



PA House of Representatives
Republican Policy Committee

414, Main Capitol Building
Harrisburg, PA 17120
(717) 260-6144

Rep. Joshua D. Kail
Chairman

PA House Republican Policy Committee Hearing
“Career & Technical Education: A Pathway to Opportunity”

Wednesday, May 17, 2023, at Noon

Upper Bucks County Technical School
3115 Ridge Rd.
Perkasie, PA 18944

12:00 p.m.

Welcome and Pledge of Allegiance

Career & Technical Education Opportunities Panel

12:10 p.m.

Dr. Michael Herrera
Executive Director, Upper Bucks County Technical School

12:20 p.m.

Rich Matthias
Instructor, Upper Bucks County Technical School

12:30 p.m.

Questions for the Career & Technical Education Opportunities Panel

Career & Technical Education Outcomes Panel

1:00 p.m.

Raymond Slifer
*Graduate, Upper Bucks County Technical School and
Junior Manufacturing Engineer, Bracalente Manufacturing*

1:10 p.m.

John Maketa
Strategic Advisor – Workforce Development

1:20 p.m.

Questions for the Career & Technical Education Outcomes Panel

1:50 p.m.

Final Comments and Conclusion



Testifier Biographies

PA House of Representatives Policy Committee Hearing *"Career & Technical Education: A Pathway to Opportunity"*



Dr. Michael Herrera

Executive Director, Upper Bucks County Technical School

Having spent over 18 years in career and technical education administration, with one year spent as a principal at a larger, comprehensive high school, Dr. Herrera currently serves as the Executive Director for the Upper Bucks County Technical School.

Dr. Herrera holds a bachelor's degree in education from Kean University, a master's in educational leadership from Seton Hall University, and a doctorate in educational leadership from Saint Elizabeth University.

Rich Matthias

Instructor, Upper Bucks County Technical School

Rich Matthias currently serves as a mechatronics instructor at the Upper Bucks County Technical School, where he teaches students to design, build, and program robotic devices.

Raymond Slifer

Graduate, Upper Bucks County Technical School and Junior Manufacturing Engineer, Bracalente Manufacturing

Currently a junior manufacturing engineer at Bracalente Manufacturing Group, Raymond Slifer holds the distinct honor of being the first-ever Pennsylvania career and technical education student to win the United States Presidential Scholar Award.

A graduate of the Upper Bucks County Technical School, Ray excelled in the Machining Technologies Program, earning the OSHA 10 Safety Certification and several NIMS (National Institute of Metal Working Skills) Certifications. He was named a member of the National Technical Honor Society and honored as the "Most Dedicated Machining Technologies Student." Ray has also competed and placed at SkillsUSA machining competitions at the district and state level.

Further accomplishments include achieving the highest rank in the Boy Scouts of America, Eagle Scout, volunteering with the Richlandtown Fire Company, and receiving the Elmer Gates Enterprise Award.





John Maketa
Strategic Advisor—Workforce Development

John Maketa leverages over two decades of experience as a strategic advisor, workforce analyst and as a hands-on Chief Revenue Officer to deliver a unique perspective on the science of demography and what it means within the context of organizational leadership.

As a thoughtful researcher, John expertly combines insights related to the power of shifting demography with his professional experience leading high performing organizations. He also adds some relatable psychology around human behavior to create instant, lightbulb moments and inspire meaningful action.

John specializes in engaging a wide variety of industry associations and companies around how social, cultural and demographic phenomena impacts their organization and how to protect and insulate their market position by attracting, developing, and retaining their next generation of A-players.

John is a Board member of KGC Direct, Fellow and advisory board member of The Work Institute, and CEO and Co-Founder of DLITE Learning. He is the Co-Author of two books “Leading with Vision” and the bestselling book “Now You’re Thinking!”



Good afternoon, distinguished members of the hearing committee. I am Dr. Michael Herrera, Executive Director of Upper Bucks County Technical School and a former national fellow for the Association of Career and Technical Education.

I am truly honored to be joined by like-minded individuals who believe Career and Technical Education (CTE) is the key to unleashing the true power of our students, communities, and economy.

