Yidan Prize
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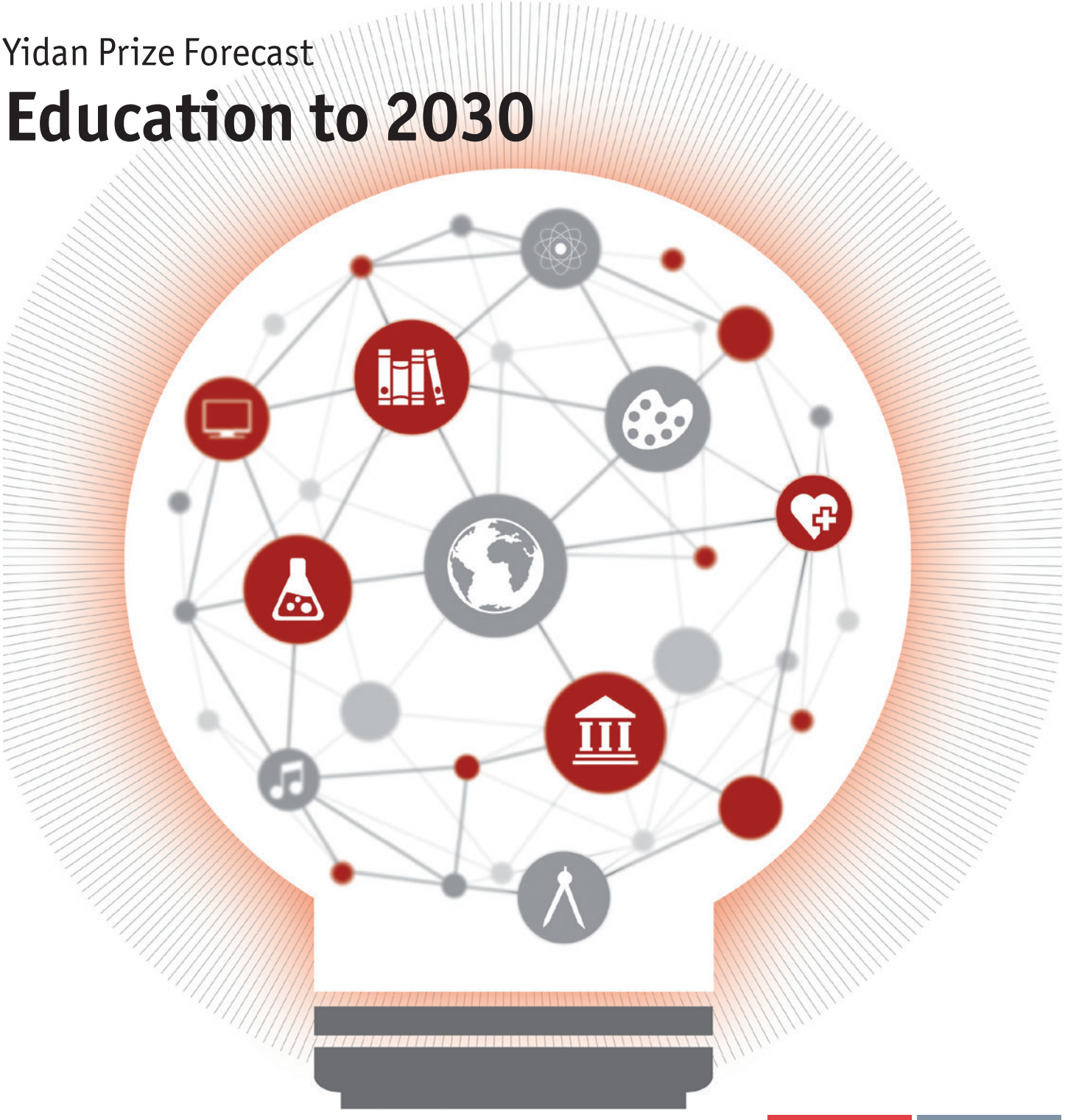
Yidan Prize Forecast

Education to 2030



Produced and written by

The Economist Intelligence Unit

Contents

Acknowledgements

The *Yidan Prize Forecast: Education to 2030* forecasts were calculated by an Economist Intelligence Unit research team led by Trisha Suresh, John Ferguson and Kai Zhang. Kathy Chen wrote the report and Chris Clague was the editor.

During the research for the writing of this report, The EIU interviewed executives and experts from across the world. Their time and insights are greatly appreciated. The EIU takes sole responsibility for the forecasts and the findings of this report.

Interviewees (arranged alphabetically by institution)

- Uri Ben-Ari, founder and president, **Athena Fund**
- Kevin Heidenreich, director foreign trade and development policy, **Association of German Chambers of Commerce and Industry**
- Caroline Wright, director general designate, **BESA (British Educational Suppliers Association)**
- Amber Northern, senior vice president for research, **Thomas B. Fordham Institute**
- Aaron Benavot, director, **Global Education Monitoring Report**
- Mahendra Vaswani, director of teaching and learning, **Hale School**
- Dave Smith, chair, Naace; ICT lead, **Havering Education Services**
- Ben Jensen, founder and CEO, **Learning First**
- Don Carlson, director-education, **Microsoft Asia Pacific**
- Andreas Schleicher, director for education and skills and special advisor on education policy to the secretary-general, **OECD**
- Miho Taguma, senior policy analyst. Early Childhood and Schools Division, Directorate for Education and Skills, **OECD**
- Rafiq Dossani, director, **RAND Center for Asia Pacific Policy**
- Preston Smith, co-founder, president and CEO, **Rocketship Education**
- Benjamin Conway, content and marketing assistant, **SAM Learning Ltd**
- Petros Lameras, research fellow, **Serious Games Institute**
- Nicole Goldin, lead author and lead economist "Toward Solutions for Youth Employment: A Baseline for 2015"
- Asma Zubairi, independent education consultant
- Qian Tang, assistant director general for education, **UNESCO**

Introduction

A combination of economic, social, and technological trends is making education more important than ever before. But those same trends are also creating stresses on budgets, the affordability of schooling and labour markets. As a result, all of the institutions involved in the provision of education—from government and the private sector to the schools themselves—will need to work together in various combinations not only to expand and improve access but to make sure that students are acquiring the skills they need.

To provide a picture of how key inputs and outcomes will change over the next 14 years, The Economist Intelligence Unit forecasted five education indicators across a mix of 25 economies.[1] The indicators are related to three trends: shifting demographics (public expenditure on education and the affordability of tertiary education), the future of work and the skills needed to succeed (youth unemployment and STEM graduates), and the use of technology (Internet access in schools). The results of the forecasts are referenced and exhibited throughout this report.

The table below provides an overview of the results, showing which economies covered by the forecasts are expected to perform best and which less well between now and 2030.

Public expenditure on education

- South Africa is projected to be spending 9% of GDP on education by 2030, a full 2 percentage points more than the next closest economies (Brazil and Finland), driven by demographics and improving incomes. One concern, however, is that even though economies like South Africa, Brazil and India spend more on education, there will be insufficient focus on the quality of the education being provided.

- Not surprisingly, the bottom of the rankings features a number of economies with shrinking and aging populations, including Hong Kong SAR, Japan, People's Republic of China (PRC) and Singapore. Other developed economies, like Norway, will experience similar circumstances, but still rank in the middle because of a high initial base of spending.

Affordability of tertiary education

- The economies at the top of this category are those where the cost of a four-year degree is the lowest relative to income per head. In Norway in 2030, for example, we forecast that cost will remain less than 1% of average annual income; in Saudi Arabia, it will be only slightly more.

- However, after the top five economies, costs begin to increase rapidly and towards the bottom, where we find economies like India, South Africa, Russia and Turkey, the cost of a four-year degree is between 200% and 500% of average incomes. It should be noted that this marks a significant improvement for some, such as India, where the figure was 503% in 2015 but declines to 263% in 2030.

[1] The forecast methodology can be found in an appendix at the end of the report.

