




The Future of Career/Vocational Education

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ACE Academy Portland

- Mark Clifford, Director
- High School Juniors and Seniors
- Engineering and Architecture programs





Today's Workshop

How can we transform our approach to career/vocational education spaces, to better prepare students for today's careers, and the requirements of tomorrow's careers that are not yet fully defined?





Today's Workshop

What spaces and resources are needed to prepare students for creative, service, and other complex careers, compared to the industrial careers of the past?





Today's Workshop

Goal: Create a vision of vocational education in 2025, including consideration of instructional needs and physical environments.

20 min Intro presentation

45 min Exercise #1

45 min Exercise #2


45 min Group presentations

5 min Closing






Learning Objectives

- Describe current issues and trends in vocational education
 - Define their own vision of vocational education in 2025
 - Compare conflicting concepts of future vocational needs, and the school's role in bridging the gap between high school and college/career
 - Apply this vision to inform planning and design decisions relating to current or future vocational education spaces
- 

Evolution

	1900-1940	1940-1960	1960-1980	1980-2000	2000-2020
ERA	Mass Production, Automation	Atomic Age	Miniaturization	Digital/Information Age	Conceptual/Creative/Collaboration Age?
LEGISLATION	Smith-Hughes Act 1917 Ag, Home Ec, Trades George-Deen Act 1936 Distributive Occupations	National Defense Education Act 1958 Science, Math, Languages	Vocational Education Act 1963, 1972 Vocational, Business, Industrial Arts	Carl D. Perkins 1984, 1998 Workforce Needs, Tech Prep, School to Work	Carl D. Perkins 2006 - Academics, Accountability
DEGREES	3%	11%	24%	29%	32%
GOALS	Apprenticeship/Job Placement			Multiple Opportunities	
FOCUS	Career-Specific Skills			Generic/Transferable Skills	



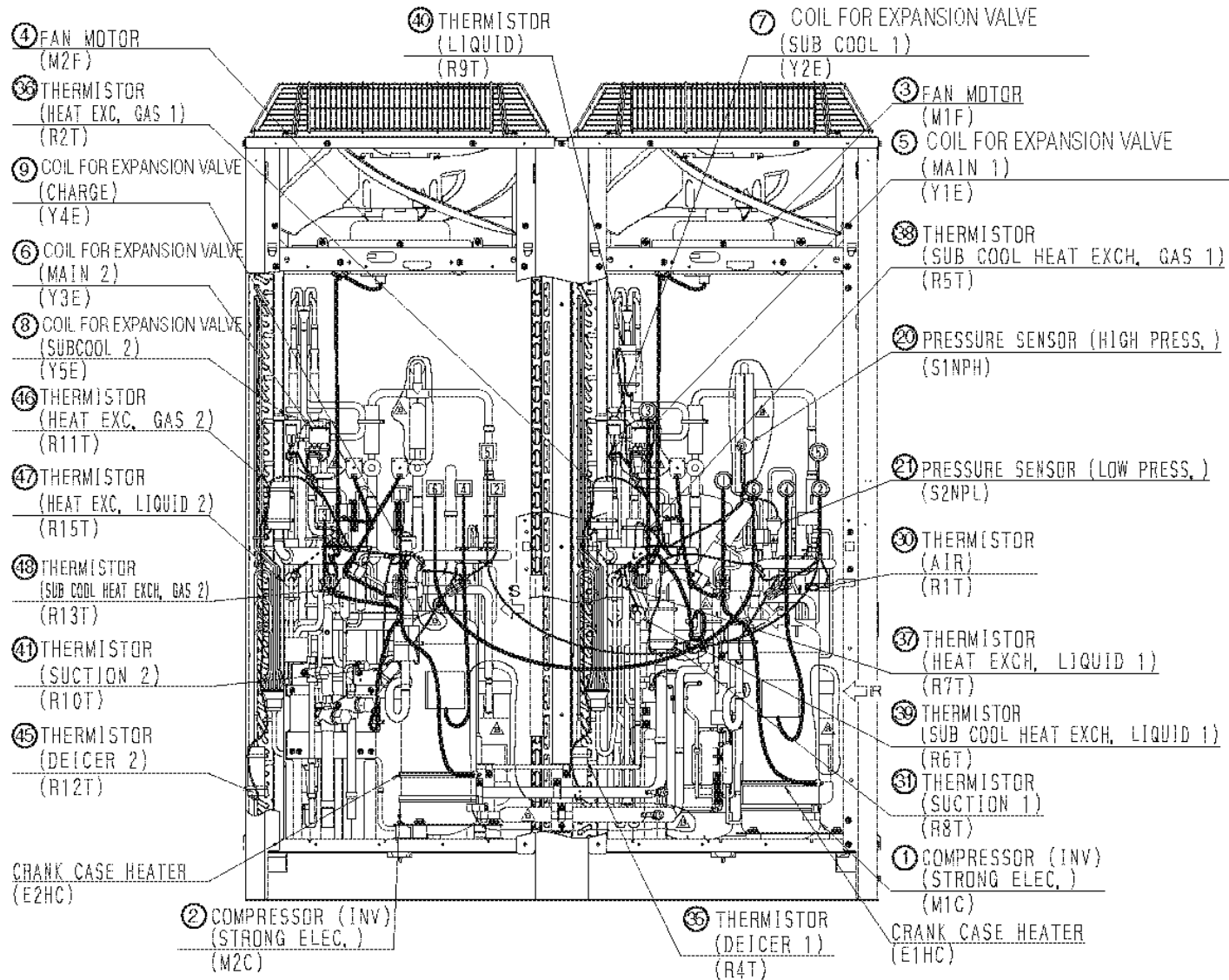
The ever-popular myth of the hard worker who can't read well or divide fractions but owns his own air-conditioning repair company is just that—a myth.