Here's what CTE means to us:

- “C” is for Career-connected learning. Our students obtain entry-level jobs with the ability to move up the career ladder quickly, attaining national competency skills certifications, entering apprenticeships, and continuing towards a 2-year or 4-yr post-secondary or college degree.
- “T” is for Technology, and we are directly putting state-of-the-art tech and skills into students' hands for part of their school day, which mirrors the workplace.
- “E” is for Embedding CTE programs into public school education to provide motivation and tangible workplace skills to support students' career aspirations far into the future.

For over 100+ years, CTE has continued to be an educational framework connecting students to careers. CTE programs emphasize rigorous and relevant academic curricula enriched in high-demand skills for success in the workplace.

As a chosen national representative of the largest educator organization for CTE teachers and administration, I've witnessed the transformative impact of high-quality CTE programs as an educator, workforce development professional, and advocate for CTE. ACTE assists Pennsylvania CTE in tackling the teacher shortage problem, providing the highest quality online professional development, and connecting students to industries and businesses. To recruit and retain qualified CTE teachers, we must remove

the many barriers they face when transitioning from industry into the classroom.

As a National Fellow in ACTE Region 1-which includes a 15-State consortium within the ACTE organization, I organized a conference earlier this month at Upper Bucks Community College and Upper Bucks County Technical School. Over one hundred twenty secondary and post-secondary CTE teachers, administrators, and nationally known keynote speakers attended. We received praise such as, “UBCTS in PA represents one of the best CTE Tech Schools nationwide - glad for a tour” “Glad to see the enthusiasm and smiles on UBCTS, students’ faces....” “Your students were amazing! Their professionalism and knowledge about their programs were outstanding!”

We need to focus on the success of centers like UBCTS and provide the support and resources they desperately need to continue and expand high-quality programs. Our success stems from cooperating with industry and implementing the Pennsylvania Department of Education CTE plan, guided by the federal supplemental funding and guidelines from the Carl Perkins’ Acts and bipartisan reauthorizations established in 1984. CTE is a well-organized and evolving program with bipartisan, fiscal oversight in the Senate and managed growth connected to the local needs of the State. CTE is an “accountable education” that works for the workers and educators of Pennsylvania.

“High-quality” CTE programs, like those offered at UBCTS, address the skills gap in transitioning from school to work, leading to national competency certifications, higher degree attainment, higher lifetime earnings, and engaged and motivated CTE graduates with many career options. High-quality CTE programs are gateways to all economic sectors in the 21st-century U.S. economy. Career and Technical Education Schools are planned to meet the needs and graduate a skilled workforce for local businesses and industries of Pennsylvania. CTE graduates enter the workforce in high demand into high-skill occupations with a family-sustaining, livable wage, and unmeasurable satisfaction.

Here are some key points that can be used to support the importance of CTE programs:

1. CTE programs address the skills gap, that is, the gap between the skills employers need and job seekers' skills, by providing students with technical, knowledge, and employability skills.
2. CTE programs lead to higher earnings: Students who complete CTE programs often earn higher salaries than those with only an academic high school diploma. CTE makes educational content actionable toward the student's aspirational goal. CTE graduates also enter and complete post-secondary programs at a higher rate than non-CTE cohorts. In fact, according to the National Center for Education Statistics, individuals with an occupational CTE credential earned, on average, \$5,000 more per year than those with only a high school diploma. UBCTS students leave with multiple industry-recognized certifications and licenses. There is even a high multiplier effect as CTE graduates use their certificates and attain more advanced degrees. Students with both CTE certifications and completion of academic diploma programs have the brightest futures for success in the workplace.
3. CTE programs can provide valuable career opportunities: CTE programs can offer opportunities for advancement and growth. Many skills are transferable and immune to AI displacement. Most are not outsourceable to low-wage countries. Listen to our students discuss why they chose Upper Bucks County Technical School by [clicking here](#).
4. A skilled workforce prepared for 21st-Century challenges, and transitions is necessary for Pennsylvania to be attractive to businesses and industries. Through collaborative partnerships, CTE programs meet the needs of local industries and the labor market. Many students can stay, thrive, and work in the area if businesses remain. CTE graduates appreciate the community's investment in them.
5. CTE programs can help reduce the student debt burden: CTE programs often offer shorter and more affordable educational

pathways than traditional four-year degree programs. As a public institution, Technical Education Schools significantly reduce the 1.75-billion dollar student debt burden after high school.

