

Roundtable News

The Future of Work

Rise of the Robots: Workplace Fantasy or the Future of Jobs?



Roundtable's "Lifelong Learners" - members since 2007. (l to r) Michael Gorman, Margaret Hayes, Janet Robinson, Claire Sheff-Kohn, & Gerald Kohn

Paul Zinni (Avon, MA) and Michael Gorman (Carneys Point, NJ) boiled down data-heavy presentations on the Future of Work during the Roundtable's July meeting into simple terms: "Where do we go with our students when we don't know where the world is going?" asked Zinni. Gorman agreed: "Some say the sky is falling, others that there are clouds on the horizon. And we also hear the sky is clear. What are we to believe?"

What does lie ahead in the world of work? A dystopian future, in which millions are rendered unemployable by robots? More of the same, in which

machines replace some jobs while creating others? Or something in between, in which a limited number of high-income jobs go to the well-educated, while many make do with low-income service jobs or temporary and part-time "gigs" without benefits?

Each of these outcomes is possible. And each comes with significant implications not just for young people, but for society and school leaders. This Roundtable meeting, held amidst celebrations of NSR's 10th anniversary, was designed to help clarify the debate about the world of work while exploring K-12's response options.

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(l to r) Zeek Edmond, Jessica Stella & Dan Voelpel describe successful turnaround of Stewart Middle School, Tacoma, Washington

THE RISE OF THE ROBOTS

While acknowledging that economists are skeptical that a workplace revolution is on the way, Martin Ford, author of *Rise of the Robots* argued that robots and artificial intelligence will put millions of people out of work in the foreseeable future. It is time, he said, to contemplate a guaranteed income for people put out of work.

Look at the recent past, suggested Ford (r). In 1998, Americans put in 198 billion hours of labor. By 2015, output increased 40%, but Americans put in just 194 billion hours of labor.

What's different today, he emphasized, is that we are witnessing exponential growth (Moore's law that computing power will double ever two years while costs are cut in half) tied to artificial intelligence meaning that algorithms can wade through vast amounts of data so that machines can learn.

Think of the introduction of electricity, he urged. Electrical power affected every industry and every occupation. Just as electricity touched everything, so will artificial intelligence. What this means, he said, is that new and emerging industries are not labor intensive. In 1979, General Motors employed 840,000 people to earn \$11 billion (in 2012 dollars). Google earns 20% more than GM (\$14 billion in earnings) with just 38,000 employees.

Old industries, of course, offered lots of opportunities for people with average skills. New industries offer fewer job opportunities, many reserved for elites.

From 1950 to 2010, lamented Ford, productivity increased 254%, but hourly compensation lagged behind – just 115%. Until 1973, he said, compensation moved in tandem with productivity growth, but there's been a sharp divergence since (see p. 5). Labor's share of national income has shrunk from 65% in 1950 to 58% in 2010. (to p. 5)



ARMAGEDDON HASN'T ARRIVED YET

Two separate presentations took issue with Ford's position, one from Josh Bivens of the Economic Policy Institute (r) taking sharp exception to Ford's analysis, the other from economists at the Department of Labor's Bureau of Labor Statistics who indicated that the evidence for widespread job displacement by robots has yet to show up in BLS models.

Bivens and his colleague Lawrence Mishel of the Economic Policy Institute (EPI) are firmly in the camp of those who believe alarm about job losses due to automation is over-wrought – and diverts attention from real issues of outsourcing of American jobs and a focused assault on unions and the bargaining power of low- and middle-

wage workers. "Worry less about robots," said Bivens, "and more about workers' bargaining power."



Bivens, EPI's director of research, argued the estimated impact of robots is small, that automation does not explain labor market trends, that there is no evidence that automation has had a large effect on employment, and that, in

recent years, the adoption of automation has actually been quite slow.

In a complicated argument, Bivens claimed that average annual growth in labor productivity and capital investment has slowed since the turn of the century. In addition, although the average payroll employee generated \$37,000 in 1948, that employee generated in constant dollars \$137,000 in 2016, without leading to plummeting employment, despite a four-fold increase in productivity.