Ross Wiener, The Education Trust

How the Federal Government Could Promote Academically Rigorous Career and Technical Education



Evolution



Evolution: Automotive



Manual Training lab works
on an automobile frame,
1918

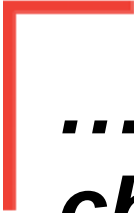


Automotive mechanics,
1960s

Evolution: Automotive



<http://www.csmonitor.com/Innovation/Tech/2010/0524/West-Philadelphia-high-school-dares-to-build-a-100-m.p.g.-car> ,
<http://live.gfalls.wednet.edu/ecoteams/>

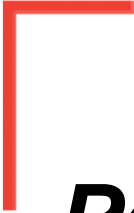


...the mission of CTE will have to change... The goal of CTE 2.0 should be that students earn a postsecondary credential or an industry-recognized certification ... a career-ready student must also have... critical thinking and problem-solving skills, an ability to synthesize information, solid communication skills, and the ability to work well on a team.

Arne Duncan, U.S. Secretary of Education


21st Century Survival Skills

- Critical Thinking and Problem Solving
- Collaboration across Networks and Leading by Influence
- Agility and Adaptability
- Initiative and Entrepreneurialism
- Effective Oral and Written Communication
- Accessing and Analyzing Information
- Curiosity and Imagination



Perhaps CTE's greatest contribution has been to make education relevant and keep students motivated and engaged in learning.

Betsy Brand, Director, American Youth Policy Forum
What a 21st Century Career and Technical Education System Could Look Like



Varied Programs



Varied Programs



Biological Lab Technician
Diagnostic Sonographer
Electrocardiograph Technician
MRI Technician
Phlebotomist
Radiologic Technologist, Aide
Direct Care Aide
Acute Care Nursing Assistant
Chiropractic Assistant
Basic Medical Assistant
Dental Assistant, Hygienist
Dental Laboratory Technician
Emergency Medical Technician
Feeding Assistant
Fitness Specialist
Home Health Care Assistant

Long Term Care Nursing Assistant
Massage Therapist
Medication Aide
Medical Assistant
Occupational Therapy Aide/Assistant
Prosthetic/ Orthotics Technician
Physical Therapy Aide
Physical Therapy Assistant
Restorative Aide
Student Athletic Training Aide
Surgical Technologist
Veterinary Assistant
Vision Care Technician, Assistant
Respiratory Therapist
Pharmacy Technician, Aide
Medical Office Specialist

Varied Programs



Focused Programs

The image is a screenshot of the ACE Academy website. At the top left is the ACE Academy logo, which includes a stylized 'A' and 'C' and the text 'ace academy architecture-construction-engineering'. Below the logo is the address '4222 NE 158th Avenue Portland OR 97230' and the phone number '5035469928'. To the right of the logo is a navigation menu with buttons for 'HOME', 'ABOUT US', 'CONTACT US', 'STUDENTS', and 'COMMUNITY'. On the right side of the page, the text 'ACE ACADEMY' is displayed in a large, bold, white font. Below the navigation menu is a large photograph of a group of students wearing green hard hats and orange safety vests, standing in a construction site with wooden framing. Below the photograph is a row of five small circles, with the second circle from the left being blue and the others being grey.

