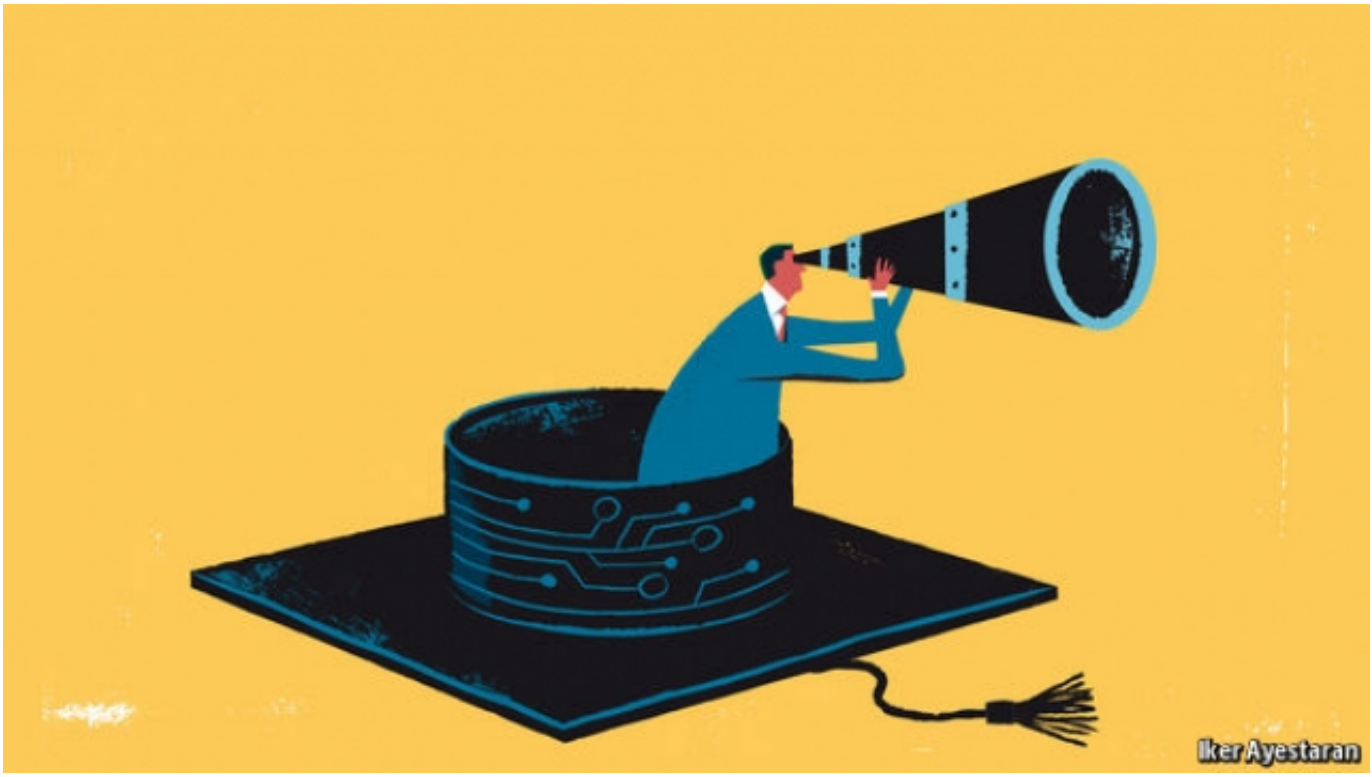
SPECIAL REPORT

Learning and earning

Lifelong learning is becoming an economic imperative

Technological change demands stronger and more continuous connections between education and employment, says Andrew Palmer. The faint outlines of such a system are now emerging



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THE RECEPTION AREA contains a segment of a decommissioned Underground train carriage, where visitors wait to be collected. The surfaces are wood and glass. In each room the talk is of code, web development and data science. At first sight

the London office of General Assembly looks like that of any other tech startup. But there is one big difference: whereas most firms use technology to sell their products online, General Assembly uses the physical world to teach technology. Its office is also a campus. The rooms are full of students learning and practising code, many of whom have quit their jobs to come here. Full-time participants have paid between £8,000 and £10,000 ($9,900-12,400) to learn the lingua franca of the digital economy in a programme lasting 10-12 weeks.

General Assembly, with campuses in 20 cities from Seattle to Sydney, has an alumni body of around 35,000 graduates. Most of those who enroll for full-time courses expect them to lead to new careers. The company's curriculum is based on conversations with employers about the skills they are critically short of. It holds "meet and hire" events where firms can see the coding work done by its students. Career advisers help students with their presentation and interview techniques. General Assembly measures its success by how many of its graduates get a paid, permanent, full-time job in their desired field. Of its 2014-15 crop, three-quarters used the firm's career-advisory services, and 99% of those were hired within 180 days of beginning their job hunt.