Why is that so, asked Bivens? Because the market and institutional channels funnel productivity growth into more demand, which (to p. 4)

ROUNDTABLE'S TENTH ANNIVERSARY

The tenth anniversary celebration found awards going to several ten-year members: Carol Choye, Michael Gorman, Margaret Hayes, Doug Hesbol, Gerald Kohn, Janet Robinson, Claire Sheff-Kohn, & Les Omotani along with special recognition of Matt Krise, Peter Negroni & Nelda Cambron-McCabe for their years of service to the Roundtable.



DEVELOPING YOUNG PEOPLE'S SKILLS AND COMPETENCIES



Above: IEL's Johan Uvin

Below: Mark Steblik, Carnegie-Mellon University

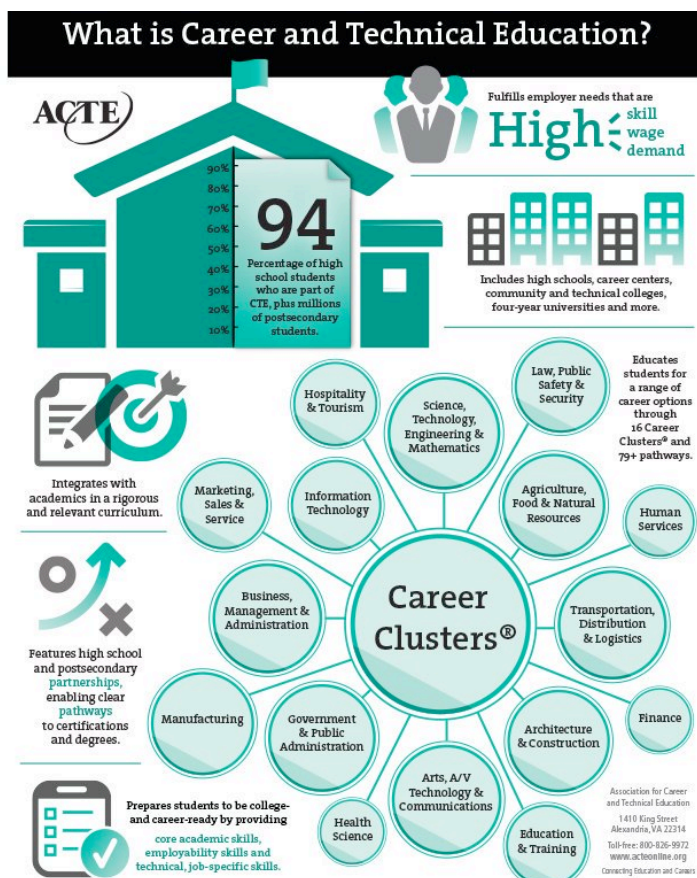
A persistent theme throughout the meeting was the need to reshape high school curriculum to meet emerging needs. A common constellation of changes was suggested. Johan Uvin from the Institute for Educational Leadership, a long-time federal official concerned with career and technical education, provided an impressive intellectual framework for the discussion. He wanted to “get a few things off his chest”:

- I am “so done” with this false dichotomy between college and career.
- The purpose of going to high school has been reduced to getting ready to go to college.
- Mid-career people needing retraining have been ignored.
- Fully 40% of first-time full-time students do not graduate from college in 4 years.
- The first question we need to ask is what skills and competencies do employers seek?

- The second is, what is the most effective way to develop them?
- The third is who are the teachers who can provide them?
- Finally, how do we assess the outcomes so that students have mastered these competencies?

Uvin urged educators to provide multiple options for students. Although corporations value academic assessments, typical tests are no guarantee students are ready for employment. Work-based and internship learning is something that’s “nice to have,” said Uvin, when it should be considered essential for developing employability skills. The graphic below (from the Association for Career & Technical Education) outlines many of the career clusters available that might be pursued through K-12 and community college partnerships.

The common elements describing the Henry Ford Early College Life Sciences Program, the P-TEP program of IBM, and others involve counseling (*to p. 6*)



ARMAGEDDON IS NOT HERE YET

boosts employment.