Upper Bucks County Technical School is committed to addressing the skilled workforce gap and supporting a workforce development program that benefits everyone involved.

Upper Bucks County Technical School has experienced a 45 percent increase in enrollment since the 2016/17 school year. This exponential growth stems from solid leadership following the CTE framework for high-quality CTE programs and an engaged and collaborative approach with business and industry. Last year, we added a new Exercise Science program and two new Healthcare Careers and Culinary Arts sections. This increase provides the CTE opportunity to serve an additional 120 students. Next year, enrollment is at capacity, with an extensive waiting list of 170 students.

The actual fiscal support from Pennsylvania does not match our success, nor is it comparable to other State investments in CTE. According to a recent Keystone Research Center and PA Budget & Policy Center report, "Pennsylvania enrollment of 6.42% of all the state's high school students in career-related learning in intensive CTE programs ranks 36th out of the 50 states. Our neighboring states enroll an average of three times the Pennsylvania share in CTE (19.3%). In Delaware, 36.7% of students are enrolled in CTE programs. In West Virginia, the number is 33%."

Emboldened by success and students' and parents' aspirations, we have plans to expand next year and add a new computer networking and cybersecurity course connected to our local college programs if given the opportunity. As required by the CTE framework, our goals and mission changed to meet the challenges of the new workforce of the 21st century and the high demand from our parents and students.

I am here today to ask your help to relieve the financial pressures that deflate the aspirational dreams of our students and parents. There is no excuse for keeping an academic skills mind from in-demand, relevant CTE programs. Unlike most stagnant academic curricula, our programs constantly change to meet industrial certification requirements and the soaring development of new technologies and concepts. Over two-hundred local businesses collaborate and redefine our programs and CTE curriculum, ensuring rigor and relevance for our graduates. At UBCTS, employers provide input on the quality and relevance of the school's curricula through a long-standing committee, Occupational Advisory Committee (OAC). The OAC meets regularly to advise teachers on safe and appropriate equipment operation, implementing and procuring state-of-the-art technology, and upgrading curricula activities and content.

We must continue to support efforts to expand and improve access to high-quality CTE programs for all students. This means investing more in our CTE schools and teachers, providing robust career-connect course offerings, and ensuring equity and opportunity for all who demand CTE.

CTE positively impacts the economy. With the support of Upper Bucks County Technical School and its workforce development program, the skilled workforce gap can be addressed, and students and employers can benefit greatly. This year alone, 116 students worked 39,423 hours, earning a total of \$589,768, well over half a million dollars, showcasing the impact and success of this program.

Employing cooperative education students, employers mentor young employees while enhancing their skills learned at school. This instills a direct connection between the classroom and the workplace, allowing students to explore trade-specific job pathways and build strong network relationships with professionals. School-to-work programs like those described enhance social-emotional learning and soft, integrative skills necessary for successful integration into the workplace after school. Through this program, students can improve their interpersonal skills with mentorship and guidance at work, creating lifelong learning opportunities.

The cost to the district for this learning and curriculum is zero, but the returns to the student are at least half a million dollars, as reported this year, along with the growth of the local economy.

The program also provides direct access to employees with sought-after skills and knowledge needed to perform specific tasks, reducing the potential for students to look for careers outside their district and keeping jobs local. This instills a sense of pride and increases connections within the community, inspiring growth for local business owners and creating a solid work/life balance.

We must do a better job of funding CTC centers in Pennsylvania. By doing so, we can help our students reach their full potential, strengthen our economy, and build a brighter future for our communities.

Funding provided to CTC centers in Pennsylvania is an investment with a real ROI manifesting in economic growth and community quality. Both result in a positive net return in the form of increased income from taxes and reduced costs of social challenges. We would like your support to expand these CTE programs.

Thank you.

