

RSA

21st century enlightenment

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A game of skills

What talents do young people need to thrive in the 21st century?
By **Bernie Trilling** and **Charles Fadel**

Sir Michael Wilshaw argues that teachers should not be slaves to their lesson plans

Tamara Erickson on how Generation Y is changing the face of the workplace



“TO QUALIFY FOR MEMBERSHIP IN TODAY’S WORKFORCE, YOUNG PEOPLE NEED TO DEVELOP 21ST CENTURY SKILLS”

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TACTICS FOR SUCCESS

Increased connectivity, the trend towards offshoring, the rise of a global workforce and the development of innovative manufacturing techniques are all transforming the way we live and work. What skills do we need to thrive in this changing world?

By Bernie Trilling and Charles Fadel

There have been three historic shifts in the nature of work. Workshift 1.0 landed when our wandering hunter-gatherer ancestors traded spears and baskets for homebound digging, ploughing, seeding and harvesting by hand and with animal assistance.

Agrarian-age innovations generated enough surplus food for a new collective human form to emerge: cities.

Workshift 2.0 arose in these cities. Sparks of human ingenuity generated industrial-age steam power, iron forges, factory machinery, electricity and the assembly line. They transformed horse pulling into motor horsepower; handicraft into factory fabrication; household manual work into home appliances; and horse-and-buggies into cars, trolleys, trains, ships and planes.

Workshift 3.0, the third and possibly most globally disruptive transformation yet, has been called by various names – the information era, the knowledge age, the digital millennium, the innovation epoch – but is still seeking its proper identity. We are now well into this phase and the ride is proving to be a bumpy one indeed.

We continue to feel the effects of Workshift 3.0 transformations as the aftershocks of the Great Recession shake societies everywhere: achingly high levels of youth unemployment; adult unemployment and underemployment at near Great Depression levels; fluctuating consumer demand for products and services; rising fuel, food and raw-material costs; escalating job automation, outsourcing and offshoring; and the uncertainty of finding enough high-skilled, high-tech, creative workers anywhere to grow businesses and build a secure economic future.

So, what are the realities – the ‘new normals’ – of this world and how can we ensure that we are ready for them? To answer these urgent questions, we must first explore four global changes

that are remaking life and work in the 21st century: connectivity and skills, automation and job migration, the rise of the global workforce, and innovation.

CONNECTIVITY AND SKILLS

Many of the electronic wonders of the 1950s and 1960s – transistor radios, electronic calculators, televisions and lasers – swiftly evolved into 21st century all-purpose tools such as laptops, tablets, smartphones, robotic machines, server ‘farms’ and the multimedia internet. Digital devices developed a social life, linking up and weaving a global nervous system, communications network and giant memory bank for humankind. Nearly 85% of humanity – almost six out of seven billion people – now uses a mobile phone.

In today’s interconnected world, where a mobile phone, a laptop and an internet connection provide the basis for participation in the world economy, the balance of the value chain of work has shifted from its industrial past to the so-called knowledge economy. The steps in the industrial value chain that used to result in manufactured products – extraction, manufacturing, assembly, marketing and distribution – are being superseded by steps that deliver knowledge and services, such as data, information, knowledge, expertise and marketing.

Though the mobile, laptop and internet are the entry tickets for much of 21st century work, the right skills and expertise are the real playing cards. To qualify for membership in today’s knowledge-focused workforce, young people need to develop 21st century skills. These include learning and innovation skills such as critical thinking and problem solving, creativity and innovation, communication and collaboration; digital literacy skills that develop information, media and ICT competencies; and career and life skills such as flexibility and adaptability, initiative and self-direction, social and cross-cultural fluency, and leadership and responsibility.

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>> Yet, until recently, education systems have not often placed the building of these skills on an equal par with acquiring content knowledge in a variety of core subjects and in building foundational literacy and numeracy skills. This has given rise to what has become a serious global skills gap: the gulf between the high demand for and low supply of many of these essential 21st century workforce skills.

The intimate links between a workforce with high 21st century skills performance and a higher standard of living and a healthy economy are now well understood. Countries that can quickly close their skills gaps have the real edge in building prosperous and sustainable societies.

The world is moving into uncharted territory. Knowledge work, service expertise, design innovations, vast information and image databases, 3D printing and digital fabrication, bioengineering, telemedicine, smarter homes, green energy, learning online and instant social media are reinventing the way people live, learn, work and play.