Conceding that technology can be especially tough on some workers, Bivens insisted that very little evidence exists showing that technology has played a serious role in the near-stagnation of wages for non-college-educated employees.

Employment Projections

Bivens' position received a vote of confidence of sorts from two economists from the Bureau of Labor Statistics. Kathryn Laurence and Richard Graham (below) formed an impressive tag team providing the Roundtable with insights into the occupational outlook in the United States according to BLS's bi-annual job projections.

For many years, BLS has anticipated that the economy will produce more low-skill than high-skill jobs, the very occupations most at risk from automation. BLS's latest statistics, for example, anticipate that jobs in computers and mathematics will grow by 13% between 2014 and 2024, faster than jobs in food preparation (+7%).

But, since the technical jobs are growing from a much smaller base, additional jobs over the decade in relatively low-skill and low-wage jobs (that do not require a four-year college degree) will far exceed those requiring four years of college.

BLS is a goldmine of information on employment and these two experts



helped us mine the data. The agency's employment outlook consists of 10-year projections updated every two years. The 2014-24 projections address the national level only and cover more than 800 occupations and 300 industries.

The projections assume a full employment economy with unemployment rates of 5.2%. If that rate is badly off, the projections are likely to be tainted, but the direction of employment is still likely to be accurate.

By Industry. BLS makes projections by industry and by occupation. It's not the case that financial services hire only bookkeepers and clerical help while forestry and fishery hire only rugged outdoors employees. Financial services need all kinds of employees handling administration and marketing while forestry and fishery industries also require accountants and clerical help.

From 2014 - 2024, BLS anticipates that:

- employment will grow by 9.8 million, slightly more than the prior decade;
- manufacturing will demonstrate the largest output in dollars (\$6.3 billion)
- financial services will generate \$3.9 billion;
- health care, state and local government, and professional and business services will each generate more than \$2 billion;
- service providing industries will provide the *most employment*, with state and local government leading the way (19 million + jobs);
- the greatest number of *new jobs* will be found in health care and social assistance (3.8 million);
- private education, construction, and health care will each grow between 1 and 2 percent; and
- employment in information technology, manufacturing, utilities, and the federal government is likely to decline in the 2014-24 decade.

By Occupation. In terms of occupations, BLS anticipates that:

- office and administrative support (22.7 million jobs) and sales (15.4 million) are the largest occupational groups;

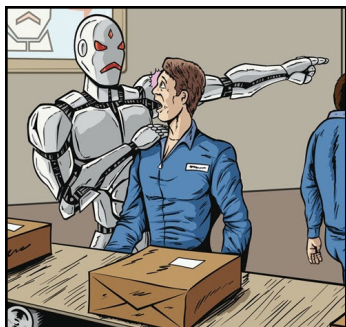
- education, training, & libraries (9.2 million jobs), management (9.1 million), and healthcare (8.3 million) are in the mid-range of occupational groups.
- farming, fishing, and forestry are the smallest occupational group (just 972 thousand jobs);
- jobs in healthcare will grow fastest (up to 23%), while jobs in production and farming, fishing, and forestry will decline (between 3 and 6%).
- 4 out of 5 of the fastest growing occupations are related to healthcare -- home health aides, physical therapist aids, physical therapists, and occupational therapists, with median annual wages between \$22,600 (home health) and \$59,000 (occupational therapy).
- Many declining occupations are being automated: locomotive firers, electronic equipment installers, telephone operators, postal mail sorters, switchboard operators, shoe machine operators, manufactured and mobile home installers, and sewing machine operators all decline by between 27 and 70%.

Laurence and Graham emphasized that projections of job openings are based on accounting for both employment growth and replacement needs. As a result, there are job openings, even if limited, in declining fields.

What does this mean for education? First, education still pays off. The median annual wages for a Ph.D. or professional degree holder are more than \$100,000. A high school dropout is likely to earn about \$21,420 on average. The fastest growing occupations are those that need higher levels of education -- a postsecondary degree of some kind. Higher education attainment also leads to lower unemployment rates.

