

Preparing Technicians for the
FUTURE OF WORK

What Should Educators Know and Do about
 Preparing Technicians for the Future of Work?

Podcast Interviews Provide Direction

<https://www.preparingtechnicians.org/podcasts/>

AUTOMATION, ROBOTICS, AND ADVANCED MANUFACTURING		
Topic and Episode(s)	Discovery	Recommended Action
1. Automation – Helping Technicians Be More Productive PC21	As we think about preparing technicians for the future, we recognize that automation systems are becoming simpler and more intuitive, so technicians can use them more productively.	Look at your program beyond Student Learning Outcomes. Can you incorporate the approach of industry training programs where graduates gain professional competencies and that focus on what technicians “can execute?”
2. Here Come the Cobots PC23	An operator who wants to move up needs to understand that the technology is available and not be afraid of it. But more importantly, understand the core process. The more they understand the core process, the easier it is to apply the automation to that process.	Gain more familiarity with collaborative robots . Take one of the free e-learning modules in the Universal Robots Academy . Each module takes less than 90 minutes to complete.
3. Technician Skills for Industry 4.0 PC17	There are nine technologies for Industry 4.0 that are transforming industrial production.	Ask your industry advisory group to help you identify the top technologies that are important in your region and industry sectors and the specific skills that are most needed. Then look carefully at your programs and curricula to see what changes you might make to keep pace.
4. A Robot for Every Technician? PC13 and PC22	A robot for every technician is an emerging trend in the workplace.	Ask yourself whether it is possible for you to consider something similar in your education and training space? A robot (or an automated system) for every student, in every learning situation?

5. Integrating New Technologies PC21	As new technologies emerge and new processes and equipment become available, technicians have the role of integrating and “commissioning.”	Create scenarios in your program where student teams are tasked with integrating or commissioning a new piece of equipment. This could include taking it out of the box and integrating it into the network.
6. Connected Devices PC18	Technicians need to learn how machines talk to each other and to the cloud and edge computing systems. It is about machines providing technicians with more accurate “actionable intelligence.”	Look for ways that you can devise learning activities to help technicians improve their knowledge, skills and abilities in the areas of standards and communication protocols
7. Welding is One Piece of the Puzzle PC27	Welding has changed to encompass more materials, lighter weight materials, and automated processes. Understanding welding as part of the process (manufacturing or otherwise) is key.	Take advantage of the professional development and instructional resources at https://www.aws.org/education/page/home and https://www.weld-ed.org/

DIGITAL SKILLS, DIGITAL MASTERY, DIGITAL TWINS, SIMULATION

Topic and Episode	Discovery	Recommended Action
8. Skilled Technicians and Farmers Yield Innovation with Digital Agriculture PC31	We don’t necessarily think of words like digital or Industry 4.0 associated with farming.	Recognize the farm today is an unique convergence of operations and information technology. Use this to create possible scenarios for your students. If you are not familiar with a concept of an indoor vertical farm, check out this TED talk
9. Digital Mastery and the Future Workforce PC19	For upskilling, companies are enhancing digital mastery using tech-enabled learning.	Ask yourself whether your program can better use tech-enabled learning to engage companies and address their needs for upskilling?
10. Technician Skills for Industry 4.0 PC17 see also Digital Twins PC8	When industry was asked to identify an important area in which technicians need better preparation, 50% said simulation , compared to only 12% of educators.	Become conversant in the language and applications of digital twins by reading this brief Deloitte Insight white paper.
11. Artificial Intelligence PC21 and PC23	It is important for people to learn about Artificial Intelligence , particularly those that are in the	Increase your own knowledge of Artificial Intelligence by taking a free online course .

