

Trends Shaping Education Spotlight 10

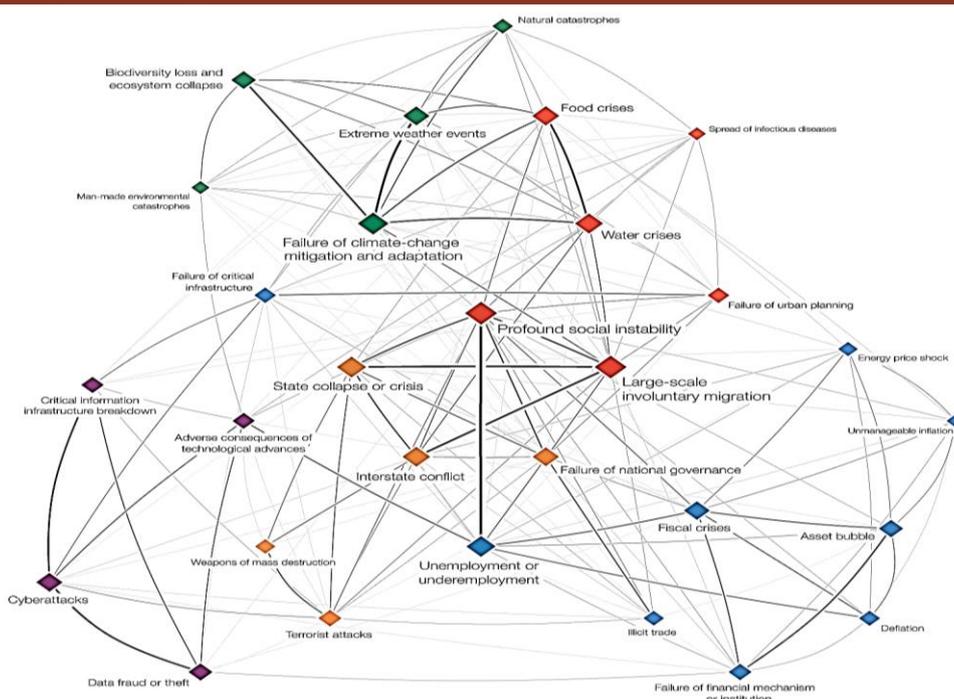
Globalisation of Risk

Our world is becoming increasingly interconnected. Global risks such as financial crises, cyber risks, pandemics and climate change all require a coordinated international response. Education can play a role in preventing and mitigating these risks by building resilience and developing the responsible and sustainable behaviours needed for a secure, global future.

Greatest Risks for the Future

Global risks are large scale disruptive events or conditions that have an impact on many countries. A disease breaking out in a village in Africa, a bank crashing on Wall Street or a protest in a distant country can all potentially “snowball” and influence the world financial, health or security order. Environmental degradation, including climate change, the recurrence of financial crises, cyber risks, and social instability both within and in between countries (e.g. terrorism) have been identified as risks with high potential impact for OECD countries (WEF, 2016).

Figure 1: Global risks interconnections map 2016



Source: The Global Risks Report (2016), World Economic Forum (WEF), www.zurich.com/_/media/dbe/corporate/docs/whitepapers/the-global-risks-report-2016.pdf?la=en&hash=B7353DFDED43A3CCFFBF286F65EC259F37473D91.

engagement in out-of-school science activities is low. For example, on average less than 25% of students reported that they watched TV programmes about science, and less than 8% of students attended a science club in PISA 2015. There is also a gender gap: boys outperform girls by 4 points on average on the PISA assessment and have larger engagement rates than girls in all reported science activities (OECD, 2016a).

There has been a push to strengthen education to raise awareness of environmental issues. For example, the UNESCO framework contains three education modules - climate change education, environmental education, and natural disaster preparedness and response - with tools and methods to integrate these key concepts into primary, secondary and TVET education (UNESCO, 2010). There is an opportunity for education systems to create critical thinkers that are able to connect their daily decisions to long-term consequences, not just for themselves but for society as a whole.

Ontario Eco Schools, Canada

The Ontario Eco Schools, a programme administered by York University with support from the Ministry of Education and Energy, is an initiative supporting all schools in the province to reduce their ecological impact.

The certification process helps schools minimise energy, water, and trash waste, saving the school money in the long-term. It is free for all public schools and accessible for a small charge for private and independent schools. The benefits also extend to the students and community who work together to improve their surroundings and develop ecological literacy.