What about robots? Self-employment? The "gig" economy? These factors had not shown up in the 2010-2012 years analyzed, but perhaps they will soon, said Laurence and Graham.

RISE OF THE ROBOTS (CONT'D)



Globally, in the search for profits, we've destroyed unions, said Ford—and we see the same dynamics at work in Japan, China, Germany, China, and Britain. So although the number of months required to recover from a recession in the 1970s was just 12, it took 76 months to climb out of the Great Recession of 2007.

The potential for change exists across the board, he noted. It might take a human being half a minute to grab and move a box, a machine can do the same job in seconds – and never tires, demands a break, suffers an injury, or insist on a vacation. And a robot can be tossed aside when broken without workman's com-

pensation or unemployment insurance claims. It used to take about 120 people per billion dollars of revenue to manage finances in large corporations; today the same job can be performed by 71 people.

What do do about this situation? Only governments and people can purchase things. If consumer purchasing power evaporates, the economy will collapse. In the short run, urged Ford, we should enhance the safety net so that people can eat, clothe their children, and keep a roof over their heads.

In the long run, he said, we should decouple income from jobs. He recommended a guaranteed basic income that incorporated incentives for education. Experiments along these lines are already apparent in Finland, the Netherlands, and even parts of the United States. Ford was the first speaker to recommend radically reshaping curriculum to meet the new demands of the times – not around STEM education, but around emphasizing vocational programs and school curriculum promoting empathy and creativity.

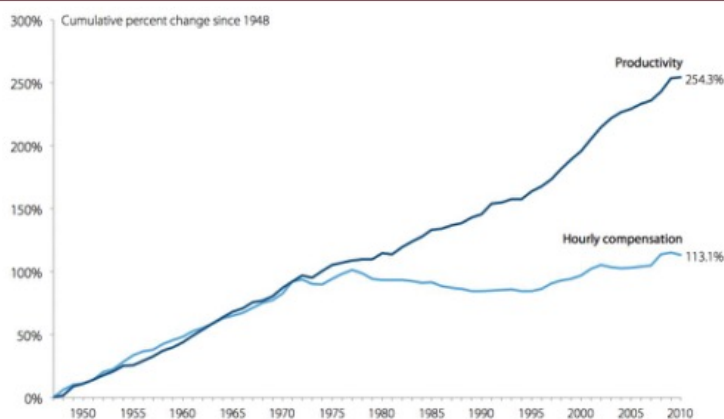
**Jobs by Education Credential, 2014**

Credential	# of Jobs
H.S. Diploma	54.9 million
No credential	40.8 million
Some college	3.8 million
Postsec. non-degree	9.0 million
Bachelor's	31.8 million
Master's	2.5 million
Doctoral/ Professional	4.1 million

***Above** The big fear*

MARTIN FORD: U.S. PRODUCTIVITY V. COMPENSATION, 1950 - 2010

U.S. Productivity vs. Compensation



Source: US: Economic Policy Institute; UK: HM Treasury & Office of National Statistics

DEVELOPING SKILLS AND COMPETENCIES (CONT'D)

and mentoring, team learning and assessment, along with an emphasis on strong technical competencies, employability skills, a focus on work-based learning, and a willingness to accept every interested student and commit to their success. Several programs deal with the pain of college tuition by offering dual enrollment that essentially provides free tuition.

A Fourth Industrial Revolution

Carnegie-Mellon's Mark Stehlik approached the issue in a different way but wound up also calling for rethinking high school preparation. Stehlik works with Pittsburgh high schools to develop coding skills. He is involved with Kevin Wang of Microsoft who developed the TEALS program (<http://tinyurl.com/y87fraue> - Technology Education and Literacy in Schools) that now works with 9,000 students in 225 schools in 25 states.

We are entering a fourth industrial revolution, said Stehlik. The first, in the

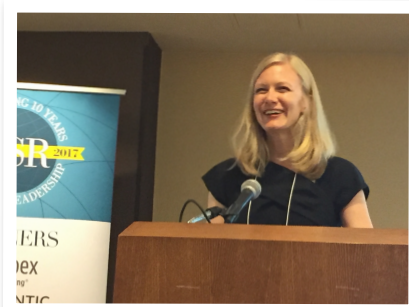
18th century harnessed water and steam; the second in the 19th was built on electricity and steel; the third in the 20th brought us the internet and the home computer; and the fourth is made up of ubiquitous computers, artificial intelligence, and robotics.