Results overview: How economies are expected to perform to 2030

	Public exenditure on education	Affordability of tertiary education	Youth unemployment	Stem graduates in the labour force	Internet access in schools
1	South Africa	Norway	Japan	Russia	Finland
2	Brazil	Saudi Arabia	India	Australia	Norway
3	Finland	Germany	Germany	Turkey	Hong Kong SAR
4	Norway	Brazil	Norway	Israel	Singapore
5	Australia	Finland	Mexico	South Korea	Canada
6	Chile	Egypt	Singapore	France	South Korea
7	Saudi Arabia	France	Hong Kong SAR	UK	US
8	France	Israel	Israel	Hong Kong SAR	UK
9	South Korea	Hong Kong SAR	Nigeria	Finland	Australia
10	UK	Japan	US	Saudi Arabia	People's Republic of China
11	Israel	Canada	Australia	Norway	Israel
12	Mexico	People's Republic of China	South Korea	India	Russia
13	Canada	Singapore	People's Republic of China	Mexico	Chile
14	India	South Korea	Canada	Indonesia	Japan
15	US	Australia	UK	Canada	India
16	Indonesia	Nigeria	Brazil	US	Saudi Arabia
17	Egypt	UK	Turkey	South Africa	Germany
18	Turkey	Chile	Finland	Chile	Indonesia
19	Russia	Mexico	Indonesia	People's Republic of China	Nigeria
20	Germany	Indonesia	Russia	Singapore	France
21	Hong Kong SAR	US	France	Japan	Turkey
22	Japan	India	Chile	Egypt	South Africa
23	People's Republic of China	South Africa	Egypt	Germany	Mexico
24	Singapore	Russia	Saudi Arabia	Brazil	Brazil
25	Nigeria	Turkey	South Africa	Nigeria	Egypt

Youth unemployment

- As we've seen in the Middle East and elsewhere, youth unemployment has political as well as economic and social implications. Many of the economies in the top 10, like Japan, Germany, Singapore and Hong Kong, have demographics that suggest a tightening in the labour market over the next 15 years, resulting in lower rates of youth unemployment. Others, like India, Mexico and Nigeria, will be helped by strong economic growth.

- A number of economies currently facing high levels of youth unemployment will see those levels come down but still remain high. South Africa's youth unemployment rate was 57.1% in 2015 and by 2030 we project it to have fallen to 48%, the largest reduction among the 25 economies covered but still not enough.

STEM graduates

- With increasing use of technology, the jobs of the future will demand a different mix of skills. STEM (science, technology, engineering and mathematics) will feature prominently in that mix and the economies that perform best are those that, annually, graduate the most students with STEM degrees as a percentage of the overall labour force. By 2030, Russia, Australia, Israel and Turkey will see new STEM graduates equivalent to one percent or more of the entire existing labour market.

- In absolute terms, however, India and the PRC will have the most STEM graduates. In India, we forecast 1.7m STEM graduates in 2030 and more than 400,000 in China. But the size of the class is not indicative of quality, which is already a concern with India's recent cohorts of STEM grads.

Internet access in schools

- With a few notable exceptions, Internet access in schools is highly correlated with a country's wealth. In Finland, Norway and Hong Kong SAR, the Internet will reach all or nearly all schools, while in Turkey and South Africa, for example, it will be available in half or only slightly more.

- As with public spending on education, there are concerns that investment in Internet and other ICT infrastructure for classrooms could easily be wasted unless it is well-integrated in the pedagogy and teachers are given adequate training. This is an in issue in developed and developing economies alike.

Demographics

Introduction

A burgeoning middle class, rapidly aging populations and growing ranks of young people seeking work—the world is facing major demographic shifts through 2030 and beyond that will transform societies and economies, and strain the resources of developing and developed economies. These changes will also have a major impact on global education as policymakers, faced with competing priorities and limited budgets, try to figure out which programmes to fund. But education policies, implemented smartly, can also offer solutions to the challenges that will arise.

With the size of the middle class throughout the world estimated to more than double over the next 15 years, demand will grow for strong basic education and access to university, even as family sizes shrink. Graying populations will require ever-more funding for healthcare and social services. Add to that the expected entry of more than 1bn young people into the workforce over the next decade,[2] many in the least-developed economies, and "we will have reduced tax revenues and resources, but increased demand for quality education," says Ben Jensen, founder and CEO of Learning First, an education reform organization in Melbourne, Australia. "There's currently little understanding of the most cost-effective ways to achieve [education policy] goals, but I think we will see a fundamental shift in how we do policy. There will be a focus on increasing the efficiency of spending on education—on what gives you the biggest bang."

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>
> *Ben Jensen, founder and CEO of Learning First*

Andreas Schleicher, director for education and skills at the Organisation for Economic Co-operation and Development, says policymakers will also need to refocus the content of education programmes, if they are to help young people acquire the skills they need to succeed in a fast-changing labour market. "Younger workers need to be more productive if the elderly are depending on them, but school systems are not focusing on these skill sets," he says. "Overall, across borders, there will be an increased demand for skills, so generally, there will be rising demand for spending."

Not a one-way street

To address these issues, the United Nations has made education a priority in its "Agenda 2030," a set of goals that seeks to put the world on a course of sustainable development over the next 15 years. Goal four calls for ensuring "inclusive and equitable quality education" and "lifelong learning opportunities" for all. That includes making sure all girls and boys complete primary and secondary education, and achieve literacy and numeracy; and that all have equal access to affordable and quality vocational and tertiary education.[3]

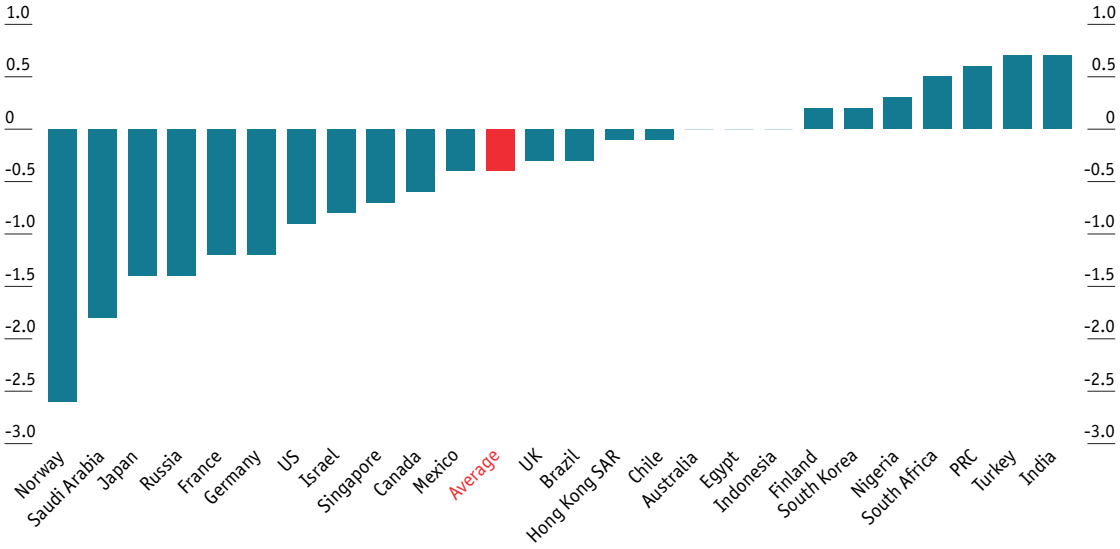
As ambitious as these goals sound, they generally align with the aspirations of the middle class. "The middle class basically survives on education," says Rafiq Dossani, director of the Rand Center for Asia-Pacific Policy under the Rand Corporation. Whether economies—especially poorer ones—are able to meet the targets is another question.

[2] *Toward Solutions for Youth Employment: A 2015 Baseline Report.* 2015. S4ye.org. https://www.s4ye.org/sites/default/files/Toward_Solutions_for_Youth_Employment_Full.pdf

[3] *Transforming Our World: The 2030 Agenda for Sustainable Development.* United Nations. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

In most high-income economies, The EIU forecasts government expenditure on education as a percentage of GDP to decrease through 2030. Declining birth rates are one cause—fewer children means less spending on education. But in economies such as the US, where healthcare and other social services for the elderly are costly, it will be important for policymakers to remember that investing in education "is not [a] one way [street]," says Mr Dossani. Young people replenish the workforce and contribute to growth and taxes, so "without the young, elderly don't have the hope to do well."