Focused Programs

AVIATION HIGH SCHOOL

The Premier Career and Technical School of New York City!

Directory

About Us

Alumni Resources

Students

Parents' Association
& Resources

Departments

- Arts & Music
- Aviation Maintenance Technology
- English/English as a Second Language Department
- Foreign Language
- Guidance
- JROTC
- Mathematics
- Physical Education
- Science
- Social Studies
- Special Education

School Resources

Directory › Group Pages › Departments › Aviation Maintenance Technology

Aviation Maintenance Technology



The Aviation industry offers a multitude of dynamic and lucrative careers for people who have the required academic and technical background. Every commercial, private, or military aircraft requires the careful attention of a professional maintenance specialist. This individual must be certified and licensed by the Federal Aviation Administration (FAA). Typically, entry level salaries for such positions range from between \$50,000 to \$60,000 annually. Our Aviation Maintenance Technology program will provide students with the knowledge, skills and certification required by the FAA.

The program is comprised of 1900 hours of instruction. Upon completion of the curriculum, written, oral and practical examinations, students will earn FAA airframe and/or powerplant certification ready for employment. From propeller aircraft to the space shuttle, our graduates design, fly and maintain them. Our mission is to provide our nation with qualified young professionals necessary to control the present and influence the future of the aerospace industry.

To learn more about our curriculum please click on the license area below:

[Airframe](#)

[Powerplant](#)

[FAA Testing](#)

Focused Programs



[ABOUT](#) [ACADEMICS](#) [ADMISSIONS](#) [STUDENT LIFE](#) [CREW](#) [GET INVOLVED](#) [CALENDAR](#)



CAREER AND TECHNICAL EDUCATION COURSEWORK

As sophomores, students enroll in one of six career and technical education (CTE) programs of study, which leads to industry certification in marine science or technology and includes a continuum of work-based learning experiences that extend student learning from the school classroom into a real-world, work-related context.

Aquaculture

Marine Biology Research

Marine Systems Technology

Ocean Engineering

Scientific Diving

Vessel Operations

Harbor Class



Predicting the Future

65% of grade school kids are going to have a job that hasn't been invented yet.

Gavin Newsom, Lt Governor of California
September 9, 2013



Predicting the Future

Cryogenics laboratory assistant

Laser beam operator

Holograph designer

Mutation expert

Artificial intelligence scientist

Genetic engineering salesperson

Space traffic control officer

Aerospace designer

Simulations specialist

Clone doctor and clone nurse

Teleconferencing coordinator

Automatic factory security

Organic computer engineer

Hybrid airship operator

Debugging specialist

Digitizer technician

Maser specialist

Silicon mining expert

Space geographer

Fiber optics technician

Voice-activated computer repairperson

Computer museum director

Technology transfer monitor

Remote-nursing technician

Sports engineer

Biological historian

Software coding experts

Charged-couple device technician

Abstract writer

Space shuttle repairperson

Magnetic train developer

Industry control center technician

Automatic drafting programmer

Robot retrainer

Video systems engineer

Microwave marketer

Computer art specialist

Automatic tunneling expert

Deep-well explorer

Submersible crew

Underwater archeologist

Bio-farming expert

Organ replacement surgeon

Sonar applications salesperson

Bullet train manager

Materials recycling technician

Speech compression technology engineer



Predicting the Future

Medical:

Cryogenics laboratory assistant
Mutation expert
Genetic engineering salesperson
Clone doctor and clone nurse
Remote-nursing technician
Organ replacement surgeon

Design/Graphics:

Holograph designer
Aerospace designer
Simulations specialist
Computer art specialist
Automatic drafting programmer

Transportation:

Space traffic control officer
Hybrid airship operator
Bullet train manager
Magnetic train developer
Space shuttle repairperson

Technology:

Artificial intelligence scientist
Organic computer engineer
Debugging specialist
Digitizer technician
Software coding experts
Voice-activated computer repairperson

Business:

Teleconferencing coordinator

Natural Resources:

Deep-well explorer
Bio-farming expert
Materials recycling technician
Silicon mining expert
Biological historian
Space geographer