This revolution is already producing driverless, autonomous cars, better kidney exchange markets, and automats replacing actors.

How do we prepare our kids? "Computer science," he declared in a lively presentation, "must be understood as a fundamental 21st-century skill." Beyond that we need a school emphasis on ethics to create an informed public, along with a focus on developing problem-solving skills, and programming (problem-solving on a computer).

Former teacher Christy Johnson (r), who now leads her own consulting firm, Artemis Connection, briefed the Roundtable on what Silicon Valley

entrepreneurs seek in new employees destined for leadership roles. Work is



changing, she noted, with more emphasis on flexibility, free-lance, and temporary work. She hears calls for continuous professional development, STEM fundamentals, creativity, grit, and complex problem solving, along with basics of math, science & technology, and higher levels of human thinking and emotional engagement.

Above all, the ability to collaborate, and willingness to keep learning will define job success in the future.

TURNING AROUND STEWART MIDDLE SCHOOL



Stewart Middle School, Tacoma, Washington is a handsome structure. Put up in 1924 and completely renovated in 2017, the physical renovation matched a remarkable academic turnaround.

Principal Zeek Edmonds, language arts teacher Jessica Stella, and district communications director Dan Voelpel led the Roundtable through a dazzling school comeback story. In 2014, Stewart ranked 1,779 out of 1,801 schools in Washington state, according to an index measuring test scores and student growth. A 50-minute documentary, partially screened at the meeting, focused on one school year, *178 Days: Confronting a History of Failure*. It followed the school's turnaround in the 2014-15 school year and documented the painful decisions required for progress.

The pain paid off. Stewart climbed up to the middle of state rankings, 1,196 out of 1,801 schools.

What paid off? An emphasis on data by administrators, teachers, and students. Students owned their own performance data, said Edmonds. Kids like to compete and the competition to improve themselves meant a lot, reported Stella. We had math, reading, and science every day using common binders for each kid and common planning sessions, along with standards-based grading, reported Edmonds. Plus here we had a school nicknamed the Panthers without a mascot. We created one to restore some pride in the school, smiled Edmonds, who comes across as an accessible, non-nonsense leader one would be reluctant to cross.

The binders drew a lot of interest. These were common binders that made sure each student had everything they needed in each class. All the materials organized in the same way so that old excuses (I don't have a pencil) went by the board. We emphasized, said Edmonds, that "Life begins at 3.00." That is: Colleges won't look at your application unless you present them with a 3.00 GPA. The full story is vividly told in the movie, *178 Days* at: <http://www.thenewstribune.com/news/local/education/article148114039.html>

SUPERINTENDENTS SPEAK

Asked to comment on what they had heard during two separate breaks for discussion led by Christine Mahoney (East Granby, CT) and Theresa Rouse (Joliet, IL) superintendents had a lot to add:

- we are not prepared for the challenge, but we're looking at what CTE needs to be;
- in our state, districts with corporate partnerships seem to be further along;
- we don't know what is out there but are emphasizing the four C's - communication, collaboration, creative thinking, & critical thinking;
- what is the support teachers need to develop the 4 C's?
- we need to worry about whether students and parents understand the disruption ahead; better understanding by parents would shift perceptions;
- if kids can communicate, analyze, calculate and think, everything else falls into place;
- we have kids who can ace tests but can't get through an interview;
- Carnegie model changing, need to embed technology in liberal arts and enhance internships;
- need to move away from Carnegie units to mastery-based learning.
- need to let the community see what the future looks like;
- need retraining for adults in 2nd & 3rd careers.
- communities all see it in different ways. One of our music teachers went into community and found 5 business without commercials. Students wrote commercials and the music and gave them to the businesses;
- Perkins advisory committee and getting teachers out into world of work help;
- how can we take all this data and use it back home?
- Need to worry about equity ahead of accountability.
- different pathways essential. Our state emphasizing either career *or* academic models;
- if we don't tackle the whole technology piece, future for our children is at risk. Need to shake up local leaders on need for response.
- taking model of 5th year (early start) looks promising.
- extremely valuable and complex topic to focus our attention.
- on return home: we need to shake up community and bring awareness to our staff and local leaders.