The company's founder, Jake Schwartz, was inspired to start the company by two personal experiences: a spell of drifting after he realised that his degree from Yale conferred no practical skills, and a two-year MBA that he felt had cost too much time and money: "I wanted to change the return-on-investment equation in education by bringing down the costs and providing the skills that employers were desperate for."

In rich countries the link between learning and earning has tended to follow a simple rule: get as much formal education as you can early in life, and reap corresponding rewards for the rest of your career. The literature suggests that each additional year of schooling is associated with an 8-13% rise in hourly earnings. In the period since the financial crisis, the costs of leaving school early have become even clearer. In America, the unemployment rate steadily drops as you go up the educational ladder.

Many believe that technological change only strengthens the case for more formal education. Jobs made up of routine tasks that are easy to automate or offshore have been in decline. The usual flipside of that observation is that the number of jobs requiring greater cognitive skill has been growing. The labour market is forking, and those with college degrees will naturally shift into the lane that leads to higher-paying jobs.

The reality seems to be more complex. The returns to education, even for the high-skilled, have become less clear-cut. Between 1982 and 2001 the average wages earned by American workers with a bachelor's degree rose by 31%, whereas those of high-school graduates did not budge, according to the New York Federal Reserve. But in the following 12 years the wages of college graduates fell by more than those of their less educated peers. Meanwhile, tuition costs at universities have been rising.

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The decision to go to college still makes sense for most, but the idea of a mechanistic relationship between education and wages has taken a knock. A

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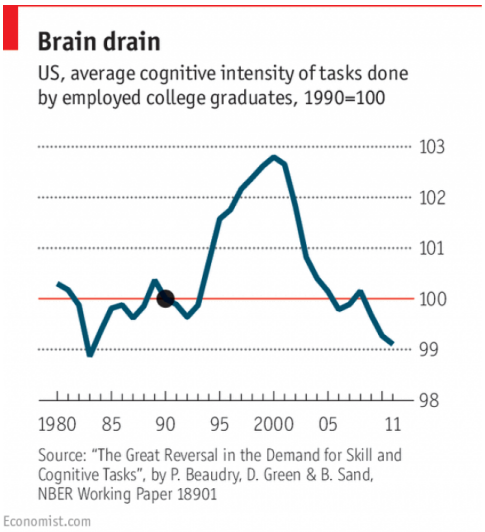
recent survey conducted by the Pew Research Centre showed that a mere 16% of Americans think that a four-year degree course prepares students very well for a high-paying job in the modern economy. Some of this may be a cyclical effect of the financial crisis and its economic aftermath. Some of it may be simply a matter of supply: as more people hold college degrees, the associated premium goes down. But technology also seems to be complicating the picture.



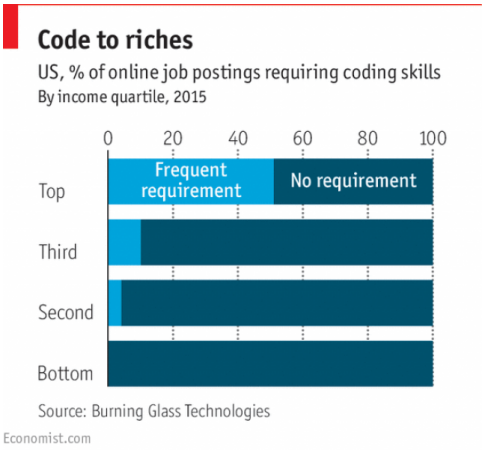
A paper published in 2013 by a trio of Canadian economists, Paul Beaudry, David Green and Benjamin Sand, questions optimistic assumptions about demand for non-routine work. In the two decades prior to 2000, demand for cognitive skills soared as the basic infrastructure of the IT age (computers, servers, base stations and fibre-optic cables) was being built; now that the technology is largely in place, this demand has waned, say the authors. They show that since 2000 the share of employment accounted for by high-skilled jobs in America has been falling. As a result, college-educated workers are taking on jobs that are cognitively less demanding (see chart), displacing less educated workers.

This analysis buttresses the view that technology is already playing havoc with employment. Skilled and unskilled workers alike are in trouble. Those with a better education are still more likely to find work, but there is now a fair chance that it will be unenjoyable. Those who never made it to college face being squeezed out of the workforce altogether. This is the argument of the techno-pessimists, exemplified by the projections of Carl-Benedikt Frey and Michael Osborne, of Oxford University, who in 2013 famously calculated that 47% of existing jobs in America are susceptible to automation.