Certification involves support and training throughout the school year. Schools are assessed on provincial standards with an emphasis on student leadership. The programme certified almost 40% of all Ontario schools in 2014/5, its first year of operation.

More information: www.ontarioecoschools.org/

Modelling eco-friendly habits in school is a good way to impart knowledge and awareness without overloading the curriculum. Minimising energy and water consumption, reusing and recycling materials and reducing waste can be taught by using educational facilities themselves as teaching tools. Environmental and sustainability education (ESE) can also be fostered by connecting traditional classroom environments to other settings from post-secondary institutions to community organisations and small and bigger businesses (OECD, 2015a).



Innovation in the water and food sector

Environmental risks not only have an impact on the natural world, they also pose threats to food and water. Extreme weather events, rising temperature and changing rainfall patterns all have the power to disrupt agriculture and water resources (UN Water, 2011).

However, by investing in human and technological capital, education can support innovative solutions to address these challenges. For example, *conservation*

agriculture, involving minimum soil disturbance, or *ecosystem based approaches*, involving decreased reliance on synthetic chemicals, are alternative and sustainable means of production. Conservation agriculture has already contributed to sustainable crops in large-scale commercial farming systems in the Americas, Europe, Australia and Turkey (Francis et al., 2011).

By 2040, most of Australia, Chile, Italy, Greece, Mexico, Spain, Turkey, and the USA will have a high to extremely high chance of severe water stress (World Resources Institute, 2015).

Many OECD countries are already feeling the impact of fresh water challenges. “Clean tech” is developing as a field of research to leverage innovative green technology. Innovations in water resource management already exist, such as wastewater and drinking water treatment or desalination. However, research is still needed on how best to alleviate groundwater pollution and depletion, ensure growing

cities have connection to water services, and treat wastewater before it is returned to the environment, to name a few (OECD, 2012a).

As food and water challenges persist, we need to reinforce and develop the skills to address them. This means that environmental sciences and engineering should be valued and encouraged (OECD, 2015a) and also that workers and managers in key sectors such as energy, industry, transportation, agriculture and waste should be trained to integrate sustainability practices and innovation in their work.

Economic Risks and Education

Increasingly global financial markets mean that countries and their economies are becoming more interdependent. Until recently, banking and financial crises could be contained to a single country's market (Schularick, 2011). However, as the 2008/2009 global financial crisis showed, country economies are now more volatile and susceptible to sudden global shocks. These economic risks are important and have an economic cost in terms of negative consequences for public debt, employment and growth. In addition, there is a social cost: eroding trust in institutions, contributing to rising social instability.

Financial education and the crisis

In the recovery from the latest global financial crisis, the OECD has argued for improved financial education as a complement to efficient financial regulation and supervision at the national and global scale. Although not the main factor of the crisis, greater financial understanding among consumers and households could have helped to reduce some of its impact (OECD, 2009a).

Less financially literate individuals are more likely to have costly mortgages and less likely to refinance them during a period of falling interest rates. They are also more prone to engage in costly credit card behaviour and use high-cost methods of borrowing, and less

likely to hold precautionary savings and undertake retirement planning (Lusardi and Mitchell, 2014). A lack of knowledge of instruments, products and services as well as poor financial risk awareness can contribute to bad decisions.