Predicting the Future

- Carbon Capture Technician
- Mining Resource Specialist
- Aquaponic Fish Farmer
- Biofilm Installer
- Urban Farmer
- Health Care Navigator
- Robot Counselor
- Makeshift Structure Engineer

Predicting the Future

Table 1.3: Fastest growing occupations, 2012 and projected 2022
(Numbers in thousands)

2012 National Employment Matrix title and code	Employment		Change, 2012-22		Median annual wage, 2012 ⁽¹⁾
	2012	2022	Number	Percent	
Personal care aides	1,190.6	1,771.4	580.8	48.8	\$19,910
Home health aides	875.1	1,299.3	424.2	48.5	\$20,820
Interpreters and translators	63.6	92.9	29.3	46.1	\$45,430
Diagnostic medical sonographers	58.8	85.9	27.0	46.0	\$65,860
Physical therapist assistants	71.4	100.7	29.3	41.0	\$52,160
Physical therapist aides	50.0	70.1	20.1	40.1	\$23,880
Skincare specialists	44.4	62.0	17.7	39.8	\$28,640
Physician assistants	86.7	120.0	33.3	38.4	\$90,930
Helpers--electricians	60.8	83.3	22.4	36.9	\$27,670
Information security analysts	75.1	102.5	27.4	36.5	\$86,170
Health specialties teachers, postsecondary	190.0	258.6	68.6	36.1	\$81,140
Medical secretaries	525.6	714.9	189.2	36.0	\$31,350
Physical therapists	204.2	277.7	73.5	36.0	\$79,860
Brickmasons and blockmasons	71.0	96.2	25.2	35.5	\$46,440
Nursing instructors and teachers, postsecondary	67.8	91.8	24.0	35.4	\$64,850
Nurse practitioners	110.2	147.3	37.1	33.7	\$89,960
Dental hygienists	192.8	256.9	64.2	33.3	\$70,210
Meeting, convention, and event planners	94.2	125.4	31.3	33.2	\$45,810
Market research analysts and marketing specialists	415.7	547.2	131.5	31.6	\$60,300
Substance abuse and behavioral disorder counselors	89.6	117.7	28.2	31.4	\$38,520

Predicting the Future

Table 1.5: Fastest declining occupations, 2012 and projected 2022
(Numbers in thousands)

2012 National Employment Matrix title and code	Employment		Change, 2012-22		Median annual wage, 2012 ⁽¹⁾
	2012	2022	Number	Percent	
Postal service clerks	66.9	45.7	-21.3	-31.8	\$53,090
Postal service mail sorters, processors, and processing machine operators	129.6	91.0	-38.6	-29.8	\$53,090
Semiconductor processors	21.3	15.5	-5.8	-27.1	\$33,020
Textile cutting machine setters, operators, and tenders	15.5	11.3	-4.2	-27.1	\$24,050
Postal service mail carriers	295.1	215.8	-79.2	-26.8	\$56,490
Sewing machine operators	161.4	119.7	-41.7	-25.8	\$21,270
Word processors and typists	104.4	78.2	-26.2	-25.1	\$35,270
Data entry keyers	220.3	166.1	-54.2	-24.6	\$28,010
Textile knitting and weaving machine setters, operators, and tenders	21.9	16.5	-5.4	-24.5	\$26,540
Postmasters and mail superintendents	23.0	17.4	-5.6	-24.2	\$63,050
Drilling and boring machine tool setters, operators, and tenders, metal and plastic	20.9	16.2	-4.7	-22.5	\$33,940
Textile winding, twisting, and drawing out machine setters, operators, and tenders	27.5	21.8	-5.6	-20.5	\$25,850
Farmers, ranchers, and other agricultural managers	930.6	750.7	-179.9	-19.3	\$69,300
Meter readers, utilities	40.2	32.5	-7.7	-19.2	\$35,940
Computer operators	74.6	62.0	-12.7	-17.0	\$38,390
Foundry mold and coremakers	12.4	10.4	-2.0	-16.2	\$30,540
Extruding and drawing machine setters, operators, and tenders, metal and plastic	74.9	63.0	-11.9	-15.9	\$32,330
Cutters and trimmers, hand	14.2	12.1	-2.2	-15.3	\$24,530

Predicting the Future



Predicting the Future

The future of work A journey to 2022



10,000 people in China, India, Germany, the UK and the US give their views on the future of work and what it means for them

66% see the future of work as a world full of possibility and believe they will be successful

53% think technological breakthroughs will transform the way people work over the next 5 – 10 years



www.pwc.com/humancapital

Predicting the Future

There will be a major shift away from the thinking that we learn one profession, have one job and stay in it for decades.