Change in public spending on education as % of GDP; 2015-2030

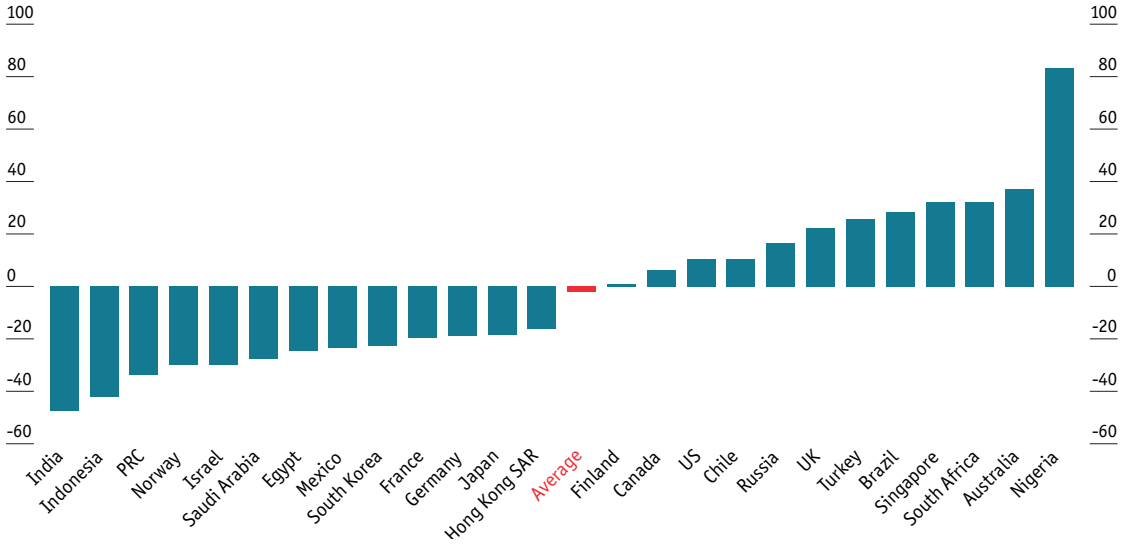


With a fast-growing middle class and a younger population, lower-income economies theoretically could be expected to spend more on education. EIU projections suggest that the world's two largest developing economies are likely to do so. India could see a 17% surge in public education spending, calculated as a share of GDP, through 2030. The PRC is expected to see an even larger jump of 26%, with the government proposing in its 13th Five-Year Plan (2016-2020) to accelerate development of education in poorer, rural areas, and to decrease the gap between urban and rural regions. China will also seek to raise the average number of years of education in its working-age population by 0.57 years to 10.8 years over this period.

The tension of tight funds and competing priorities that many economies will experience will make it all the more critical to ensure an efficient use of education budgets. South Africa and Brazil have high public expenditures on education, but educational outcomes in those economies aren't as strong as for some economies that spend less. The bottom line for policymakers, Mr Dossani believes, will be to guarantee that "resources will be there to make sure everyone gets a great K-12 education."

Public funding for tertiary education and job training may take a hit. Families in economies such as the US, Chile and Russia may feel it more as wage growth isn't expected to rise as quickly as the cost of college tuition, making education more expensive in the future. In other high-income economies where wage growth is expected to increase faster—such as Hong Kong SAR, Japan, South Korea and the UK—tertiary education may actually become more affordable.

Change in cost of four-year degree as % of annual income: 2015-2030



Among middle- and low-income economies, South Africa and Nigeria have experienced significant increases in university fees. If this trend continues against a backdrop of slow income growth, tertiary education will become more expensive. Conversely, fast-rising incomes could help moderate the cost of tertiary education in Asian economies, including Indonesia, India and the PRC, though deregulation and demand could drive larger fee hikes at better universities.

With fewer children and more disposable income, middle class families may be more willing and able to cover some education costs on their own. These include college tuition, as well as fees for private schools, tutors and cram schools—specialized schools set up to help students improve their school performance or to pass entrance exams. Students from the PRC are already flocking to Ivy League schools and other elite institutions in Western economies. The coming years could see a "huge wave" of students from emerging economies that also reaches middle-tier colleges, says Mr Jensen of Learning First.

Bridging the gap

As demand for education grows, fierce competition for places and rising education costs could perpetuate problems for the poor. A challenge for policymakers will be to ensure that quality basic and tertiary education doesn't become "the burden of households," says Aaron Benavot, director of the Global Education Monitoring Report, an editorially independent annual report published by UNESCO. "Education should be a vehicle for intergenerational mobility."

Governments can help by keeping tuition and overall fees down, and guaranteeing access to grants and income-contingent loans, such as those available in the UK and Australia. Many measures aimed at strengthening the quality of education don't require major outlays, says Mr Benavot, whether it's revising textbooks, training teachers, or offering formative assessments and adequate nutrition to students.

Opening opportunities for girls

A growing middle class bodes well for girls because parents are more likely to see the value in them attending school. In fact, girls in many developing economies have already closed the enrollment gap with boys at the primary level, though the gap widens at higher levels. Governments responding to middle class desires to secure equitable education and job opportunities for daughters will need to address barriers to their continuing education, including safety concerns, school location and the practice of child marriage.

In many developed economies, women have been outpacing men as a percentage of the higher education student population for at least a decade, and this trend is likely to continue through 2030 and beyond. In the US, women also account for a larger share of masters and doctorate students. In Jordan and some other Middle Eastern economies, women also outnumber men in universities. And they are starting to catch up in some other developing economies, including the PRC and India.[4] But generally, women's success in higher education hasn't resulted in job and pay equity.

Education for girls has gained increasing attention from philanthropists and social impact investors. For example, in a three-year pilot project in Rajasthan, India, UBS Optimus Foundation raised $238,000 from UBS clients who wanted to make investments with a social impact. The foundation partnered nonprofit group Educate Girls, with the goal of improving retention rates among girls and learning outcomes for all students in 150 of the poorest-performing schools. Forty percent of girls leave school before fifth grade, and only 15% of grade school children can read basic Hindi in the northern state.[5] Under the agreement, Educate Girls will seek to retain 10,000 girls and improve results in basic subjects for some 20,000 students. If the project is successful, the outcome payer, the Children's Investment Fund Foundation, would pay investors a return of between 7% and 13%, depending on the rate of success.

Ensuring effective use of resources is also a key consideration. In Indonesia, for example, schools receive grants from several sources but often not until the end of the school year. As a result, schools are not able to spend money on items that can help improve the quality of education, and instead use funds for such purposes as painting the building, says Asma Zubairi, an independent consultant on education. In India, the vast majority of education budgets go towards teacher salaries, but teachers are often absent from the classrooms—a problem that could be alleviated with the implementation of a tracking system to monitor teacher presence in schools.

In developing economies in Africa and Asia, low-fee private schools have sprung up in response to parents looking for a better option for their children than public schools plagued by overcrowding and teacher absenteeism. Lagos, in Nigeria, is reported to have approximately 18,000 low-cost private schools, with fees averaging about 7,000 naira (US$35) per term—compared to 1,600 government schools.[6] India, Chile and Pakistan also have many low-fee private schools.

Low-cost for-profit school chains offer another choice in major cities in Africa and South Asia, operating in a similar fashion to charter schools in the US. Bridge International Academies, backed by Bill Gates and Facebook CEO Mark Zuckerberg, among others, operates more than 400 nursery and primary schools in Africa, with plans to expand to a dozen economies covering 10m students by 2025. Schools like these enjoy more flexibility to hire and fire teachers and to control spending and have been shown in some cases to deliver similar results as public schools, but at lower cost. Critics say many

[4] http://monitor.icef.com/2014/10/women-increasingly-outpacing-mens-higher-education-participation-many-world-markets/

[5] http://www.cgdev.org/blog/first-development-impact-bond-launched

[6] "Low-Cost Private Schools: Learning Unleashed." August 1, 2015. *The Economist*. http://www.economist.com/news/briefing/21660063-where-governments-are-failing-provide-youngsters-decent-education-private-sector

such schools are unregulated and that they have the potential to increase the gap between affluent and less well-off students.

Social impact bonds—also known as development impact bonds—are also gaining in popularity. This model brings in private investors and compensates them if certain target results are achieved. Originating in developed economies to improve performance in such sectors as healthcare and criminal justice, this financing model is being expanded to the education sector in some developing economies. Typically, the private investor will bring in a non-governmental organisation to implement the plan. "You don't have a front mouse-click load of capital, but if the outcome improves, the private investor gets a profit," says Ms Zubairi. "It ties resources to results." Some educators prefer this approach over low-fee schools, costs for which can still be beyond the affordability of the poorest families.

In terms of secondary and post-secondary education, massive open online courses, or MOOCs, may offer a viable option in the future for students who don't have the money or means to attend traditional institutions. The model still requires refinement; currently, many enrollees fail to complete their courses, and there isn't a widely recognized system to certify programmes or graduates.[7] In addition, most of the people that sign up already have college degrees, so MOOCs aren't reaching the poorest students to the extent that they were expected to.

Vocational and technical programmes can also provide a cheaper alternative to college, while imparting hands-on experience and practical skills. With the fast-changing labour landscape, such programmes should also foster analytical, communication and other generic skills useful for various jobs.

Technology has the potential to lower costs and boost educational outcomes at all levels. Some experts warn that few economies have gotten this right so far, nor is there much empirical evidence to support claims of technology's benefits to pedagogy. Many schools today shell out money to buy hardware but fail to train teachers to use it properly, resulting in "a very ineffectual utilisation in education," says Mr Schleicher of the OECD. But he adds, "It's one of the biggest promises in education and…it's a big part of the solution in the future."

