Swapping

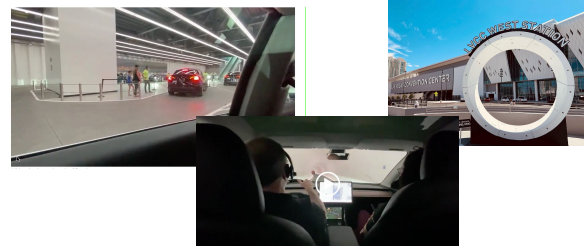
- The Ample company has battery-swapping stations,
- GM’s Ultium Charge 360 is the automaker’s response to the fractured nature of EV charging in the US



Source: CNBC.com, May 29, 2021

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Urban Tunnels WITH EVs – Live In Las Vegas



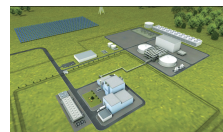
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Innovations in Energy - Fusion & Nuclear

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Small Nuclear Plants



- Wyoming's bet on small nuclear reactors could launch a new industry
- China starts construction of its first small modular reactor

Source: Washingtonexaminer.com,
www.scmp.com

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Floating Nuclear Plants

- Russia to deploy first floating nuclear plant
- Mass-produced floating nuclear reactors use super-safe molten salt fuel

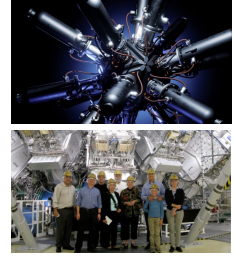


Source: newatlas.com, Seaborg Floating Nuclear

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Fusion – Replicating the Power of the Sun

- “Physicists Say We’re Officially at the “Threshold of Nuclear Fusion Ignition”
- Researchers just passed a major milestone, one they’re calling “a Wright Brothers moment.”
- Experimental fusion reactor put out a record-breaking 10 quadrillion watts



www.techradar.com, August 19, 2021

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Demonstration Fusion Plan planned for UK, Bezos backed

Nuclear energy: Fusion plant backed by Jeff Bezos to be built in UK



Source: www.bbc.com

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Innovations in Energy - Solar

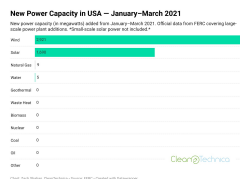
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Renewables Take the Lead

Solar & Wind Power = 99.7%
Of all New US Electricity
Capacity In 1st Quarter Of
2021



Source: www.cleantechnica.com, June 14, 2021

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New Deployments for Solar

- Solar-Covered Canals (generate electricity, reduce evaporation)
- Floating Farm, Singapore
- First Mountain-based Solar (50% more efficient)



www.wired.com, www.interestingengineering.com

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New Solar & Battery Farm Co-Located

- In New Mexico, a consortium will be a co-located Solar Farm and Battery Farm to provide continuous energy.

www.wired.com, www.interestingengineering.com

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Solar and Wind Energy Jobs Growing

- Solar - 231,000 workers in 2020.
- Wind Energy – 115,000 in U.S. (1.2 million globally)



Source: www.seia.org, 2020,

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Innovations in *Human Augmentation*

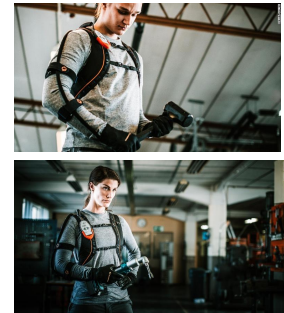
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The Robotic Iron Hand

- Provides extra strength
- Helps protect factory workers from injuries



<https://edition.cnn.com/2021/05/12/world/ironhand-exoskeleton-glove-spc-intl/>

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Apple Watch – Health Monitor Device

Apple Watch Likely to Gain Blood Pressure, Blood Glucose, and Blood Alcohol Monitoring



<https://www.macrumors.com/2021/05/03/apple-watch-blood-pressure-glucose-alcohol/>

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Innovations in *Space Exploration & Settlement*

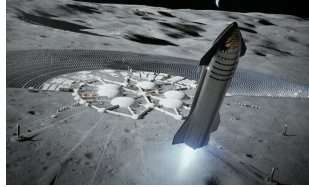
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Humans to Return to the Moon on the SpaceX Starship

NASA's bold bet on
Starship for the Moon may
change spaceflight forever



<https://arstechnica.com/science/2021/04/five-reasons-why-nasas-starship-award-is-a-watershed-moment-in-spaceflight/>

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US Return to the Moon via SpaceX Starship

- Starship self-landing capability proven in Spring 2021
- Testing of full launch and orbiting with mega-boosters to begin Fall 2021



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CHINA Commits To Human Mars Landing

China plans its first
crewed mission to
Mars in 2033

Reuters, June 24, 2021



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Space Tourism Flights Available Now, In the Future, a Hotel?



The Space Hotel?

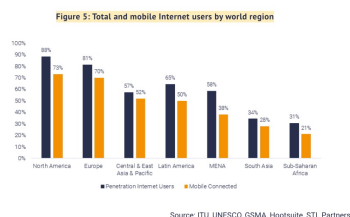
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SpaceX's StarLink Global Internet

- One-half the world has limited access to the internet
- SpaceX is deploying thousands of mini-satellites to provide high speed satellite base internet.