But this is by no means a utopian walk in the techno park for everyone. Many developing countries struggle to manage Workshift 1.0, 2.0 and 3.0 transitions all at the same time. More than a billion workers earn less than two dollars a day, labouring in rural subsistence farming or forming part of the vulnerable urban workforce. Many struggle with bottom-wage occasional work in the crowded slums and alleys of the world's sprawling cities.

AUTOMATION AND JOB MIGRATION

Meanwhile, a profusion of urban mega-manufacturing complexes have been springing up in developing countries. Rural subsistence farm workers continue to flock to cities for jobs and their entry into the middle class, where they may be able to afford the products made in the factories they work in.

Work in developed countries continues to swing towards on-screen service, design and knowledge work, polarising into high-skilled and low-skilled jobs. Middle-skilled workers – middle managers, bank tellers, manufacturing line workers and so on

– are increasingly finding themselves displaced by automation and software. This hollowing out of middle-skilled jobs in more developed countries, and the rise of both high- and low-skilled work, is visible in the changes in US employment since 2000.

Certain types of work are particularly vulnerable to being outsourced to lower-wage countries. Routine impersonal work, such as accounting, call centre operators and airline help desks, is already mostly offshored now and will continue to go to the lowest global bidders or move towards further automation. Non-routine impersonal work, such as medical pathologists, legal analysts and document editors, is becoming easier to offshore as specialised skills advance in lower-wage countries. Routine personal work, such as taxi drivers, cleaning services and childcare workers, remains onshore, with aspects of the work increasingly automated. Non-routine personal work, such as surgeons, CEOs and teachers, will probably remain onshore for a long time, depending on how quickly innovations such as telepresence, telemedicine, robotics and intelligent online self-service take hold.

Jobs continue to migrate around the globe, landing where the right skills are available at the right price at the right time. Even the personally delivered service jobs that remain onshore may not pay enough to support a family. It is therefore more important than ever to equip young people with 21st century skills and to ensure that they can apply them to real-world challenges.

THE RISE OF THE GLOBAL WORKFORCE

In the final decades of the 20th century, the worldwide workforce more than doubled, with vast armies of workers in China, India, Brazil and other countries joining the 21st century global labour pool. The numbers continue to grow each year.

This is increasing the level of global competition for jobs enormously, especially for routine low-skilled work that can easily migrate to low-wage countries. Global workforce expansion continues to have a profound impact on unemployment: in 2010, 6.2% of global workers were unemployed (up from 5.6% in 2007), with advanced economies suffering from unemployment

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rates of more than 8.7%, a new post-war high. Wages have also declined in two-thirds of developed countries.

To paint a more nuanced picture of global workforce dynamics, a closer look at shifting working-age populations is needed. The global working-age population is projected to reach 5.9 billion by 2050, up from its 2010 level of 4.5 billion. The largest growth will occur in the less developed economies, with growth flattening or declining in the more developed countries. More than half of the world's workers are now in Asia, mostly in lower-wage countries. A wave of low-skilled, low-wage work has already migrated to these countries, lifting millions into the

middle class. As skill levels rise, medium-skilled, mid-wage jobs are beginning to head there too.

The age structure of a country's population reveals a great deal about its social and economic dynamics. This information can help explain where public services are most needed and why youth unemployment may be a serious problem.

Countries such as Egypt and Yemen have strong youth-weighted populations: nearly 50% of Yemen's population is between the ages of 15 and 29. Other 'youth bulge' countries include Afghanistan, Algeria, Ethiopia, Iran, Iraq, Lebanon, Libya, the Palestinian Territories, Saudi Arabia, Syria, Tunisia, Turkey and Zambia.

Civic unrest is more likely when large urban youth populations that are educated and technologically proficient are confronted with a severe lack of jobs and an autocratic or corrupt government. This has been the case in Egypt, as well as in a number of the Middle Eastern and North African 'Arab Spring' countries that are now experiencing widespread civil protests.

On the other hand, a youth-dominant age structure can benefit a country when all that young talent and energy is productively harnessed into a force for economic growth. The key to reaping this advantage lies in creating economic and social policies and institutions that can mobilise young populations into productive work. A few of the Asian economies, notably Japan and South Korea, did just that in the early stages of their boom years. In doing so, they managed to boost their economic capacity, productivity and living standards.