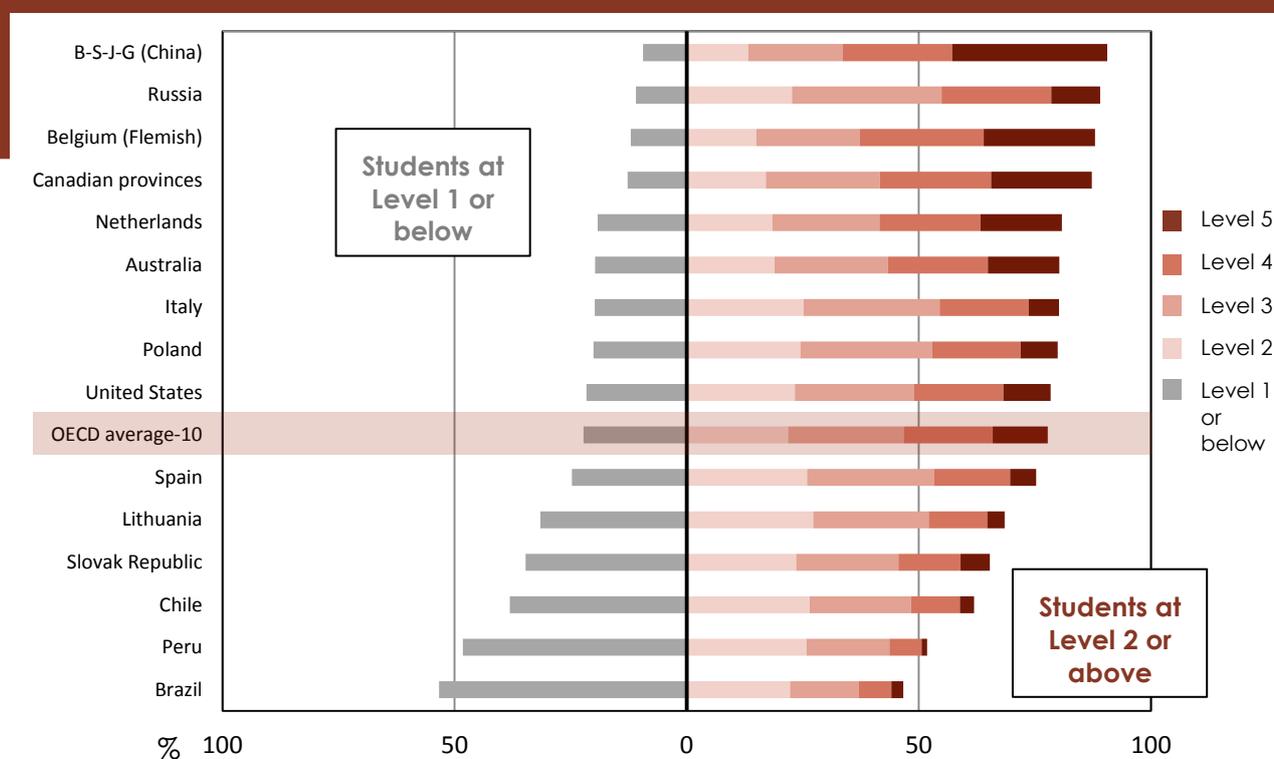
To address this issue, financial education for youth has gained traction because children are likely to bear more financial risks and be faced with increasingly complex and sophisticated financial products than their parents. A key element, nevertheless, is making sure all individuals possess strong generic literacy and numeracy skills, which are central in making informed financial decisions (Lusardi, 2012).

22% of students do not have basic financial skills across OECD countries.

2015 PISA results indicate that on average 15 year olds had medium to poor levels of financial literacy. This average masks wide differences between the highest-performing (Belgium (Flanders), Canada, China and Russia) and the lowest-performing countries and economies (Brazil, Chile and Peru) (Figure 3).

Over a third of European countries have now developed a national strategy for financial education and financial consumer protection policies. These aim to educate in a variety of ways from communication campaigns to classroom activities (OECD, 2016b). Financial education which increases knowledge and develops the emotional and decision making skills needed to operate in today's complex financial landscape, is a worthwhile investment for the future (OECD, 2009a).

Figure 3: Percentage of students at each level of proficiency in financial literacy



Source: OECD (2017a), Figure VI.2.6, PISA 2015 Results (Volume IV): Students' Financial Literacy, OECD Publishing Paris, www.oecd-ilibrary.org/education/pisa_19963777.

Technological Risks and Education

While technological innovations have the capacity to greatly improve many facets of life, they also bring with them increased risks.

Children's cyber-safety

New technology-related risks for children include consumer (for example, online fraud and marketing), contact (for example online predators and cyber bullying) and privacy (for example issues related to protection of personal information) risks (OECD, 2012b). Youth need to be educated about how to deal with these challenges.

There are now multiple online resources, toolkits and classroom materials for internet safety training that are readily available for educators to use. Cyber “hygiene” education is also an increasing part of the curriculum in countries such as the Netherlands, the UK or Japan (OECD, 2012b). While schools can play an important role in addressing these issues, the speed of technological change makes it difficult to keep abreast of the latest challenge. It is thus useful to partner with governments, NGOs, and private sector representatives to provide a shared response to these issues (OECD, 2014a).