Source: CNBC, April 15, 2021, STL Partners, 2018



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Innovations in *Water*

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Intense Water Shortages in U.S. and Across the World

The water level at Lake Mead (Hoover Dam) reached a historic low in June, dropping to 1,071.57 feet above sea level.

Affects 3 U.S. states and Mexico



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Cheaper, Faster Salt Water to Drinkable

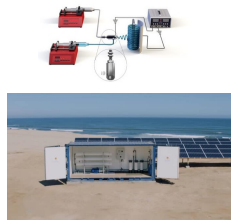
Purdue U. breakthrough in reverse osmosis may lead to most energy-efficient seawater desalination ever



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Cheaper, Faster Salt Water to Drinkable

- South Korean team created filtering materials that last as long as a month vs. a few days
- Solar desalination device will provide clean water to 400,000 Kenyans



Source: StudyFinds.com, August 2021

Source: <https://www.inceptivemind.com>, October 9, 2021

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Part 3 Implications for the Education Sectors

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Workforce Turbulence

Key Trends:

- Workers are getting more selective about work.
- Many workers will insist on remote work or hybrid work options.
- Basic minimum wages going up to attract to harder to fill jobs.
- The workplace will be more inclusive - younger workers, some tolerance of recreational drugs, more opportunity workers will criminal backgrounds...
- Shortages will drive automation in every job.
- Jobs will be changing constantly.
- Every worker must be able to navigate their career path and pivot to new jobs and new careers.

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Workforce Turbulence

Action:

- Stress the importance of ongoing Career Navigation as an essential skill.
- Personal finance management skills are a must – students must know how to save and plan for ups and downs in their careers, especially if they are working “gig” jobs.
- Workers must know how to work in micro-businesses and also know the basics of self-employment, starting a business, and working in a small business setting.

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Digital Literacy and Just-in-Time Learning

Trends:

- Basic office applications (WORD and Google) are the new literacy for the modern workplace.
- New technologies and applications will be regularly integrated into the workplace, with little or no opportunity for formal training on them.
- Workers must be self-directed learners.

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Digital Literacy and Just-in-Time Learning

Action Items for Educators:

- Build consistent use of professional office technologies - email, presentations, spreadsheets -- into every pathways program.
- Teach professional communications (i.e. email, oral presentations, customer relations) as distinct from non-professional communications.
- Embed learning opportunities for new technology and new applications through informal means.
- Don't spoonfeed students on how to use every piece of technology or application. Instead, build opportunities for self-directed learning and peer-provided instructions for new tech (this is how digital natives already know how to learn).

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Artificial Intelligence and Automation

Trends:

- Because of workforce shortages, automation will accelerate, replacing SOME jobs, but complementing and integrating into almost EVERY job.
- Every worker will need to interface with some form of Artificial Intelligence and/or Robotics technology.

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Artificial Intelligence and Automation

Action:

- Embed understanding information about Artificial Intelligence in every CTE/Pathway Program.
- Embed information about robotics and smart tech in every program...

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Remote Learning/Remote Work:

Trends:

- COVID-19 was a Remote Work accelerator.
- With remote professional work, how will young people become acclimated to norms and expectations of the remote/virtual workplace or blended workplace?

Action:

- Build Remote Work simulations and expectations as an ongoing experience in your pathways program.

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Employers Expectations for the Workplace

Trends:

Employers across all industries are looking for workers with:

- **Dependability** (arriving on time and following through on assignments)
- **Teamwork and collaboration** (working well with others within a team and the company as a whole)
- **Problem-solving** (being resourceful when taking on work challenges and solving them without assistance)
- **Flexibility** (willingness to take on new assignment or ways of working)

Source: Monster.com's Report on the "Future of Work 2021)

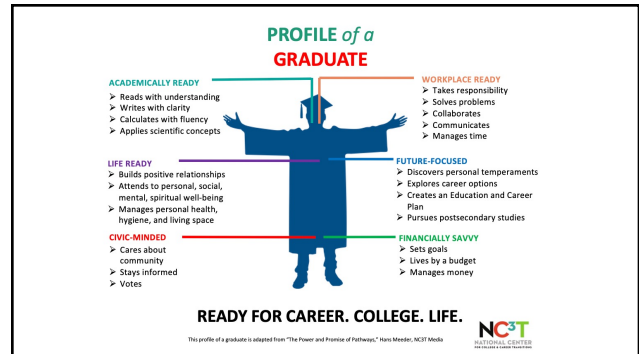
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Employers Expectations for the Workplace

Action Items for Educators:

- **Create and Implement a Profile of a Graduate** for your pathway programs, and ideally for your school and community.

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REFLECTION

How can we in CTE and pathways:

- Better understanding workforce trends and innovations,
- Reflect these changes in our pathway programs,
- Make sure our students are equipped for the skills to succeed in the workplace?



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If you would like a PDF of this slide deck, or have any follow-up questions, please email:

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Thank You!

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