[7] https://www.gse.upenn.edu/news/press-releases/penn-gse-study-shows-moocs-have-relatively-few-active-users-only-few-persisting-

Skills

Introduction

The global youth unemployment rate has stabilized after a period of record increase following the 2008 financial crisis, and the number of young people who are out of work has declined. At 13%, however, the jobless rate remains well above pre-crisis levels[8], and overall, one-third of young people worldwide are still categorised as not being in education, employment or training, also known as NEETs.[9] In coming years, it will be essential for economies to provide them—and record numbers of new entrants into the workforce—with the education and training needed to succeed in a labour market undergoing transformation.

One billion young people around the world are expected to enter the job market over the next decade, even as economies face an increased demand for social services from graying populations and an expanding middle class. Young people, when fully participating in the workforce, can help alleviate some of the pressures on public coffers by contributing to a country's productivity and tax revenues. Unemployed, they drain resources through their dependency on unemployment benefits and other social services. Jobless youth also have higher rates of involvement in crime and are more likely to contribute to social unrest. In addition, studies have shown that if young people, especially college students, don't get a job soon after graduating, they tend to be underemployed for the rest of their lives.

The challenge facing policymakers, then, will be to make sure that young people have the skills needed to prosper in the 21st century marketplace. "The kind of things that are easy to teach and test are disappearing" from the roster of skills needed in jobs, says Mr Schleicher of the OECD. "Demand is rising for non-routine, analytical skills. But it's not a main focus of schools."

Don Carlson, education lead for Microsoft APAC, based in Singapore, envisions a labour market through 2030 shaped by such trends as cloud services, cybersecurity and the Internet of Things, and technology-driven construction.

"There needs to be a significant shift where we are in education to enable that," he says. In the short term, he says, that means turning out more workers who are well versed in STEM curricula; in the longer term, he envisions a need for more creative problem solvers.

Science matters

The US National Science Foundation, in a 2015 report,[10] notes that STEM knowledge and skills are used in many more occupations than traditionally thought of as science and engineering, including finance and sales and marketing, and technical jobs at the sub-baccalaureate level. Such a trend is only likely to intensify in the next 15 years and beyond, as technology becomes increasingly central to all aspects of life.

[8] *Global Employment Trends for Youth 2015: Scaling Up Investments In Decent Jobs for Youth.* 2015. International Labour Organisation. http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_412015.pdf

[9] *Toward Solutions for Youth Employment: A 2015 Baseline Report.* October, 2015. Solutions for Youth Employment Coalition. https://www.s4ye.org/sites/default/files/Toward_Solutions_for_Youth_Employment_Full.pdf

[10] *Revisiting the STEM Workforce: A Companion to Science and Engineering Indicators 2014.* February 2015. National Science Foundation. http://www.nsf.gov/pubs/2015/nsb201510/nsb201510.pdf

"New types of jobs emerge as new industries are created, and new problems requiring solutions are encountered," the NSF report says. "To remain competitive, our nation needs flexible STEM-capable workers at every education level."

The US isn't alone in failing to match skills and demand. Nicole Goldin, lead author of a World Bank report on youth employment, says the world already faces a "youth underemployment crisis." The mismatch is likely to worsen, as the labour market undergoes rapid change through 2030 and beyond, due to globalisation, a fourth industrial revolution that will blur the lines between the digital, physical and biological spheres, and rapid urbanisation, among other factors.

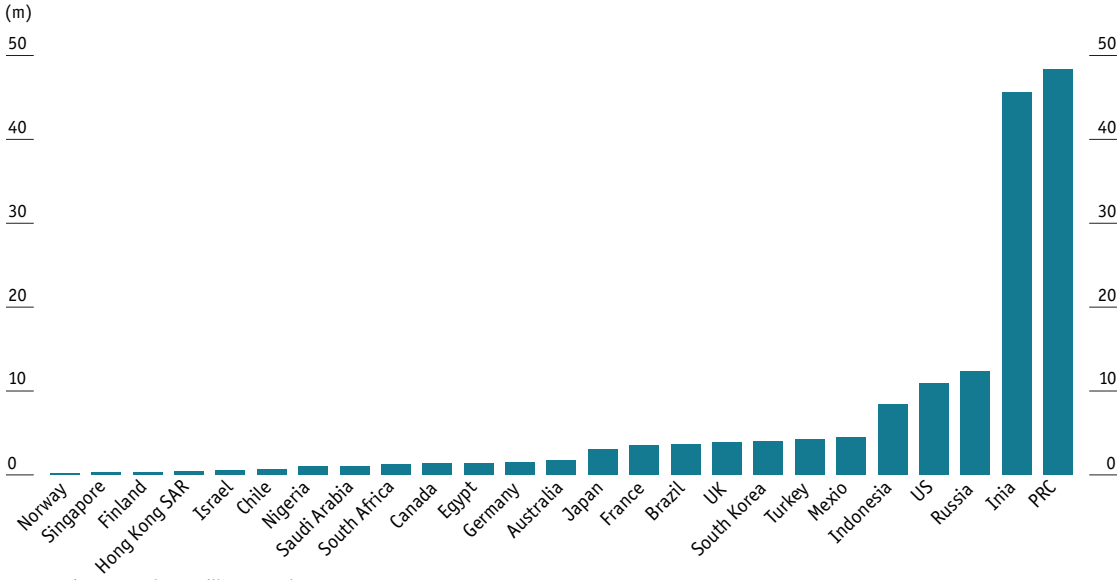
> "Gender equality is a major issue and there have been significant improvements in most regions, particularly at the primary level. However, girls everywhere are still not encouraged to pursue technical or vocational education and that's a problem that needs addressing."
>
> *Qian Tang, assistant director for education, UNESCO*

Girls have made great strides in primary education completion, as well as in secondary and tertiary attendance, especially in developed economies. But women still lag men when it comes to STEM majors—as well as in job and pay equity, once they enter the labour force. Only 14% of women entering university for the first time in 2012 chose science-related fields of study, compared to 39% of young men, according to a recent OECD report.[11] It attributed the gap in part to a lack of confidence among girls and parental expectations, saying that parents, educators and policymakers could all help change the trend.

Women are more likely to work in undervalued and low-paying jobs in many parts of the world, and have higher unemployment rates. About half of all women globally work today, compared to 77% for men, little changed from 1995, according to the International Labor Organization.[12] And women in general make an average 77% of what men earn, with the absolute gap widening for higher-earning women, the ILO says, adding that without targeted action, pay equity would not be achieved before 2086.

If the rate of STEM graduates as a percentage of overall graduates is held constant at current levels, low-income economies are predicted to see the fastest growth in total number of STEM graduates. In these economies—which include Nigeria (100%), Indonesia (200%), South Africa (150%) and Turkey

Total # of STEM graduates 2015-30



[11] *The ABC of Gender Equality in Education: Aptitude, Behavior and Confidence.* 2015. OECD. https://www.oecd.org/pisa/keyfindings/pisa-2012-results-gender-eng.pdf

[12] http://www.ilo.org/global/about-the-

(120%)—youth population growth is expected to drive the size of their total tertiary population. Quality STEM programmes can help produce skilled workers to fuel economic growth in these economies. This could be especially relevant for Saudi Arabia and South Africa, which are expected to have the highest levels of unemployment in future among the 25 economies in this study.

The problem for the PRC, in fact, will be to ensure that there are enough jobs in various sectors to ensure a good absorption of STEM graduates (as well as college graduates across all majors) in coming years. According to EIU data, China's youth unemployment rate is projected to increase to 14% in 2030 from 10.8% in 2015. The economy is expected to surpass the US and EU in R&D spending to become the world's top R&D spender by 2019.[13] Growth in sectors such as green technology, new energy, biotechnology and software development could employ some of these graduates. With the state sector still dominating industries including telecommunications, finance and automobiles, experts suggest that policymakers should also open up these sectors.

Quality not quantity

At the same time, some educators warn against a knee-jerk reaction to get more science and technology into schools. Introducing new technology into a curriculum can take three or four years, by which time "it's obsolete," says Mr Jensen, founder and CEO of Learning First. He argues that it's more important to equip students with "good generic skills," including a strong base in literacy and math. That's especially important in economies with weak math and science programmes, such as the U.S. and Australia, he says.

Quality control is also important, especially as demand surges. India has dramatically stepped up its engineering programmes, producing approximately 1.5m engineers a year amid fast-growing demand for low-end software engineers to do web maintenance. The U.S., by contrast, produces an estimated 100,000 engineers annually.