Cyber Bullying: Turning Obstacles into Opportunities

A European collaboration between six countries (Romania, Latvia, UK, Italy, Spain and Denmark) recently launched a project for developing educational interventions to teach children bully-proofing abilities. The project aims to develop and implement programmes for preschool and elementary school children that help raise awareness about bullying for students, parents and teachers and also offer support and skills for children to protect themselves and others.

More information:

www.bullyingandcyber.net/en/turning-obstacles-opportunities/project/

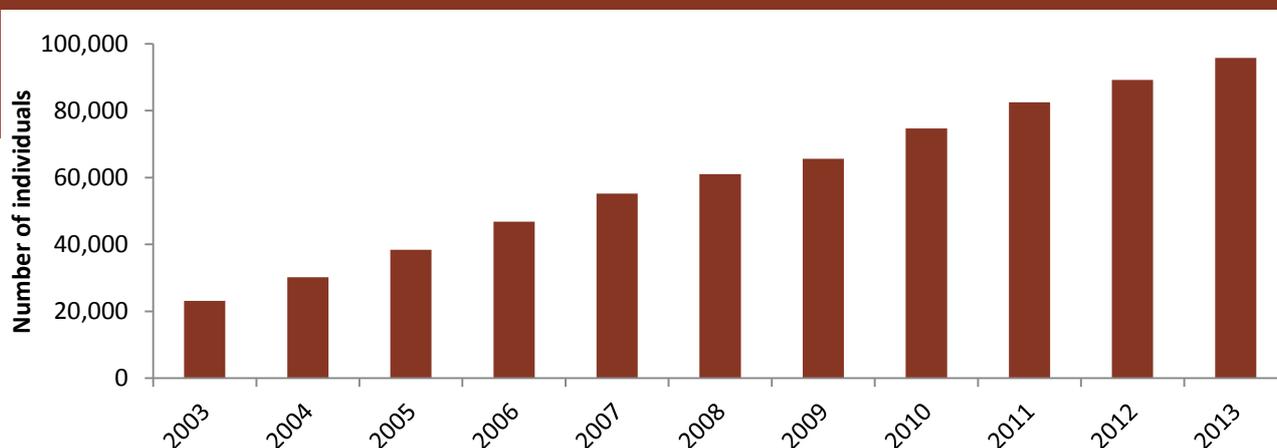
Preparing for a brave new world

Keeping up with the fast pace of digital change requires a strong workforce trained in science, technology, engineering and mathematics (STEM). Yet on average across OECD countries, only about 10% of students who took the PISA 2015 assessment expected to work as science and engineering professionals or technicians (OECD, 2016a). Even countries with the best STEM outcomes (e.g., Finland, Germany, Japan, Korea, Sweden or Switzerland) have few students who aspire to science-related occupations. Helping students see science as a life opportunity and engage with science-related issues is thus more than about grades. Inquiry-based or participative pedagogies are good predictors of engagement and motivation in science-related issues, and can be a useful way to set the stage for careers in this area.

Strong STEM training is necessary but is not sufficient. Students need to be trained in specific skills to address the unique challenges of the 21st century. For example, skills related to military cybersecurity and cyber espionage are increasingly important for national and international security (OECD, 2012b). Along with demand for a strong cybersecurity workforce, the number of cybersecurity degrees and certifications is on the rise, from more than 20,000 in 2003 to close to nearly 96,000 in 2013 across OECD countries (see Figure 4),

and they are being offered by an increasing range of formal and informal educational institutions all over the world (OECD, 2016d). This reflects a clear policy shift in countries' cybersecurity strategies, which also includes investing heavily in a cross-sector cybersecurity research agenda and encouraging the training of "ethical hackers" as an approach to improve cyber-safety (OECD, 2012b).

Figure 4: Number of certified individuals in cybersecurity worldwide



Note: The International Information Systems Security Certification Consortium, otherwise known as (ISC)², issues a range of cybersecurity certifications

Source: OECD (2015) *Digital Economy Outlook 2015* cited in OECD (2016), *Trends Shaping Education 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/trends_edu-2016-en.

Cyber-attacks are not the only technological advance changing the face of the international security landscape: digital, biological and biochemical weapons have also emerged as new technological threats. There is now even concern for neuro-weapons, in the domains of brain-machine interface or memory manipulation for example, which might become the new frontier (Giordano, 2016).



These emerging issues also open up new opportunities for research, increasing need for innovative solutions. Experts from the cybersecurity field can help the public stay informed and knowledgeable about the current threats and opportunities.