	industry today or preparing students for the workforce.	Integrate AI into your program via an Intro to AI course .
12. Digital Fabrication PC24	Many gain digital fabrication skills through maker-type activities and document those skills through digital badges or micro-credentials.	Update your knowledge on approaches to digital badges and micro-credentials .
13. Technology and Education for Future Farming PC29	There are two types of technical applications in agriculture—one dealing with software and data components and another with hardware and electrical components.	Watch a mini-documentary (12 minutes) on the future of farming . Use this video scenario as a good example for your students when you discuss the importance of cross-cutting skills.
14. It's Not Just Pressing Cycle Start PC20	There is an expectation that technicians will have some level of awareness of the four major control systems in use today.	Examine your program. Does it provide hands-on experience in more than one CNC control system?
15. Digital Transformation PC10 ; see also Digital Mastery PC19	The latest new job title is, "Digital Transformation Specialist." Digital tools are moving companies forward into the future.	Adopt or adapt this Digital Transformation learning activity for your class.
INDUSTRY, FACTORY, AND EDUCATION TRENDS		
Topic and Episode	Discovery	Recommended Action
16. Every Day Is Different for a Food Technician PC30	The fast moving food processing industry creates great scenarios to use when you are trying to convince your students they need to be agile .	Create situations in your training and education environment where things change quickly and your learners have to adapt with some on the job training. Use the Instructional Cards from the Preparing Technicians website to get ideas for scenarios.
17. One of the Key Things to Measure PC3	Factory metrics are very commonly used in industry but seldom addressed in education programs.	Integrate the Overall Equipment Efficiency metric into your curriculum. Invite an industry colleague to your class to discuss how it is used.
18. Micro-credentials in Training and Education PC6	Industry may find value in shorter-term, competency-based, micro-credentials .	Ask yourself whether your program can adapt and create a relevant credential based on just a few key competencies in 9-15 credit hours.

19. Cross-functional Teams PC16	It is vitally important for technicians to gather data, present information, and balance the technical aspects of a project with the business considerations as well as perform what are considered more traditional technical skills. They also must be able to work in cross-functional teams .	Develop a project for a cross-disciplinary/cross-functional student team. (The project can be anything that requires collaboration for problem-solving or critical thinking.) Ask an industry partner to serve as an advisor with the specific goal of integrating the business implications into the project.
20. Predictive Maintenance for Automation Systems PC14	Unplanned downtime has the potential to affect customer satisfaction and company reputation, so predictive maintenance is important in a high-volume business. As data streams in from machines and sensors, technicians are in charge of capturing and acting upon that data.	Integrate more about predictive maintenance into your programs.
21. The Technician as THE Customer Interface PC11	The demand for field service technicians is rising steeply. Maintenance visits, preventive or predictive, provide a unique customer interface opportunity.	Develop those customer-centric skills in your students using the free instructional resources available from Necessary Skills Now.
22. It's All About Connected Devices PC18	The Internet of Things is bringing together Information Technology and Operations Technology—the convergence of IT and OT .	Industry is working to have less siloed IT and OT departments. Increase your awareness by reading this short article and bring together IT and OT together in a student project.
NEW SKILLS, NEW GENERATIONS OF STUDENTS		
Topic and Episode	Discovery	Recommended Action
23. Robotics Skills and Robotics Careers PC25	Automation and/or robotics program need to be really aligned with industry's desired skills and competencies? Is your program aligned and promoted as such?	Your action item is to explore https://www.roboticscareer.org/ . If you have an education and training program consider, at the minimum, submitting your program for inclusion in their database. It is free to do so. In addition, there may be real value in your program becoming endorsed.

24. Future Work, Future Technologies, Future Workforce PC26	The National Science Foundation identifies a number of areas for their future investment. These include improving access to training and education, exploring new modes of delivery, working closely with industry for incumbent training and education, and new definitions of credits and credentials.	Get involved in a proposal development effort to shape your idea or help shape the ideas of others. Align your ideas with where the agency wishes to make its investments. Developing proposals is not easy, it takes a lot of time, but it is a real professional development opportunity for you. Start with the solicitation .
25. Reinventing the IT workforce PC28	New types of learning approaches, or re-invented ones, like apprenticeships and work-based learning, are getting fresh looks by tech companies.	Get yourself up to speed on the new types of apprenticeships . Would they fit your program? Here is one example: IBM’s new collar program .
26. Agility and Resilience in the Modern Workforce PC12	Multiple industries are working together with education to create unique learning and training opportunities.	How can your program engage industries from other sectors to increase opportunity for students and workforce capacity? Look at this example from one college industry partnership .
27. Education Industry Partnerships PC5 and PC20	Manufacturing is no longer dark, dirty and dangerous. How can that perception be changed to bring new generations of students into your program and the workforce?	Ask yourself how can you be persuasive and change that perception. Learn what industry is doing to engage the future workforce through the FlexFactor and Champion Now programs.
28. Designing for Gender Equity PC4	There is a lot of talk about gender equity but achieving it in technology industries and education programs is not easy.	Consider starting small. Have you asked the women in your program what challenges and barriers they are facing or have faced? Review the idea of “designing” for gender equity here .
29. Working “Remotely” PC15	Sponsoring competitions is one way that companies attract new students to career pathways.	Can your students participate in a competition? It could be national or it could be something you develop locally. Here is one model .