"There's a massive supply [in India], but not very good quality," says Mr Dossani of the Rand Center. "There has to be much more quality control. The role of the state should be to push for more quality control and let the market respond." Indeed, a 2013 study of engineering programmes in Brazil, Russia, India and the PRC[14] conducted by Mr Dossani and others found that while elite universities in the world's biggest developing economies turn out graduates on a par with those of developed economies, graduates of non-elite schools—where the fastest growth has occurred—and especially those in India and Brazil, tend to fall short.

EIU data suggest that youth unemployment will ease for India, dropping to 7.3% in 2030 from 9.7% in 2015. The rate for Brazil is also expected to fall, but will still remain high at 17.2%, down from 21.2% in 2015. India is expected to increase public spending on education as a percentage of GDP over this period, to 4.8% from 4.1%, but Brazil is seen cutting the share of education to 6.8% from 7.1%.

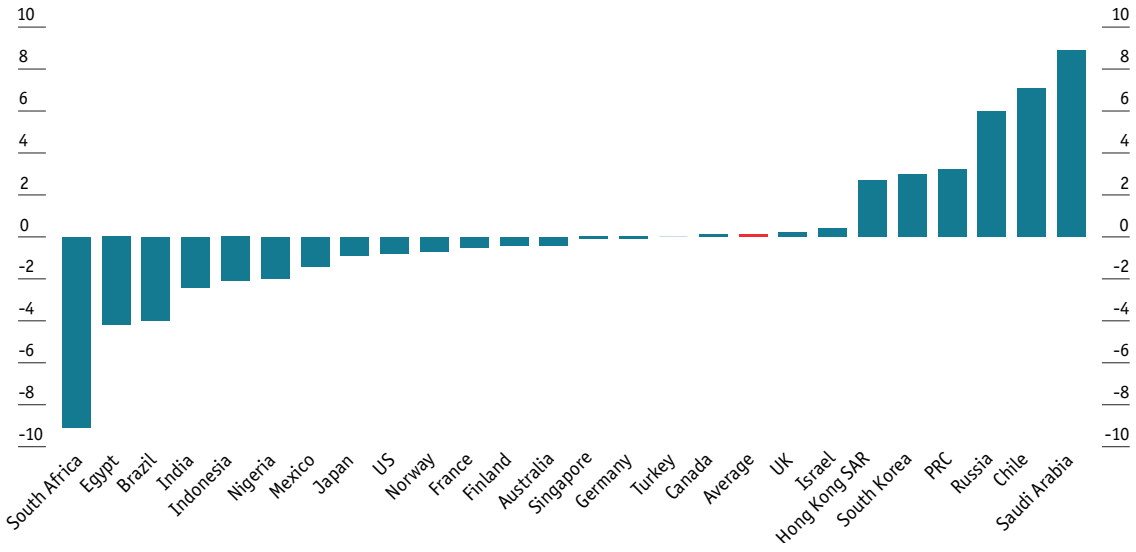
Technical tracks offer another path for young people to enter labour markets. Some economies, including Germany, Finland and Switzerland, have a long tradition of vocational programmes, which businesses help design and run. Germany, which has the lowest youth unemployment rate in Europe, at 7.1% in January 2016,[15] requires companies to help train vocational programme students. "It's a big investment for companies, but it pays off," says Dr Kevin Heidenreich, deputy representative of German

[13] OECD Science, Technology and Industry Outlook 2014. November 12, 2014. OECD. http://www.oecd.org/science/oecd-science-technology-and-industry-outlook-19991428.htm

[14] *The Quality of Engineering Education in the BRIC Economies.* By Prashant Loyalka, Martin Carnoy, Isak Froumin, Raffiq Dossani, J.B. Tilak, Po Yang. June 2013. https://reap.fsi.stanford.edu/sites/default/files/Quality_of_engineering_education_in_the_BRIC_economies.pdf

[15] http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics

% change in youth unemployment: 2015-2030



Industry and Trade in Washington, D.C. "Companies get people who are well-trained and have practical experience."

German companies work with chambers of commerce, the Ministry of Education and unions to design and regularly update systems frameworks, which set national training guidelines and exams for specific occupations. The country's youth unemployment rate is expected to inch higher to 7.5% for 2030, according to EIU estimates. The PRC, too, is seeking to expand its vocational programme as it turns out record numbers of college graduates, many who struggle to find jobs. Under its proposed 13th Five-Year Plan, it will seek to set up a "modern vocational school system" for 2016-2020, while encouraging some universities to be transformed into vocational schools.[16]

Mr Benavot of UNESCO's Global Education Monitoring Report says his report has been "very sceptical" of the claims of the benefits of a traditional technical education, given the tendency of young people to frequently change jobs and the fast-changing labour market. "It's very difficult for the system to anticipate what skills will be needed in 2030," he says. "The skills acquired [in a vocational education] are not necessarily what will be needed 10 or 20 years after in the job market."

He, along with a growing number of other education experts, argue that ultimately it will be more valuable to teach transversal or generic skills, such as communications, adaptability, flexibility and the ability to work in different contexts and to respond to change, as well as life skills, such as organisation and punctuality.

They lament that universities that once devoted time to what Mr Benavot describes as "the pursuit of knowledge and truth, and basic research," are seeing a decline in such pursuits, because of the emergence of much more professional, vocationally oriented schools. "Students aren't getting the deeper, critical education" that permeates social science and humanities studies, he says. "These skills are undervalued and very important, and probably will be more important in a globalised world—to

[16] http://www.chinadaily.com.cn/china/2015cpcplenarysession/2015-11/03/content_22361998.htm

understand other cultures, convey views not threatening to other cultures, to have a sense of history and to speak different languages."

Indeed, engineers and scientists need to be educated more broadly, as they increasingly must consider the political, ethical and moral implications of new technologies they work on, says Phillip Rogaway, of the Department of Computer Science at the University of California, Davis, in an article, The Moral Character of Cryptographic Work.[17]

In the US, vocational training has traditionally been stigmatised as being low quality, but some educators have been pushing a 21st century version dubbed "career and technical education." CTE seeks to tie STEM education to real career pathways, and to teach critical thinking and other soft skills that prepare young people "to do six different jobs," says Amber Northern, senior vice president for research at the Thomas B. Fordham Institute, an education policy think tank based in Washington, D.C. Offering both academic and career-oriented courses, such programmes include internships and on-the-job training, and can stand alone or be incorporated into traditional school curricula. "It ties into public expenditure and the question of how to prepare kids for cutting-edge careers," says Ms Northern.

Since the late 1990s, Singapore has implemented educational reforms to respond to the demands of a knowledge-based economy. The Ministry of Education in 1992 set up the Institute of Technical Education, which offers a unique career and technical education in contrast to the traditional university and polytechnic tracks.[18] Under the Institute, three colleges offer technical education and develop skills certification and standards for different sectors, including engineering, business and technology. The model has strengthened the quality of, and respect for, technical education in Singapore and has been adopted by other economies in Asia.

Other measures that have helped Singapore to continue to produce a market-ready workforce include a strong training programme for teachers; the pilot of "future schools" that seeks to incorporate ICTs into traditional learning in a holistic way;[19] and a shift in emphasis away from a focus purely on grades and academic achievement to include development of students' character and leadership. According to EIU projections, Singapore will see its ratio of STEM graduates rise to 1.8% of the labour force in 2030, from 1.3% in 2015.

Companies can also help policymakers and educators anticipate job trends and demands. With a growing need for regular, rigorous assessments of labour market needs, the World Bank has set up a skills measurement programme, dubbed Skills Towards Employability and Productivity (STEP), that surveys households and employers to provide data on such trends.

And as more people delay retirement in graying economies, industry can provide and fund training and retraining to help workers keep their skills up to date. Forty percent of adults in Sweden take part in continuing education, and lifelong learning is also common in Norway. But frontloading education tends to be the norm elsewhere, and "that's not good for upgrading skills," says the OECD's Mr Schleicher. "Employers and government need to work on the design of curriculum and on a deep sharing of responsibilities. Employers can do a lot to keep education relevant."

[17] http://web.cs.ucdavis.edu/~rogaway/papers/moral-fn.pdf

[18] http://hrd.apec.org/index.php/The_Institute_of_Technical_Education_in_Singapore

[19] http://www.unescobkk.org/education/ict/online-resources/databases/ict-in-education-database/item/article/singapore-future-school-project/

Technology

Introduction

Technology is transforming all facets of life, education included. Already at some schools in America, students work independently for part of the day on computer programmes personalised to their individual progress. In Africa and the Middle East, young people access learning material on their cell phones to boost literacy and math skills. Teachers elsewhere can tap into open digital education resources to tailor instructional content for their classrooms, share best practices via the Internet, and work with avatars to improve their teaching skills.