Countries such as Japan, the UK, the US and Canada have much smaller youth populations, with population spikes in the middle age ranges. In these countries, older workers are holding on to their jobs longer because of economic uncertainty, and are not clearing the way for younger workers to step in. This is contributing to higher unemployment and underemployment among young people. Then, as large numbers of older workers eventually retire and collect their pensions and social security, younger workers must support a greater number of retirees with their earnings. This is putting severe strains on government pension programmes.

Age structure, working-age populations and large labour pool additions all contribute to the complexity of workforce dynamics and the types of workshift challenges each country must face.

INNOVATION

Let's put the challenge into perspective: the global Workforce 3.0 transformations now under way may be deeper and wider than those confronted in the move from an agrarian to >>

FELLOWSHIP IN ACTION

2020 EDUCATION

2020 Education, an RSA Catalyst-funded initiative, is working with schools to help them engage pupils in thinking about major 21st century issues such as terrorism, war, poverty, the environment and the economy.

In contrast with traditional top-down educational approaches, the initiative, led by Andrew Hadley FRSA and Nicholas Mellor, encourages young people to use social media to articulate and share responses to global challenges.

To launch the project, Hadley and Mellor organised an event for schools from the UK and South Africa to showcase successful projects. Examples included a school in Taunton whose pupils are running a Fairtrade coffee business that generates profits to support farmers in Ecuador; a school in Derbyshire that has collaborated with the International Space Station to broaden pupils' awareness of planetary issues; and a school in East London whose pupils are building mini battery-powered racing cars as a way of developing environmental engineering skills.

Hadley and Mellor hope to make the event an annual fixture and to broaden the project's geographic scope. "We've seen some creative ideas coming out of schools in Latin America, India and Africa," said Hadley. "We're keen to use the RSA's international network to help us expand into those regions."

To find out more about 2020 Education or to offer your support, visit www.youthmomentum.org/2020-education

» an industrial age more than 300 years ago. Innovations in technology and the distribution of work are revolutionising how – and how sustainably – things can be made. New career opportunities are rising in smart product design and simulation, intelligent health systems and new ‘green’ services in areas such as food production and distribution, energy, transportation and housing. Expertise and creative innovation will be in high demand in fields such as biotechnology, nanotechnology, genetic engineering, healthcare, microelectronics and environmental engineering.

A ‘fourth wave’ in the way things are made is rapidly approaching. The first wave was the harnessing of steam, electricity and machines to manufacture things; the second was the invention of the assembly line and manufacturing for the masses; and the third was the computerised automation of mass manufacturing. The fourth wave, now in its early stages, is the local design and fabrication of parts and products using desktop and small computer-controlled equipment.

Imagine designing shoes or a hearing aid on a screen based on a scan of your feet or ears and sending the design to a local fabrication shop. There, it would be printed on a 3D printer – a device made of high-tech, computer-controlled mini-glue guns mounted on a plotter that precisely squirts micro-layers of various materials to build the product – and would be ready for you to pick up the next day. When your shoes or hearing aids wear out, you could drop them off at the same local shop, where they would be recycled back into material that could be used for the next new and improved personalised design.

Smart, local, customised fabrication – with its low energy and transportation costs and its emphasis on recycling – is already present in its early forms. Indeed, basic home-use 3D printers are now available for less than £400. A new personal manufacturing ecosystem is emerging, mixing the best of artisan and mass-production techniques. At the same time, a global

online community of ‘makers’ is springing up, enabling people to share their electronic blueprint designs freely.

THE ROLE OF EDUCATION

These four global shifts in the way we work have considerable implications for education. How can schools and other educational institutions best prepare young people and adults for emerging challenges? Any country’s response depends on how well, and how quickly, it can transform a common, widespread, change-resistant industrial-age institution: education.

The science of learning is rapidly advancing, thanks to significant research contributions from cognitive psychology, neuroscience, sociology, media studies and other related fields. We now have a better understanding of the key criteria for effective learning.

First, learning needs to be put in its context. Students benefit from studying in real-world, authentic environments in which they can apply their knowledge meaningfully. Second, students need to care about what they are learning. They need to develop an intrinsic motivation to solve relevant problems and find answers to compelling questions. Third, educators need to help learners develop constructive models – whether drawing or writing – that enable students to build on existing mental models and reinforce the new perspectives they have gained through learning. Fourth, there needs to be a diversity of competences: educators must address the needs of diverse learning styles by incorporating words, thoughts, images, sounds, music, feelings and movements into their teaching. Finally, community is an essential component of education. Learning is inherently social and students benefit from discussing questions, working together on problems, gaining insight from experts, reading and seeing examples of others’ work and being part of a community of learners.

