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The Upshot

ROBOT REVOLUTION

How to Prepare for an Automated Future

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We don't know how quickly machines will displace people's jobs, or how many they'll take, but we know it's happening — not just to factory workers but also to money managers, dermatologists and retail workers.

The logical response seems to be to educate people differently, so they're prepared to work alongside the robots or do the jobs that machines can't. But how to do that, and whether training can outpace automation, are open questions.

Pew Research Center and Elon University surveyed 1,408 people who work in technology and education to find out if they think new schooling will emerge in the next decade to successfully train workers for the future. Two-thirds said yes; the rest said no. Following are questions about what's next for workers, and answers based on the survey responses.

How do we educate people for an automated world?

People still need to learn skills, the respondents said, but they will do that continuously over their careers. In school, the most important thing they can learn is how to learn.

At universities, “people learn how to approach new things, ask questions and find answers, deal with new situations,” wrote Uta Russmann, a professor of communications at the FH Wien University of Applied Sciences in Vienna. “All this is needed to adjust to ongoing changes in work life. Special skills for a particular job will be learned on the job.”

Schools will also need to teach traits that machines can’t yet easily replicate, like creativity, critical thinking, emotional intelligence, adaptability and collaboration. The problem, many respondents said, is that these are not necessarily easy to teach.

“Many of the ‘skills’ that will be needed are more like personality characteristics, like curiosity, or social skills that require enculturation to take hold,” wrote Stowe Boyd, managing director of Another Voice, which provides research on the new economy.

Can we change education fast enough to outpace the machines?

About two-thirds of the respondents thought it could be done in the next decade; the rest thought that education reform takes too much time, money and political will, and that automation is moving too quickly.

“I have complete faith in the ability to identify job gaps and develop educational tools to address those gaps,” wrote Danah Boyd, a principal researcher at Microsoft Research and founder of Data and Society, a research institute. “I have zero confidence in us having the political will to address the socioeconomic factors that are underpinning skill training.”

Andrew Walls, managing vice president at Gartner, wrote, “Barring a neuroscience advance that enables us to embed knowledge and skills directly into brain tissue and muscle formation, there will be no quantum leap in our ability to ‘up-skill’ people.”

Will college degrees still be important?

College is more valuable than ever, research shows. The jobs that are still relatively safe from automation require higher education, as well as interpersonal skills fostered by living with other students.

“Human bodies in close proximity to other human bodies stimulate real compassion, empathy, vulnerability and social-emotional intelligence,” said Frank Elavsky, data and policy analyst at Acumen, a policy research firm.

But many survey respondents said a degree was not enough — or not always the best choice, especially given its price tag. Many of them expect more emphasis on certificates or badges, earned from online courses or workshops, even for college graduates.

One potential future, said David Karger, a professor of computer science at M.I.T., would be for faculty at top universities to teach online and for mid-tier universities to “consist entirely of a cadre of teaching assistants who provide support for the students.”

Employers will also place more value on on-the-job learning, many respondents said, such as apprenticeships or on-demand trainings at workplaces. Portfolios of work are becoming more important than résumés.

“Résumés simply are too two-dimensional to properly communicate someone’s skill set,” wrote Meryl Krieger, a career specialist at Indiana University. “Three-dimensional materials — in essence, job reels that demonstrate expertise — will be the ultimate demonstration of an individual worker’s skills.”

What can workers do now to prepare?

Consider it part of your job description to keep learning, many respondents said — learn new skills on the job, take classes, teach yourself new things.

Focus on learning how to do tasks that still need humans, said Judith Donath of Harvard’s Berkman Klein Center for Internet & Society: teaching and caregiving; building and repairing; and researching and evaluating.

The problem is that not everyone is cut out for independent learning, which takes a lot of drive and discipline. People who are suited for it tend to come from privileged backgrounds, with a good education and supportive parents, said Beth Corzo-Duchardt, a media historian at Muhlenberg College. “The fact that a high

degree of self-direction may be required in the new work force means that existing structures of inequality will be replicated in the future,” she said.

Even if we do all these things, will there be enough jobs?

Jonathan Grudin, a principal researcher at Microsoft, said he was optimistic about the future of work as long as people learned technological skills: “People will create the jobs of the future, not simply train for them, and technology is already central.”

But the third of respondents who were pessimistic about the future of education reform said it won’t matter if there are no jobs to train for.

“The ‘jobs of the future’ are likely to be performed by robots,” said Nathaniel Borenstein, chief scientist at Mimecast, an email company. “The question isn’t how to train people for nonexistent jobs. It’s how to share the wealth in a world where we don’t need most people to work.”

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