For economies facing tighter budgets from graying populations and increased expectations from a growing middle class, technology offers the potential to improve educational outcomes while saving on costs. And as more jobs require technological know-how, and skills such as collaboration and communication across cultures, technology can help students better prepare for working in a fast-changing labour market.

"The introduction of technology into the classroom and of computer-assisted learning decreases the dropout rate and makes learning more relevant to job market skills," says Nicole Goldin, lead economist for the World Bank report, "Toward Solutions for Youth Employment."[20] She says some studies have shown that technology can also make learning more engaging and relevant to students, in particular, recognizing "the possibilities for technology in basic knowledge."

> "The introduction of technology into the classroom and of computer-assisted learning decreases the dropout rate and makes learning more relevant to job market skills."
>
> *Nicole Goldin, lead economist for the World Bank report, "Toward Solutions for Youth Unemployment."*

The EIU projects that Internet access will increase in schools through 2030 for all economies in this report's rankings. While the rate of increase is expected to be relatively slow in developed economies, due to an already large base, it is expected to be significant in some developing economies. These include Brazil, Mexico, Turkey and Indonesia, as well as Nigeria and South Africa. Increases in Internet penetration and income levels are expected to drive wider use of information and communication technologies (ICT) in these economies.

Apply carefully

For ICT to achieve its potential in education, however, it will be critical to ensure that the introduction of hardware into schools is accompanied by teacher training and infrastructural support, including sufficient bandwidth and proper security measures. Incorporating technology in schools typically requires large upfront costs, and some education experts argue that developing economies might be better off using their limited funds to first improve basic conditions, such as classroom size and teacher quality.

Certainly, there are plenty of examples of misguided efforts. In India, policymakers have poured money into buying technology and expanding Internet access, but educational outcomes have continued to stagnate, or even decrease. "Essentially, it's like building roads; it's an infrastructure project to give money to local governments," says Mr Benavot of UNESCO's Global Education Monitoring Report. "It's not about training teachers or finding ways to improve curriculum."

[20] http://www.ilo.org/employment/areas/youth-employment/WCMS_413826/lang--en/index.htm

Mr Jensen of Learning First says that so far, "most technology use in education has produced little results," in terms of boosting either student learning or cost-effectiveness. He says this situation will only change when policymakers and other buyers of educational technology become smart consumers and demand evidence that software actually improves outcomes. "Technology can be useful, but we have to learn how to integrate it into the curriculum and improve teaching," he says. "If you have the right teaching population and curriculum, it can work."

Devolve decision-making

Some educators have found effective ways to integrate technology into the classroom. Hale School, a private boys school in western Australia, launched a one-to-one laptop programme in 2003 for students in years 5-12. Initially, students hardly used the devices in class, and teachers used theirs for basic tasks, such as PowerPoint presentations. "We had to figure out the best direction" for how to incorporate technology into learning, says Mahendra Vaswani, the school's director of teaching and learning.

Today, technology imbues multiple aspects of learning at Hale. Tablets loaded with Microsoft OneNote and Office 365 allow students to collaborate on assignments and projects, while teachers comment on their work in real time. Videoconferencing links students to scientists diving in the Great Barrier Reef, and gives them opportunities to ask questions. Students have also used videoconferencing to work with students in other parts of Australia and as far away as the US, such as during the International Ethics Olympiad.

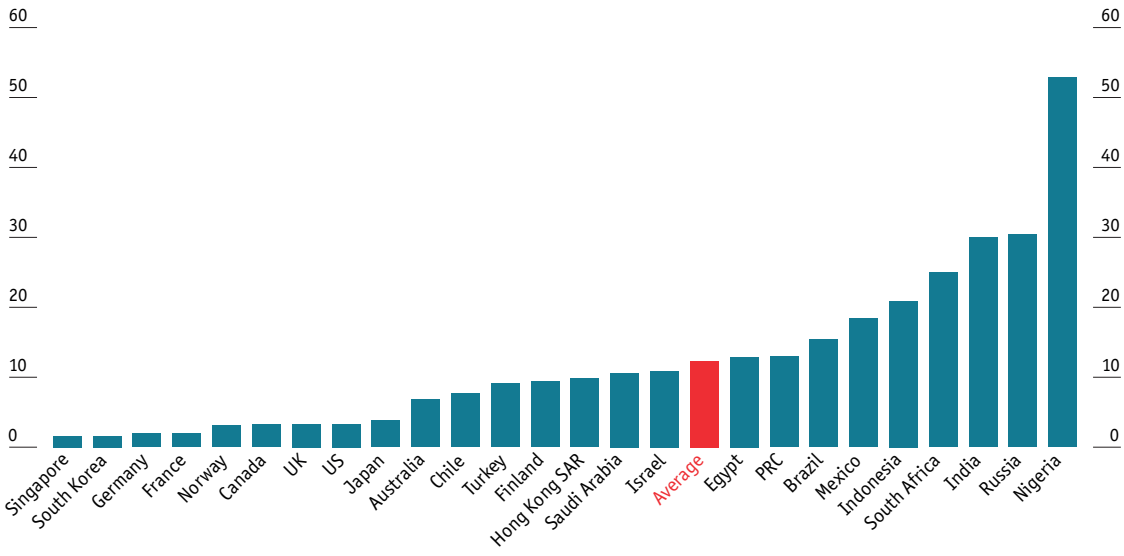
Technology has also helped to change the way instructors teach older students. Rather than lecturing and following up with exercises, teachers of year 7-8 students start by assigning problems to small groups of students. The groups work to solve them on their own, tapping online resources if needed, with limited input from the teacher. Each group then presents its solutions on a big screen, with the rest of the class and the teacher offering critiques. After several lessons, the teacher formalizes the learning, noting trouble areas or points missed by the students. "The school vision around technology is…to prepare the boys for 21st century jobs," says Mr Vaswani, and this approach generates challenges and opportunities for collaboration and problem-solving.

The UK has also implemented more effective ed-tech policies based on "lessons learned." In the early 2000s, policymakers poured funds into ICT investments in schools, but the attitude was "let's buy lots, rather than have a strategy for how to use it effectively to increase learning outcomes," says Caroline Wright, director general designate of the British Educational Suppliers Association (BESA), a trade association.

The UK is projected to see a 3.3% rise in Internet access in schools through 2030, slightly lower than for some other developed economies. Ms Wright says a national teacher shortage is raising teacher wages, and putting pressure on funding for education across the board, including technology purchases.

UK policymakers have also given schools more freedom to choose what to buy, underscoring a growing consensus that such an approach leads to more effective use of educational technology. One programme being adopted by some secondary schools helps prepare students to take the

Improvement in internet access in schools: 2015-30



General Certificate of Secondary Education exams. Produced by SAM Learning, based in London, the programme seeks to inject a bit of fun and competition into test prep, allowing students to log into individual dashboards that show how their personalized avatar performs against those of other students, based on activity performance and completion.

Benjamin Conway, content and marketing assistant for the company, says an independent assessment of the programme's impact has shown an improvement in exam performance for students who use the programme for 10 hours each year, or the equivalent of two activities a week.

Havering Education Services, the education department for Havering borough in Greater London, teamed up with Rising Stars, an educational publishing company, to develop a computing curriculum that its primary school teachers could use. Dubbed "Switched on Computing," the programme includes videos, teacher notes and projects.

"The issue is that sometimes top-down implementation solutions don't come with enough support or training," says Dave Smith, ICT lead for Havering schools and chair of NAACE, an education technology association representing schools, teachers and other stakeholders. The programme has been purchased by 6,000 schools in the UK and internationally, he says.

Teachers need training too

Empowering teachers to use technology not only helps boost their efficiency, it's also critical to ensuring the effective incorporation of technology in the classroom, experts say. A project to equip all teachers in Israel with laptop computers showcases the impact of such an approach. Spearheaded by the nonprofit Athena Fund, the project has since 2006 equipped some 13,000 teachers in the country with their own devices. Just as important, teachers receive 120 hours of training: 60 on the basics of computers, including how to use Microsoft Word and Google.docs, and on strategies for teaching with computers; and another 60 hours of subject matter training.

The Fund has worked with the Israeli government, subject matter experts and teacher unions to develop and supply training programmes. Schools receiving laptops must guarantee Internet connections and an overhead projector in each classroom.