There is another, less apocalyptic possibility. James Bessen, an economist at Boston University, has worked out the effects of automation on specific professions and finds that since 1980 employment has been growing faster in occupations that use

computers than in those that do not. That is because automation tends to affect tasks within an occupation rather than wiping out jobs in their entirety. Partial automation can actually increase demand by reducing costs: despite the introduction of the barcode scanner in supermarkets and the ATM in banks, for example, the number of cashiers and bank tellers has grown.

But even though technology may not destroy jobs in aggregate, it does force change upon many people. Between 1996 and 2015 the share of the American workforce employed in routine office jobs declined from 25.5% to 21%, eliminating 7m jobs. According to research by Pascual Restrepo of the Massachusetts Institute of Technology (MIT), the 2007-08 financial crisis made things worse: between 2007 and 2015 job openings for unskilled routine work suffered a 55% decline relative to other jobs.



In many occupations it has become essential to acquire new skills as established ones become obsolete. Burning Glass Technologies, a Boston-based startup that analyses labour markets by scraping data from online job advertisements, finds that the biggest demand is for new combinations of skills—what its boss, Matt Sigelman, calls "hybrid jobs". Coding skills, for example, are now being required well beyond the technology sector. In America, 49% of postings in the quartile of occupations with the highest pay are for jobs that frequently ask for coding skills (see chart). The composition of new jobs is also changing rapidly. Over the past five years, demand for data analysts has grown by 372%; within that segment, demand for data-visualisation skills has shot up by 2,574%.

A college degree at the start of a working career does not answer the need for the continuous acquisition of new skills, especially as career spans are lengthening. Vocational training is good at giving people job-specific skills, but those, too, will need to be updated over and over again during a career lasting decades. "Germany is often lauded for its apprenticeships, but the economy has failed to adapt to the knowledge economy," says Andreas Schleicher, head of the education directorate of

the OECD, a club of mostly rich countries. “Vocational training has a role, but training someone early to do one thing all their lives is not the answer to lifelong learning.”

Such specific expertise is meant to be acquired on the job, but employers seem to have become less willing to invest in training their workforces. In its 2015 Economic Report of the President, America’s Council of Economic Advisers found that the share of the country’s workers receiving either paid-for or on-the-job training had fallen steadily between 1996 and 2008. In Britain the average amount of training received by workers almost halved between 1997 and 2009, to just 0.69 hours a week.

Perhaps employers themselves are not sure what kind of expertise they need. But it could also be that training budgets are particularly vulnerable to cuts when the pressure is on. Changes in labour-market patterns may play a part too: companies now have a broader range of options for getting the job done, from automation and offshoring to using self-employed workers and crowdsourcing. “Organisations have moved from creating talent to consuming work,” says Jonas Prising, the boss of Manpower, an employment consultancy.

Add all of this up, and it becomes clear that times have got tougher for workers of all kinds. A college degree is still a prerequisite for many jobs, but employers often do not trust it enough to hire workers just on the strength of that, without experience. In many occupations workers on company payrolls face the prospect that their existing skills will become obsolete, yet it is often not obvious how they can gain new ones. “It is now reasonable to ask a marketing professional to be able to develop algorithms,” says Mr Sigelman, “but a linear career in marketing doesn’t offer an opportunity to acquire those skills.” And a growing number of people are self-employed. In America the share of temporary workers, contractors and freelancers in the workforce rose from 10.1% in 2005 to 15.8% in 2015.

Reboot camp

The answer seems obvious. To remain competitive, and to give low- and high-skilled workers alike the best chance of success, economies need to offer training and career-focused education throughout people’s working lives. This special

report will chart some of the efforts being made to connect education and employment in new ways, both by smoothing entry into the labour force and by enabling people to learn new skills throughout their careers. Many of these initiatives are still embryonic, but they offer a glimpse into the future and a guide to the problems raised by lifelong reskilling.

Quite a lot is already happening on the ground. General Assembly, for example, is just one of a number of coding-bootcamp providers. Massive open online courses (MOOCs) offered by companies such as Coursera and Udacity, feted at the start of this decade and then dismissed as hype within a couple of years, have embraced new employment-focused business models. LinkedIn, a professional-networking site, bought an online training business, Lynda, in 2015 and is now offering courses through a service called LinkedIn Learning. Pluralsight has a library of on-demand training videos and a valuation in unicorn territory. Amazon's cloud-computing division also has an education arm.

Universities are embracing online and modular learning more vigorously. Places like Singapore are investing heavily in providing their citizens with learning credits that they can draw on throughout their working lives. Individuals, too, increasingly seem to accept the need for continuous rebooting. According to the Pew survey, 54% of all working Americans think it will be essential to develop new skills throughout their working lives; among adults under 30 the number goes up to 61%. Another survey, conducted by Manpower in 2016, found that 93% of millennials were willing to spend their own money on further training. Meanwhile, employers are putting increasing emphasis on learning as a skill in its own right.

This article appeared in the Special report section of the print edition under the headline "Learning and earning"

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