The need for economic and environmental efficiency [will have the single biggest impact on the way we work over the next ten years]

Greater emphasis on work – life balance – more employees wanting work that fits around their life rather than focusing on a specific career path [will have the single biggest impact on the way we work over the next ten years]

Crowded urban centres will necessitate 'anywhere working' aided by technology.

Contract employment will be king. Full-time jobs will become obsolete.

2 out of 5

People around the world believe that traditional employment won't be around in the future. Instead, people will have their own 'brands' and sell their skills to those who need them.¹

Predicting the Future

Proficiencies and abilities required across different jobs and work settings.





Predicting the Future

Sense-making: *ability to determine the deeper meaning or significance of what is being expressed*

Social intelligence: *ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions*

Novel & adaptive thinking: *proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule-based*

Cross-cultural competency: *ability to operate in different cultural settings*



Predicting the Future

Computational thinking: *ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning*

New-media literacy: *ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication*

Transdisciplinarity: *literacy in and ability to understand concepts across multiple disciplines*

Design mindset: *ability to represent and develop tasks and work processes for desired outcomes*





Predicting the Future

Cognitive load management: *ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques*

Virtual collaboration: *ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team.*



The Tough Question

If exact jobs are hard to predict, and we believe students will likely have multiple jobs/careers over a lifetime, how can future CTE programs create lifelong learners with a head start on key skills?



The Future of Career/Vocational Education:


Group Exercise #1



Group Exercise #1: 45 minutes

Reverse Brainstorming Example:


- a. Real question - How to stop people from speeding on the roads
 - a. More cops, higher penalties, timed lights, etc.

 - b. Flip it – How to get people to speed on the roads
 - a. Flat, wide roads in great condition, racecar training, signs you can read while whizzing by, etc.
- 




Group Exercise #1

Reverse Brainstorming:

- a. Generate a list from your flipped example
 - b. Reverse the list into solution ideas for the original question
 - c. Evaluate these ideas – which are potential solutions, or attributes of a potential solution?
- 




Group Exercise #1

1. Select a broad career field:
 - a. Medical
 - b. Culinary
 - c. Fabrication/Engineering
 - d. Business
 - e. Agriculture
 - f. Other (need 5 people to work with you)
- 



Group Exercise #1

2. Reverse Brainstorming:

- a. Original question - How can CTE programs in x (chosen field) create valuable lifelong learners with a head start on key future skills?
 - b. Flip it – How can CTE programs in x completely fail to prepare students for the future skills and careers they need?
- 



Group Exercise #1

- 5 minutes: Pick career and scribe
- 20 minutes: Generate list for flipped question
 - **How can CTE programs in x completely fail to prepare students for the future skills and careers they need?**






Group Exercise #1

- Last 20 minutes: Reverse list into solutions for the original question, narrow down to 3-5 most compelling
 - **How can CTE programs in x create valuable lifelong learners with a head start on key future skills?**



The Future of Career/Vocational Education:


Group Exercise #2



Group Exercise #2: 45 minutes

1. Building on Exercise #1, consider:

- What will this require spatially?
 - (Type of space, space use, relationship to other things, technology, furniture, etc.)
 - How is this different from current practice?


 - 20 minutes: Generate design ideas/questions, start fleshing out your main ideas
- 



Group Exercise #2

2. Illustrate key design drivers: Use words, collage, drawings, digital media, etc. to represent your main design ideas.

20 minutes: Create a physical or digital representation that communicates your key ideas and how it is different from current practice





Group Exercise #2

3. Pick 1-2 spokespeople to do a 5 minute presentation


5 minutes: Organize your presentation, which should cover all key elements of your thinking and design in 5 minutes



**The Future of
Career/Vocational Education:**
Group Presentations



Group Presentations

- 5 minutes per group
 - What field did you choose?
 - What were your main ideas for how to create valuable lifelong learners with a head start on key future skills?
 - What will be required spatially to teach these skills? (design drivers, your concept)
 - How is this different from what is being done now?
- 

The Future of Career/Vocational Education:

Wrap-up



Thank you!

Dekker/Perich/Sabatini
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<http://www.acecharterschool.org/>

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