"The average age of teachers is about 45 in Israel, and over 80% of teachers in the world are women," says Uri Ben-Ari, Athena Founder and President. "The key to success is making them digitally literate. If they don't have the tools and are not trained, kids are doomed to stay behind. "Take the case of Yerucham, a struggling community in the southern part of Israel. Between 2007 and 2012, all K-12 teachers there received laptops and training. Teachers said the use of computers helped them to improve their communications, lesson planning and classroom teaching. And over this period, the percentage of high school students passing the matriculation test nearly doubled to 79.8% in 2011-12 from 43.1% in 2005-06. The ratio of students meeting basic college entrance requirements also jumped.[21]

Mr Ben-Ari says Athena's programme also boosts teachers' status among students and in the community, and the strategy could work even in developing economies. "It's not expensive to give [teachers] a computer and training."

According to a 2016 survey by Microsoft of educators in the Asia-Pacific region, 95% of educators recognize the importance of technology's role in transforming education and inspiring students. But more than half cited a lack of training as the biggest challenge to optimising technology use in classrooms. Other challenges included inadequate budgets and a lack of integration of technology with curriculum.

Mr Carlson, education lead for Microsoft APAC, says the company is working with economies to put more programmes in place, including cooperating with showcase schools and providing opportunities for teachers to share best practices. Developing economies can benefit from these cases, by learning from the experiences of developed economies and leapfrogging to where these economies are today, he says.

Technology is also being used to train teachers. TeachLivE Lab, developed at the University of Central Florida in the US, features mixed-reality classrooms and student avatars that allow teachers to hone their instruction strategies in STEM studies. The avatars have distinct personalities, and respond—or fail to respond—to the teacher's prompts, much like real students would.[22]

Under the SimAULA project[23] funded by the European Union, a consortium of European partners, including the UK's Serious Games Institute, have been designing and testing a similar teacher-training programme. The "teacher player" fields questions that foster inquiry-based learning among student avatars, with the goal of engaging them so they "understand and pay attention," says Petros Lameras, a research fellow at the Institute, based in Coventry. Mr Lameras says the programme, which offers scenarios on such topics as carbon dioxide and electromagnetism, is currently being used in 5,000 secondary schools across Europe.

Private companies are also jumping into the ed-tech market, which was valued at US$8.38bn for the 2012-13 academic year in the US alone, according to the Education Technology Industry Network. That represented an 11.7% rise from 2009.[24] US public schools have at least one computer for every five students, and spend more than US$3bn a year on digital content.[25] The US government is speeding

[21] http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/pdf/RANKINGS/UriBenAri.pdf

[22] http://teachlive.org

[23] http://www.simaulaproject.eu

[24] http://www.theatlantic.com/education/archive/2015/11/quantifying-classroom-tech-market/414244

[25] http://www.edweek.org/ew/issues/technology-in-education/

ahead with an ambitious campaign to make affordable high-speed Internet, with access in schools slated to rise 3.3% between 2015 and 2030, according to EIU projections. The government is also making free online teaching resources available to the most remote schools, and more states are expected to deliver standardised tests online than via a paper format for the 2015-16 academic year.

So what will technology actually look like in the classroom in 2030? Ms Wright of BESA says that, for one, she doesn't think anyone will be debating the efficacy of ed-tech. Rather, instruction will likely incorporate "technology, paired with hands-on resources, face-to-face learning and flipped learning," she says, referring to the practice of harnessing technology at home to learn, with classroom time devoted to exercises and discussion. "There should be a healthy balance, with hope that technology is just used sensibly."

Appendix 1: Forecast methodology

The Yidan Prize Rankings consists of five rankings with forecasts from 2015 to 2030. Between January and March 2016, The Economist Intelligence Unit analysed historical data and developed custom forecasts for five metrics that were important themes related to education to 2030. These metrics are:

- Public expenditure on education
- Affordability of education
- Youth unemployment
- Science, technology, engineering and mathematics (STEM) graduates
- Access to internet in schools

The five metrics are organised in this report under three chapters:

Chapter	Forecasts
Demographics	• Public expenditure on education • Affordability of education
Future of skills	• Youth unemployment • Number of graduates in science, technology, engineering and mathematics (STEM) courses
Technology	• Access to Internet in schools

Economy/city selection

To select 25 economies for the study, we started with variables that reflect long-term economic growth and quality of labour force. Based on GDP growth rate (2015-2050) and five-year forecasts for EIU's market opportunities rating, working age population and overall productivity of labour, we selected the best-performing economies. We then reviewed the list, adjusting our selection to ensure regional representation comprising at least four economies from each regional group. The final groupings of economies/territories are as follows:

Americas	Asia-Pacific	Europe	Middle East and Africa
Brazil	Australia	Finland	Egypt
Canada	People's Republic of China	France	Israel
Chile	Hong Kong SAR	Germany	Nigeria
Mexico	India	Norway	Saudi Arabia
United States	Indonesia	Russia	South Africa
	Japan	Turkey	
	Singapore	United Kingdom	
	South Korea		

Building the forecasts

For each of the five metrics we forecasted, The EIU collected historical data and developed econometric models to test relationships with macroeconomic factors. The forecast results were then sense-checked and adjusted based on feedback from our analysts.

Overview of data sources

Metric	Data source	Source
Public expenditure on education	Government expenditure on education as a percentage of GDP	UNESCO Institute for Statistics
Affordability of education	Cost of 4-year university education as percentage of average annual income	Cost of university education from QS University Rankings; EIU income data
Youth unemployment	Employed youth (persons aged 15-24) as a percentage of labour force (persons aged 15-64)	International Labour Organisation
Number of graduates in STEM courses	STEM graduates as a proportion of total tertiary graduates	UNESCO Institute for Statistics
Access to internet in schools	Internet access in schools (relative scores; 1-7, 7 is the best)	World Economic Forum

Public expenditure on education

We collected government expenditure on education as a percentage of GDP from 1990-2014 from UNESCO Institute of Statistics. Following a review of the literature, the following series were collected and explored in the quantitative analysis:

- Number of live births per year per 1,000 population estimated at mid-year
- Total disposable income of households with nominal disposable income of more than US$25,000 per annum
- Median nominal disposable income earned by households per annum
- Real growth rate of total personal income after taxes and deductions
- Number of households in a country
- Average number of people in each household, based on number of households divided by total population
- Ratio of those people older than 64 to those aged 15-64
- Size of population aged over 60 years

The series were sourced from EIU databases and, where appropriate, related series were used if a country did not have data for that indicator. The potential drivers fell into two broad categories: demographics indicators, such as the birth rate; income and income distribution series, such as the real growth rate of personal income. From the literature review, it was anticipated that at least

one series from these categories would reveal a significant relationship with public expenditure on education.

A dynamic cross-country panel model was chosen to conduct the analysis, given its ability to allow both contemporaneous and lagged effects of indicators. This factor was important in these models as some indicators, such as income, may take more than a year to have an impact on education and related series. We found two significant drivers:

- Total disposable income of households with nominal disposable income of more than US$25,000 per annum
- Size of population aged above 60 years

The final model selection and forecasts were chosen after an iterative process with EIU country analysts.

Affordability of education

Affordability of education is presented as the cost of a four-year degree (tuition fees) as a percentage of average annual income. Data for university programmes was sourced from QS University Rankings, and forecasts were developed based on assumptions of how tuition fees will grow from 2015-30. In some economies, annual growth was assumed to be at the rate of inflation (consumer price index), and for other economies, it was assumed to be significantly higher based on analyst feedback and desk-based research. In the final ranking, total university education fees are presented as a percentage of annual income (GDP per capita) from 2015 to 2030.

Youth unemployment

We collected youth unemployment data from International Labour Organisation for the period 1990-2014. Youth unemployment is defined as the share of the labour force aged 15-24 without work but available for and seeking employment. Following a review of the literature, the following series were collected and explored in the quantitative analysis:

- Gross ratio of enrolment in primary education to the population of the corresponding school age
- Number of households with nominal disposable income of more than US$35,000 per annum
- Industry; mining, quarrying, manufacturing, construction and utilities value-added as percentage of nominal GDP at factor cost. GDP at factor cost is GDP at market prices, less indirect taxes, plus subsidies.
- Services; Services sector value-added at constant prices as a percentage of nominal GDP at factor cost. GDP at factor cost is GDP at market prices, less indirect taxes, plus subsidies
- Overall labour productivity; Gross domestic product (GDP) at purchasing power parity (PPP) in US$ per person employed
- Average number of years spent in school and higher education

- Public expenditure on education

The series were sourced from EIU databases and, where appropriate, related series were used if a country did not have data for that indicator. A dynamic cross-country panel model was used to explore the potential drivers of youth unemployment. Our analysis found three significant drivers:

- Overall labour productivity
- Public expenditure on education
- Number of households with nominal income above US$35,000

The choice of model and forecasts were guided by additional analysis on the level of youth unemployment, which was also modelled in a panel framework. The ratio of youth employment to overall employment was used as a guide to determining the forecast for youth unemployment. Again, EIU country analysts were consulted in this iterative process of model building and selection.