Sources:

- Keystone Research Center and PA Budget & Policy Center (2023). "Pennsylvania's Career and Technical Education Enrollment Lags Behind Peer States and Fails to Deliver Equitable Outcomes."
- National Center for Education Statistics. (2017). "Work First: Career Preparation and Work-Based Learning in the Middle Grades."
- Robert Marraccino, Personal Communications

Additional Links

- [UBCTS April Newsletter \(smore.com\)](https://smore.com/ubcts-april-newsletter)
- [Work Based Learning 2023 - Google Slides](#)
- [Upper Bucks County Technical School \(ubtech.org\)](https://ubtech.org)

- [Reducing the Critical Skills Gap Likely to be Widened by COVID-19 Pandemic \(associationdatabase.com\)](https://associationdatabase.com)
- [National Apprenticeship Week-November 20th \(vimeo.com\)](https://vimeo.com)
- [Upper Bucks County Technical School: Collaborating with Local Workforce Development Board to Create Improved Workforce and Economic Conditions – CTE Resources \(pactresources.com\)](https://pactresources.com)
- [Promising Practice Upper Bucks County Technical School – CTE Resources \(pactresources.com\)](https://pactresources.com)
- [Ray Slifer, PA's 1st Presidential Scholar](#)
- [“Perkins V and Continuous Improvement” article](#)
- [Refocus on the Skilled Trades to Reduce the Critical Skills Gap in a Post-Pandemic World with Dr. Michael Herrera by NCLA Podcast \(spotify.com\)](https://ncla.org)



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RRB-D CO

13 May 2023

To Whom It May Concern,

Upper Bucks County Technical School is committed to furthering students' education and success by offering professional development opportunities to students from Quakertown Community High School, Pennridge High School, and Palisades High School. Recently, there has been an unprecedented increase in interest and applications. With the support of its sending schools, Upper Bucks County Technical School (UBCTS) continues to provide its students opportunities for professional development by attending conferences, job site visits, and conventions that allow them to witness the impact of their chosen career field. Those who complete the extensive education and training programs provided by UBCTS promptly earn certifications that are often not offered by their sending schools.

Although students continue their education under another administration, the education they receive should be viewed as a trusted extension of their sending schools. Without this crucial support, the many programs offered by UBCTS could not provide the valuable tools and resources that they currently do. Under the current budget, it has become increasingly difficult to continue to offer these opportunities for learning for all students who wish to receive them. Our economy has a high demand for those with specialized trade skills and UBCTS plays an integral role in bringing these skills to students entering the workforce. The Pennsylvania Army National Guard is an additional resource for students offering opportunities to enhance their professional development, earn education benefits for college, serve their country, and gain leadership skills essential to advancing within the workforce. The school board and UBCTS administration recognize that the National Guard is a valuable resource that adds to their current curriculum, offering additional opportunities the original budget could not afford.

For these reasons, we ask for your consideration in providing Upper Bucks County Technical School the funding it desperately needs to continue producing highly qualified individuals that are expertly prepared to enter the workforce. Thank you for your attention to this important issue and am hopeful for a resolution that continues to support the education and training of our community's future skilled workers.

Respectfully,

Bradley Wanamaker

Bradley Wanamaker
SSG, USA
Recruiting and Retention NCO

Career & Technical Education: A Pathway to Opportunity

Good afternoon, hearing committee members, and welcome to beautiful Bucks County, PA. I would like to thank everyone for recognizing the importance of CTE and its role in Pennsylvania and the world economy. I am Rich Matthias, and I'm honored to offer insight, facts, and vision on the pathway of opportunity through CTE.

I'm the mechatronics instructor here at UBCTS. I graduated from Upper Bucks County CTE welding program nearly 45 years ago. I also do consulting for automation systems and evaluate training and equipment needs for industry and education. I hold over 15 industry certificates and college degrees in robotics, automation, engineering, and education. I am a member of several professional associations, including the Society of Manufacturing Engineers, the American Welding Society, and Siemens Professional Education. I studied Mechatronic engineering at several universities and the Siemens Technik Akademie in Germany. I received the CTE program of the year for Mechatronics from PA Association for Career and Technical Education. I was recognized with a congressional citation for my technology, science, and math work.

As I began my career, I leveraged my welding skills and the certifications earned at the technical school to obtain great-paying jobs such as a welder at Limerick Nuclear Power Plant and aerospace airframe welding. Welding was just the Kickstarter for me, and I continued to learn many trades as my career progressed, taking on various responsibilities and roles in manufacturing, automation, and construction. I began several businesses and invented multiple medical devices and sports products over the next 20 years.