MEETING MOMENTS



Top: Christine Mahoney, who helped host the meeting, leads discussion

Middle: Jill Gildea, Greenwich, CT, (r) with Christy Johnson

Bottom: Nelda Cambron-McCabe accepts award from James Harvey for 25 years of service to superintendents

Curriculum & the Classroom of the Future

A number of ideas were put forth at the July meeting to make K-12 programs more relevant to work of the future. Among them:

- Computer science as an essential 21st-century literacy
- More emphasis on work-based learning
- An emphasis on learning how to learn
- Ten skills for the workforce: sense-making; adaptive thinking; computational thinking; transdisciplinary thinking; cognitive load management; social intelligence; cross-cultural competency; new-media literacy; a design mindset; collaboration, including virtual collaboration.
- More wraparound services
- Apprenticeship programs
- Dual enrollment efforts
- School-community partnerships
- Embed assessment in asking students to show they can do the work
- Develop complex problem-solving skills
- A willingness to keep learning

No one claimed that adopting these ideas would be easy, but there seemed to be widespread agreement that current accountability-based approaches emphasizing traditional testing will not get us where we need to be.

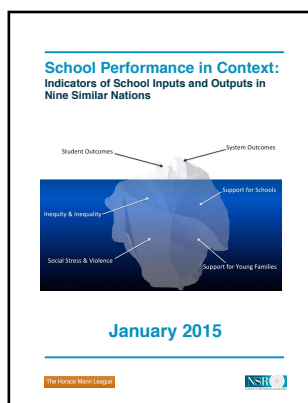
All of the videos and speakers' presentations from the meeting can be downloaded here:

https://www.dropbox.com/sh/cxrosygzrgtex9I/AAD55gt-q_qxxds6SRVIPkaMa?dl=0

The Iceberg Effect

The Roundtable's pathbreaking report, *School Performance in Context* (aka *The Iceberg Effect*), took issue with the conventional wisdom that American schools are failing by exploring 24 indicators of school success, including student outcomes, in nine advanced economies.

Published in 2015 and made available to 19 million people in newspaper articles and television accounts, the report has helped define a new way of thinking about schools. It can be downloaded for free here:

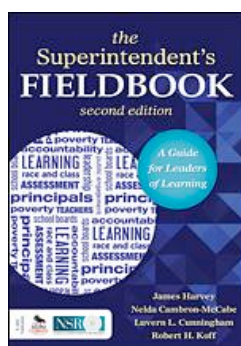


Superintendent's Fieldbook

Best-selling text developed by four Roundtable members.

Available from Corwin Press at:

<http://tinyurl.com/ycxf54et>

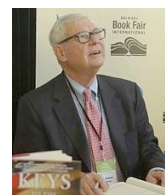


Fall Meeting

Education for Democracy

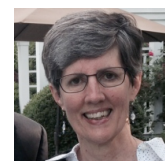
San Francisco, Oct. 27-29, 2017

Featured Speakers



BOB GRAHAM

Former Florida governor & U.S. Senator; Author: *America - An Owner's Manual*.



SARAH MONDALE

Producer: "Backpack Full of Cash," narrated by Matt Damon



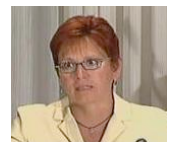
RICHARD KAHLBERG

The Century Foundation; co-author "Putting Democracy Back into Education."



CLIFFORD JANEY

Experienced superintendent in Rochester, NY; Washington, DC; & Newark, NJ. Co-author "Putting Democracy Back into Education."



NANCY KOBER

Center for Education Policy; to analyze Founders' vision for public schools



BILL PURCELL

Former director Institute of Politics at Harvard; to analyze media's impact on public perceptions.

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