STEM graduates

The forecast for STEM graduates from 2015 to 2030 is presented as the number of new STEM graduates as a proportion of labour force. Historical data for STEM graduates was patchy and inconsistent. As a result, we developed forecasts for total number of tertiary graduates, and assumed a constant proportion of STEM graduates in 2015 and 2030. Historical data for tertiary graduates was sourced from UNESCO Institute for Statistics and country-level higher education statistical databases. Following a literature review, the following series were analysed as potential drivers of total tertiary graduates:

- GDP per capita
- (market) Exchange rate
- Real effective exchange rate; trade-weighted basket of currencies converted to an index (1997=100) and adjusted for relative price movements
- Overall labour productivity

The series were sourced from EIU databases and, where appropriate, related series were used if a country did not have data for that indicator. Using a dynamic cross-country panel model, our analysis found the following drivers for size of tertiary graduates:

- Size of youth population (ages 15-24)
- GDP per capita
- Exchange rate

As above, model and forecasts were chosen following feedback from EIU country analysts, model diagnostics and indicator suitability. Where necessary, this resulted in an iterative process to reach a final model and associated forecast for total tertiary graduates.

To derive STEM graduates from 2015 to 2030, we kept the same proportion of STEM graduates in 2015. This means that if a country produced 20% of STEM tertiary graduates in 2015, it will produce the same 20% proportion of graduates in 2030. The number of STEM graduates was then normalised and presented as a proportion of the country's labour force.

Access to Internet in schools

We developed forecasts for access to internet in schools as a proxy for the use of ICT in education. A consistent dataset to reflect ICT use in education was not available for economies under this study. We gathered historical data from "Internet Access in Schools" indicator in the World Economic Forum's Global Competitiveness Index. The scores were developed based on survey results: "In your country, how widespread is Internet access in schools (Grades 1-7)", with responses from 1-7, 7=best. We found two significant drivers:

- Public expenditure on education
- Internet penetration rate

Appendix 2: Forecast data

Public expenditure on education as a % of GDP

2015		2030	
Norway	9.0%	South Africa	9.0%
South Africa	8.5%	Brazil	6.8%
Saudi Arabia	7.3%	Finland	6.8%
Brazil	7.1%	Norway	6.4%
Finland	6.6%	Australia	6.1%
France	6.5%	Chile	5.5%
Australia	6.1%	Saudi Arabia	5.5%
Israel	5.9%	France	5.3%
Chile	5.6%	South Korea	5.2%
Canada	5.4%	UK	5.1%
UK	5.4%	Israel	5.1%
US	5.4%	Mexico	5.0%
Mexico	5.4%	Canada	4.8%
Russia	5.1%	India	4.8%
South Korea	5.0%	US	4.5%
Germany	4.9%	Indonesia	4.2%
Japan	4.5%	Egypt	3.8%
Indonesia	4.2%	Turkey	3.8%
India	4.1%	Russia	3.7%
Egypt	3.8%	Germany	3.7%
Hong Kong SAR	3.4%	Hong Kong SAR	3.3%
Singapore	3.4%	Japan	3.1%
Turkey	3.1%	People's Republic of China	2.9%
People's Republic of China	2.3%	Singapore	2.7%
Nigeria	0.7%	Nigeria	1.0%

Source: EIU forecasts

Affordability of 4-year degree (as % of income)

2015		2030	
Norway	1.0%	Norway	0.7%
Saudi Arabia	1.8%	Saudi Arabia	1.3%
Germany	3.2%	Germany	2.6%
Brazil	4.6%	Brazil	5.9%
Finland	10.8%	Finland	10.9%
France	19.2%	Egypt	14.8%
Egypt	19.6%	France	15.4%
Israel	34.0%	Israel	23.8%
Nigeria	45.8%	Hong Kong SAR	39.6%
Hong Kong SAR	47.2%	Japan	50.0%
Singapore	53.1%	Canada	59.1%
Australia	54.8%	People's Republic of China	65.9%
Canada	55.6%	Singapore	70.2%
Japan	61.3%	South Korea	74.0%
South Korea	95.5%	Australia	75.2%
People's Republic of China	99.5%	Nigeria	83.9%
UK	110.5%	UK	135.2%
Chile	149.1%	Chile	164.8%
South Africa	206.9%	Mexico	199.6%
US	207.8%	Indonesia	201.3%
Mexico	260.9%	US	229.3%
Indonesia	346.8%	India	263.8%
Russia	418.6%	South Africa	273.7%
Turkey	468.1%	Russia	487.4%
India	503.1%	Turkey	588.3%

Unit: % of income per head
Source: QS university rankings, university websites, EIU forecasts

Youth unemployment rates

2015		2030	
Japan	7.1%	Japan	6.2%
Germany	7.6%	India	7.3%
Norway	8.9%	Germany	7.5%
Hong Kong SAR	9.2%	Norway	8.2%
India	9.7%	Mexico	8.6%
Mexico	10.0%	Singapore	10.8%
South Korea	10.7%	Hong Kong SAR	11.9%
People's Republic of China	10.8%	Israel	12.5%
Singapore	10.9%	Nigeria	12.6%
Israel	12.1%	US	13.2%
Australia	13.8%	Australia	13.4%
US	14.0%	South Korea	13.7%
Canada	14.0%	People's Republic of China	14.0%
Nigeria	14.6%	Canada	14.1%
UK	16.5%	UK	16.7%
Russia	16.5%	Brazil	17.2%
Turkey	17.9%	Turkey	17.9%
Chile	18.6%	Finland	20.9%
Brazil	21.2%	Indonesia	21.5%
Finland	21.3%	Russia	22.5%
Indonesia	23.6%	France	24.4%
France	24.9%	Chile	25.7%
Saudi Arabia	33.5%	Egypt	37.5%
Egypt	41.7%	Saudi Arabia	42.4%
South Africa	57.1%	South Africa	48.0%

Source: ILO, EIU forecasts

New STEM graduates as % of labour force

2015		2030	
Russia	0.9%	Russia	1.4%
South Korea	0.9%	Australia	1.1%
UK	0.6%	Turkey	1.0%
France	0.6%	Israel	1.0%
Australia	0.6%	South Korea	0.9%
Finland	0.6%	France	0.8%
Turkey	0.5%	UK	0.8%
Israel	0.5%	Hong Kong SAR	0.8%
Hong Kong SAR	0.5%	Finland	0.7%
India	0.4%	Saudi Arabia	0.6%
Canada	0.4%	Norway	0.6%
Norway	0.4%	India	0.6%
US	0.4%	Mexico	0.6%
Saudi Arabia	0.4%	Indonesia	0.6%
People's Republic of China	0.4%	Canada	0.5%
Chile	0.3%	US	0.5%
Mexico	0.3%	South Africa	0.5%
Singapore	0.3%	Chile	0.5%
Japan	0.3%	People's Republic of China	0.4%
Egypt	0.2%	Singapore	0.4%
Indonesia	0.2%	Japan	0.3%
South Africa	0.2%	Egypt	0.3%
Germany	0.2%	Germany	0.2%
Brazil	0.1%	Brazil	0.2%
Nigeria	0.0%	Nigeria	0.1%

Source: UNESCO, EIU forecasts

Internet access in schools (out of 7)

2015		2030	
Norway	6.5	Finland	7
Finland	6.4	Norway	6.7
Singapore	6.4	Hong Kong SAR	6.7
South Korea	6.3	Singapore	6.5
Canada	6.3	Canada	6.5
UK	6.1	South Korea	6.4
US	6.1	US	6.3
Hong Kong SAR	6.1	UK	6.3
Australia	5.9	Australia	6.3
Israel	5.5	People's Republic of China	6.1
People's Republic of China	5.4	Israel	6.1
Japan	5.3	Russia	6
Chile	5.2	Chile	5.6
Germany	5.1	Japan	5.5
France	5	India	5.2
Saudi Arabia	4.7	Saudi Arabia	5.2
Russia	4.6	Germany	5.2
Turkey	4.4	Indonesia	5.2
Indonesia	4.3	Nigeria	5.2
India	4	France	5.1
Brazil	3.9	Turkey	4.8
Mexico	3.8	South Africa	4.5
South Africa	3.6	Mexico	4.5
Nigeria	3.4	Brazil	4.5
Egypt	3.1	Egypt	3.5

Unit: Relative scores (1 - 7, 7 is best)
Source: World Economic Forum, EIU forecasts

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