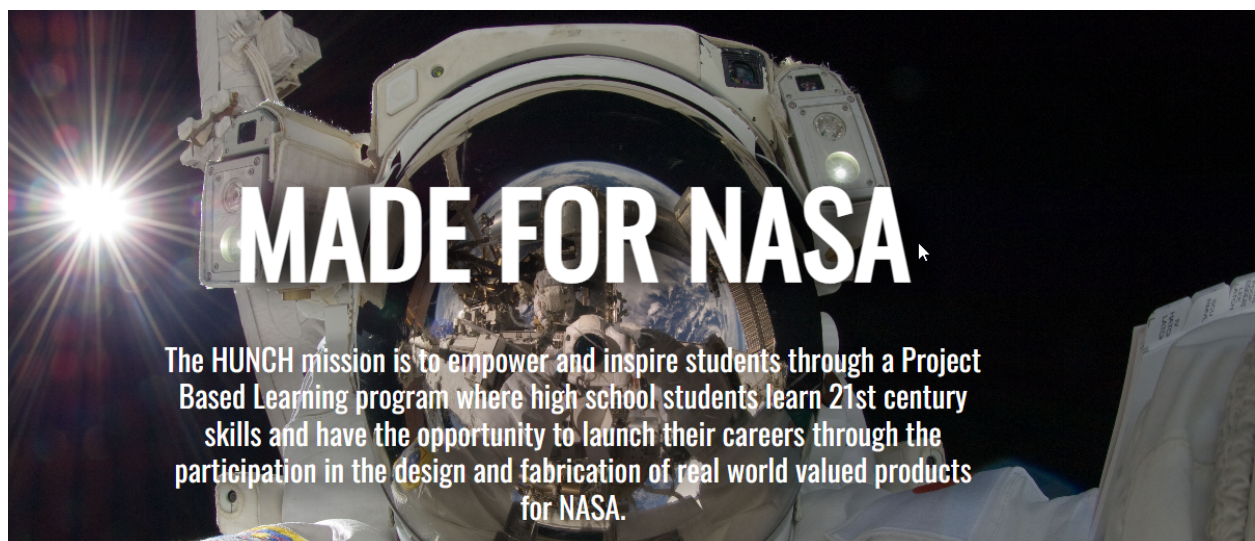
As we begin another industrial revolution of SciFi magnitude, we are experiencing skill gaps more significant than ever. There are many theories on this exponentially widening gap, and most have merit. Still, one is not disputable; technology is advancing faster than it takes to learn, and new skills are evolving with new technologies. Many jobs with the highest pay, the largest skill gap, and the smallest pool of candidates are found within the advanced manufacturing cluster. This is the age of Smart Things, some refer to it as industry 4.0 or the internet of all things. Whatever you call it, the individuals working or training in this arena will find golden opportunities. Likewise, PA is in the Pharm Belt, where automation and technology are going full speed. While not the largest state in the Belt, major drug manufacturers look to CTEs to upskill hundreds of technicians yearly. Likewise, local food manufacturers will hire any CTE graduates available from the mechatronics program.

For example, OV, a 2022 mechatronics graduate, was offered a job as a technician at a local candy manufacturer. His starting salary was \$27.14 per hour part-time until graduation, at which time he would surpass \$30 per hour plus a handsome benefits package. Above that, we just received an update that the manufacturer now increased the starting rate for our students to more than \$30 per hour.

A CTE offers industry-relevant knowledge and real-world experiences. Employers view CTE graduates as valuable assets to contribute immediately to the workplace. CTE programs collaborate with local industries to ensure the curriculum meets workforce needs. While additional training is typically required, employers get more when hiring CTE graduates.

When it comes to real-world experiences in the classroom, our CTE has provided these learning environments in many ways. Still, one notable expertise comes from a partnership with NASA, where we produce a part for a deployer. Cube Satellites, or CubeSats, are put into orbit by Nano Rack deployers on the International Space Station. At UBCTS, students manufacture NASA parts used on the International Space Station and other applications.