The challenge facing every education system is to apply these findings to everyday learning in schools and communities everywhere. It is high time that we transformed the existing

FROM THE ARCHIVE

THE PREMIUM AWARD SCHEME

The RSA has always encouraged individuals to turn socially progressive ideas into viable projects, from its 18th century Premium Award Scheme to today’s Catalyst fund.

At its foundation in 1754, the Society sought to promote the encouragement of arts, manufactures and commerce through a series of competitions that granted awards for useful inventions, discoveries, improvements and artistic endeavours. Men, women and children from anywhere in the world were eligible to win awards, which took the form of premiums (medals) and bounties (money). By 1757, the scheme had proved so successful that the Society decided to establish committees to preside over six categories: agriculture, manufactures, chemistry, mechanics, colonies and trade, and the polite arts.

The scheme came to an end in the mid-19th century, at which point the Society’s focus changed from offering prizes to establishing a lecture programme, publishing a journal and instigating exhibitions.

Not until April 2010 did the RSA return to an incentive-based approach to social change, with the launch of a Catalyst fund to support new or early-stage projects with the potential to tackle pressing social issues. Since its launch, Catalyst has supported more than 100 ideas, including 62 projects that have benefited from a share in £150,000 of funding.

■ *To find out more about the Catalyst fund or apply for support, visit www.thersa.org/catalyst*



“COUNTRIES THAT CAN QUICKLY CLOSE THEIR SKILLS GAPS HAVE THE REAL EDGE IN BUILDING PROSPEROUS AND SUSTAINABLE SOCIETIES”

industrial model of schooling, with its emphasis on rote learning of content and on basic literacy and numeracy skills, into an approach fit for the 21st century.

Fortunately, a number of education programmes and networks of schools around the world have evolved learning principles and practices that are more consistent with current theory and with the digital tools we now have to empower learners. These schools and programmes share a number of characteristics that are defining the shape of effective 21st century education.

Almost all of these schools have set wider learning goals that go beyond literacy and numeracy achievement. They enable students to apply academic learning to the real world, along with ongoing evaluations and assessments to measure progress towards this broader set of goals.

Many of these schools are designed as smaller learning communities. By studying in small groups, guided by a supportive advisor, students benefit from more intimate, collegial and personally meaningful learning experiences. These schools engage students in collaborative learning projects: interdisciplinary projects that are driven by real-world issues and require teamwork, time management and the presentation of project results to the public. Such projects make use of enquiry and design methods that challenge students to use on-screen and hands-on tools to devise innovative solutions to local and global problems, as well as to design their own learning plans.

Many 21st century learning programmes employ community internships and apprenticeships: guided work experiences in business and community organisations that offer students relevant skills and experience. These help students to make future career choices, develop essential work skills and apply academic content to real-world challenges.

As more learning is driven by the demands of projects and student-centred work, teachers can spend more time facilitating, mentoring and learning from students and other teachers. They can then help build a professional culture of high expectations, high-quality work, responsibility and self-direction, and a supportive culture of respect, trust, cooperation and community.

Schools, learning programmes and education systems that are adopting and integrating these practices are seeing more students graduate from higher-education and technical-training programmes. Many of their students go on to find meaningful work or to create new jobs and new kinds of work. Though the challenges are great in this time of deep and disruptive transitions, these institutions are paving the way for engaged lifelong learning, meaningful work in multiple careers and an active and responsible community life.

There is great hope and opportunity for countries and communities that take the lead in confronting the realities of a Workshift 3.0 world, transform their education systems to close the growing skills gaps, take an innovative approach to work and prepare everyone for success in life and work in the 21st century. ■

Bernie Trilling and Charles Fadel are the co-authors of *21st Century Skills: Learning for Life in Our Times*, published by John Wiley & Sons.

■ *The RSA's Education programme focuses on three overarching themes: social justice, democracy and innovation. Current projects include the development of a family of academies, the diversification of the Opening Minds curriculum framework and the implementation of an Area Based Curriculum in and beyond Peterborough. For more information, visit www.thersa.org/education*