This will not only keep research aligned to public goals and expectations, but also ensure that research is supported by government and industry, bolstering future collaboration.

Social Stability Risks and Education

Social and political stability are also global. An unstable society or government in one country may now result in a wave of migrants and refugees to another. This can then give rise to further instability, for example in a rise of increasing xenophobia and social unrest if locals see newcomers as a threat to their employment and access to public services.

Globally, social and political instability are on the rise in both frequency and intensity. Top drivers include economic injustice issues (e.g. jobs, higher wages), failure of political representation and political systems, global injustice (e.g. free trade) and rising social inequality (Ortiz et al., 2013).

Peace and Human Rights Education

One avenue for fostering peace and social cohesion among communities is promoting "citizenship education", "democracy education" or more broadly "peace education". Citizenship education is already part of the national curriculum, and considered a key pillar of education in almost all OECD countries. Following recent terrorist attacks, two-thirds of European countries have revised their citizenship education with the aim of reinvigorating social cohesion, and in particular, addressing the issue of terrorism. These new policies have the objectives of: (1) ensuring that children acquire social, civic and intercultural competencies, (2) promoting intercultural dialogue, and (3) enhancing critical thinking and media literacy. They target all education levels from primary to higher education (European Commission/EACEA/Eurydice, 2016).

Target 4.7 of the UN Sustainable Development Goals emphasises the role of education for promoting human rights, gender equality, and a culture of peace and non-violence.

In a globalised and interdependent world, open and flexible attitudes are required to bring people from different countries, cultures and beliefs together. Schools play a key role in equipping children with the knowledge and understanding of global and intercultural issues,

critical thinking skills and values and attitudes of respect for other cultures. National governments and international organisations, such as UNESCO and the OECD, are increasingly promoting global competency education for intercultural understanding (OECD, 2016c).

New skills for an uncertain world

Global competence is only one dimension of a wider range of educational needs children have in a world of highly complex and interconnected risks and opportunities. Basic literacy and numeracy skills continue to be important, as they play a fundamental role in learning. Critical thinking, problem solving, and the ability to find individual solutions to emerging issues are also important. And increasingly, individuals need skills to effectively manage change and uncertainty in a fast-paced modern world. This includes both cognitive and metacognitive skills as well as socio-emotional skills, such as empathy and the capacity to

collaborate with others (OECD, 2017b). In addition, helping students to understand the value of robust evidence against weak arguments, as well as the limits of such evidence, is also important.

Gamification might be useful to develop such skills (Glover, 2013). Political and geopolitical games have been developed to simulate real world security problems and develop children's strategic and leadership abilities. For example, the "ISIS Crisis" board game has been developed in Canada to strengthen university students' understanding of geopolitical situations and strategic decision-making (PAXsims, 2015).

World Peace Game

Global risk is increasingly incorporated in curriculum as initiatives such as the world peace game, a political simulation, engages students to understand the economic, social, and environmental repercussions of war. Through the exercise student players also have the opportunity to reflect on philosophical issues of military intervention and behaviour that can help support global prosperity. The game can be modified to be suitable across ages and levels.

More information:

<http://www.worldpeacegame.org/>

Countering radicalisation and extremism

There has been a growing concern about "radicalisation" in schools and online. Research and preventive measures such as education, skills development and empowerment of youth, as well as strategic communication online are all topics recently set out in a UNESCO plan of action to prevent violent extremism (UNESCO, 2015).

Radicalisation refers to "the process through which an individual or a group consider violence as a legitimate and a desirable means of action" (UNESCO, 2016).