Upper Bucks Technical School partners with NASA to make real parts for space



CTE programs offer multiple pathways to high-wage careers. Their programs prepare students for immediate employment and provide a solid foundation for further education. Combining practical skills and academic knowledge gained through Career and Technical programs enhances students' college and career readiness. This exposure helps students make informed decisions about their future career paths.

KR is a Mechatronic student who competed in Mechatronics at SkillsUSA. She and her teammate won gold at all levels, including nationals, and then were invited to

represent the USA at the World Championships in Abu Dhabi. She earned a Fanuc programmer certification at CTE and was offered a full scholarship at Rutgers University, where she recently graduated with a degree in Industrial and Systems Engineering. She now works in the Lancaster area.

CTE programs aim to equip students with practical skills directly applicable to specific industries or professions. These skills make them job-ready and increase their employability and earning potential. Additionally, technical programs foster an entrepreneurial mindset by encouraging students to think creatively, develop problem-solving skills, and explore innovation within their chosen industries. This entrepreneurial focus can open doors to opportunities for self-employment and leadership positions.

As completed his mechatronics CTE program ten years ago and now owns a machine service and automation company that employs multiple employees throughout PA.

CTE programs play a crucial role in addressing the skills gap and meeting the demands of the labor market. By training students in high-demand fields, CTE programs help bridge the divide between education and industry, ensuring students are equipped with the skills employers need. This alignment between education and workforce requirements directly leads to employment opportunities.

MM attended the Mechatronics program and, before graduating, was offered a job at a local food plant. He accepted and quickly succeeded in becoming a lead technician and then supervisor. Now nine years later, he is a special projects engineer, and he manages many projects over \$2M.

CTE is part of the solution to workforce development

CTE is very expensive as programs embrace technology and adapt their curriculum to include the latest advancements in relevant industries. This may involve incorporating emerging technologies, software, and equipment used in the field. By providing students with hands-on experience with cutting-edge technologies, CTE programs ensure that graduates are well-prepared to work with the tools and systems commonly used in the industry. However, we have no profit gain from selling the finished goods. Therefore, many only see CTE as an expense but need to see the long-term value to local and state industries.

In addition, unskilled labor generally brings low wages and more employee turnover. When these graduates enter the industry as qualified employees, they immediately start earning family-supporting wages and allowing companies in Pennsylvania to exist. Without this pipeline of young employees, local businesses would rely on unskilled labor requiring considerable training and then have a high percentage of failure.

CTE programs offer exit points to allow students options depending on the school

By actively engaging with the industry, analyzing labor market trends, providing professional development opportunities for educators, incorporating work-based learning experiences, integrating technology, and continuously evaluating their programs, CTE programs ensure they remain relevant to the needs of the industry. This

dynamic approach helps students develop the skills, knowledge, and experiences necessary to succeed in the ever-changing job market.

In addition to technical skills, CTE programs also emphasize developing essential work ethic soft skills such as teamwork, communication, problem-solving, and professionalism. Employers highly value these skills in any industry and contribute to career success.

Overall, CTE provides students with practical skills, industry-relevant knowledge, increased career opportunities, college and career readiness, career exploration, personalized learning, soft skills development, and an entrepreneurial mindset. These benefits equip students with the tools they need to succeed in their chosen careers and pursue meaningful opportunities in the job market.

The perception of certain industries or occupations may impact the interest and pursuit of related careers. Some industries, such as manufacturing and skilled trades, have faced challenges attracting new talent due to misconceptions about job prospects, work conditions, or perceived prestige. This can further exacerbate the skills gap in these industries.

CTE was viewed below their academics and those who attended. This misrepresentation has come to be another barrier to the solution. We must do more than recognize the need for a CTE pipeline. We must have a vision and a plan to support the entire process and showcase the fantastic outcomes a career education can lead one to.

Good afternoon.

My name is Raymond Slifer.

I am a 2021 Quakertown Community High School and Upper Bucks County Technical School graduate.

I am also a member of the United States Presidential Scholars Class of 2021, which recognizes my academic accomplishments and career and technical education.

This Scholars program selects scholars annually based on their academic success, technical excellence, essays, school evaluation, transcripts, evidence of community service, leadership, and demonstrated commitment to high ideals. I was one of 161 high school seniors chosen out of 6,000 candidates; amongst 3.6 million graduating from high school in 2021, only 20 of the 161 seniors were selected for Career and Technical Education.

I attended Quakertown Community High School and Upper Bucks County Technical School from 2018-2021

UBCTS was the best choice because I got to spend four years with the same teacher and group of students, which allowed me to grow in manufacturing and as a person. It exposed me to problems I could troubleshoot with the knowledge I learned in the classroom.

04/29/2019 - 05/02/2021 - I was a CO-OP student at Bracalente Mfg Group while attending school.

My first two years at UBCTS were spent learning the basics and all the safety precautions of machining. In my second 2 years, I excelled at skills I already knew and learned new skills, such as programming CNC lathes and mill. While at UBCTS, I did many projects, such as NIMS, where I learned how to use manual and CNC machines.

During my CO-OP, I was exposed to advanced manufacturing. I worked in different areas, such as the toolroom, CNC machining, and quality. During my CO-OP, I spent four days at Bracalente and one day in the classroom at UBCTS.

MAY 2021 – I was hired full-time with Bracalente as a machinist after graduation.

AUGUST 2021 – I was promoted to a Junior Engineer position. I received hands-on training from my mentors and opportunities for additional training, such as Mastercam, which I use to program parts for companies worldwide.

Due to my learning at the Upper Bucks County Technical School and my CO-OP opportunity, I entered the workforce with a basic knowledge that I applied and used to excel in the engineering role.

My education journey has led me to be 20 years old, earning over \$50,000 a year with unlimited room for advancement and no college debt.

I enjoy sharing my journey with students who visit Bracalente with our annual Manufacturing Day Event.

John Maketa Workforce Council Testimony Points

- Twenty-five years in Human Capital focused on talent acquisition, selection, development, and retention in K-12, higher ed, and corporate markets.
- Currently, serve as a strategic workforce development advisor to trade associations & organizations looking for ways to strengthen their talent pipeline. Industry examples: Wholesale Distribution, Plumbing & Supply, HVAC, Flooring, Electrical, Packaging, Trucking, Supply Chain, Healthcare.
- Organizations' revenue range from multibillion-dollar enterprises to independent contractors. Main pain point and common denominator - they all need significant help finding, recruiting, & developing their next-generation workforce to meet market demand.
- Supporting the trades has become unbelievably crucial to our economy, and we need to create awareness and assist with solutions regarding the talent issue.
- Resignations have accelerated post Covid. The organizations supporting the housing and manufacturing markets have been significantly impacted and need immediate help. Immediate needs include:
 - Help to rebrand the trades as a viable career path
 - Employers need skills, not degrees (problem-solving, solid customer service orientation, and hands-on experience)
 - Most needed roles (Technicians, Operators, Installers)
- Disruptive technologies (3D printing, Robotics, Laser, AI, Predictive Analytics, etc.) are now ubiquitous across industries.
- To adequately train people to use a 3D printer, they need hands-on experience. There is no other way to do it.
- Automation (AI and Robotics) will soon alleviate some pain in the talent shortage. However, the machines will break, and someone must fix them.
- Los Alamos National Labs – Current staff of approximately – 12,000 employees. Immediate talent needs include 1500-2000 digital fabrication technicians (3D, CAD) every year for the next ten years.
- Manufacturing is coming back to the US.
- On November 15, 2021, President Biden signed the [Infrastructure Investment and Jobs Act \(IIJA\) \(Public Law 117-58, also known as the “Bipartisan Infrastructure Law”\)](#) into law. The Bipartisan Infrastructure Law is the most significant long-term investment in our infrastructure and economy in our Nation's history. It provides \$550 billion over fiscal years 2022 through 2026 in new Federal investment in infrastructure, including roads, bridges, mass transit, water infrastructure, resilience, and broadband.
- Wholesale distribution in the US is vulnerable due to weak talent pipelines. Wholesale distribution is a vital link between global supply chains and your front door.
 - Food & Beverage
 - High Tech products
 - Healthcare (Dentistry)

- o Industrial Hardware
- The housing unit shortage in the US is estimated to be 25 million. Housing is our economy, and our economy is housing...we learned that in 2008.
- We need to solve this problem, and investing in our Career & Technical schools should be the first place to start.