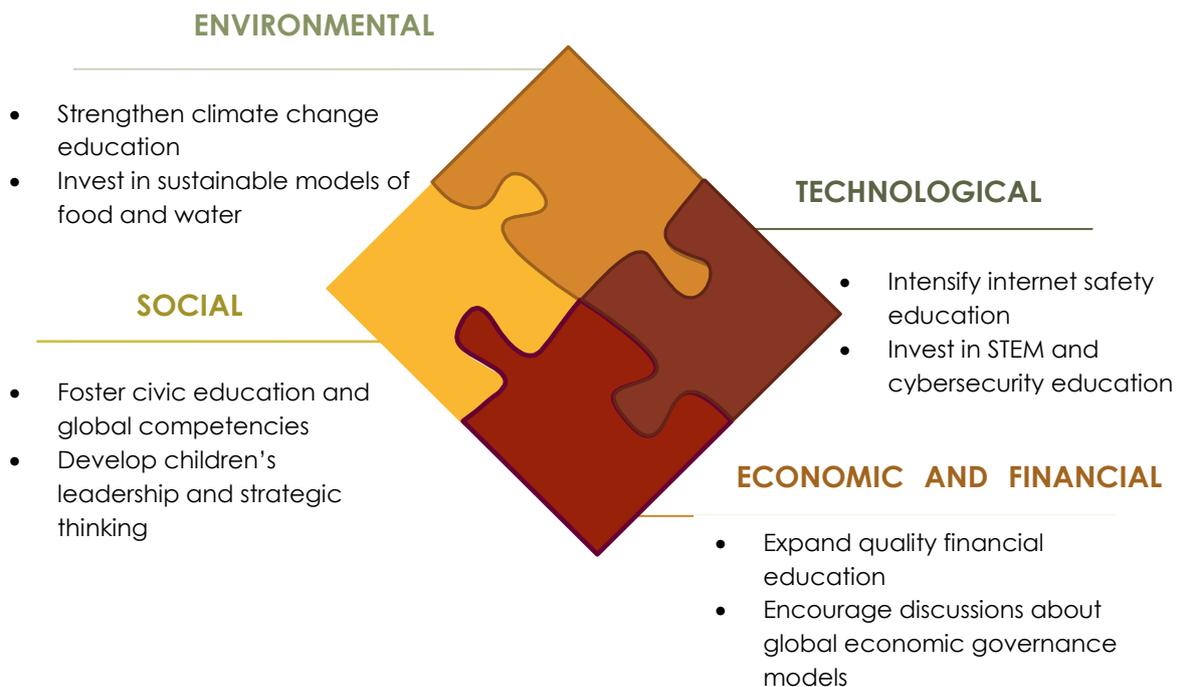
While there are a number of citizenship and education programmes specifically targeted at countering radicalisation, the best way to do this is still not clear. In fact, the evidence for the link between

education and violent extremism is ambiguous. Neither primary, secondary nor tertiary school enrolment rates seem to be correlated with terrorist activity at the national level (Institute for Economics and Peace, 2015). A recent review of 133 countries over 20 years found that education only helped reduce terrorism in countries and contexts where the population had strong and stable institutions and a high level of economic development. In countries where the conditions are poor, greater education was positively correlated with terrorism (Brockhoff, Krieger, & Meierrieks, 2014).

Education is not a panacea against violence and extremism. Combined with efforts to improve socioeconomic and political conditions to reduce social inequality, education can positively influence the occurrence and consequences of violence and extremism. Youth unemployment, income inequality, low social cohesion, and perception of foreign policies are important drivers of violent extremism (Institute for Economics and Peace, 2015). Families, communities and government must all work together to address this risk.

Towards the future

An increasingly dynamic and volatile world presents risks that can have swift worldwide repercussions for adults and children alike. Education is part of a “whole-of-society approach” that incorporates all stakeholders into risk governance (OECD, 2014b). It might also help us enhance resilience and responsiveness and imagine a safer future for all.



Questions for future thinking

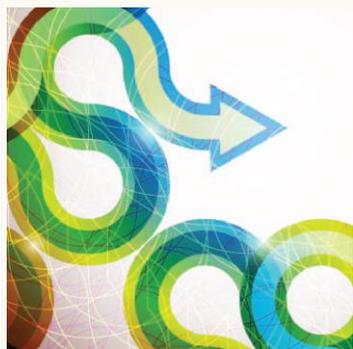
1. What will be the most important risks to our societies in the next ten years? The next twenty years? What kinds of skills will be needed to achieve the local and global co-operation necessary to tackle them?
2. What would education for risk resilience look like, for each level of education? What are the necessary steps in developing such a strategy, and which stakeholders should be part of its design and development?
3. Blockchain technology has great potential for changing the future of finance, voting, consumption or law. New opportunities (e.g., smart contracts, fast and cheap transactions) come with new concerns (energy consumption, security cryptocurrency etc.). The question is: do we identify and incorporate these kinds of developments soon enough in our thinking about education?

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For more information



Contact

Tracey Burns (tracey.burns@oecd.org)

See

OECD (2016), *Trends Shaping Education 2016*, OECD Publishing

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