



## Education: Digital technology's role in enabling skills development for a connected world

Axelle Devaux, Julie Bélanger, Sarah Grand-Clement and Catriona Manville

**M**ore and more day-to-day routine activities can be done with the support of digital technologies, including tablets, mobile phones, laptops and computers to access the Internet at home, and it is increasingly difficult to live in contemporary society without using these technologies. It follows, therefore, that those not able to access these technologies are at risk of being excluded from society (Rust 2014). This access to technologies not only implies having access to infrastructure and hardware, but also having the right skills to exploit the benefits and avoid the pitfalls of this new way of living.

Ofcom's *Children and Parents: Media Use and Attitudes Report* (2014) highlights the prevalence of technology use among 5- to 15-year-olds in the UK.

- Close to nine out of every ten children (88 per cent) have access to the Internet at home.
- Seven in ten (71 per cent) have access to a tablet at home.

- Four in ten (41 per cent) have a mobile phone, and of these, 31 per cent have a smartphone.
- Close to nine in ten (87 per cent) go online using any device; while laptops are still the most common way of using the Internet (66 per cent), mobile phones and tablets are being used more and more.

The increasing use of technology and the growth in connectivity is also disrupting the labour market of today and will continue to do so in the future – a phenomenon labelled the 'digitalisation of work'. Gartner predicts one in three jobs will be converted to software, robots and smart machines by 2025 (Gartner 2014). This change, combined with the use of technology in our personal lives, requires the upskilling of the current workforce and wider population to adapt to an increasingly digital world and to reduce the risk of this change creating a new stratum of social exclusion.

Looking to the future, some estimate that as many as 65 per cent of children in primary school will have jobs which do not exist today (Carroll 2007, 2016; Fey 2012). Therefore, being familiar with information communications technology (ICT) and possessing the skills to use this digital technology are crucial. Employers have noted a disconnect between what young people are being taught in schools and the ICT skills actually required in the workplace: Approximately 72 per cent of large companies and 49 per cent of small to medium-sized enterprises (SMEs) are currently experiencing technical skills gaps in their workforce (Ecorys UK 2016).

However, while digital skills will increasingly be needed for the jobs of the future, the growing availability of ICT and technology in the workplace also means that employers seek a workforce with additional aptitudes. These include sense making, novel and adaptive thinking, new media literacy, computational thinking, cognitive load management, problem solving, critical thinking, teamwork and collaboration, communication, creativity, and innovation (Davies et al. 2011; Herk 2015; Wojcicki & Izumi 2015). Moreover, succeeding in the digital world also requires a wider set of 'digital navigation skills', which include finding information, prioritising information requirements, and assessing the quality and reliability of information. These skills will be increasingly important in the

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labour market of the future and, more generally, for inclusion and participation in society. It is crucial to ensure equal opportunities for all to acquire these skills, without which those who do not have either the relevant skills or access to technology are at risk of being excluded from society (social exclusion).

Education has a crucial role to play in achieving digital, social and labour market inclusion. However, is education preparing today's young people for tomorrow's jobs using yesterday's tools? How can we make sure that we give today's children the tools they need to adapt to tomorrow's world? How can we make sure that education and technologies work in partnership, where education supports the acquisition of the skills required to use technologies and technologies support the teaching and learning process?

Some argue that using technology alters our brain plasticity, cognition and concentration (Carr 2010). It is important to recognise these changes in the delivery of education and skills development to reflect how learners obtain and retain information.

### **Digital education and digital skills**

Digital skills and digital navigation skills are increasingly present in education. Countries such as France and Norway have included digital literacy (defined as focusing on understanding and interacting with everyday ICT tools) as part of their core curriculum, while many other jurisdictions (including Estonia and England) have included computer coding or programming in primary and secondary classes (Belshaw 2011; Euroactiv 2015; Ministère de

l'Éducation nationale, de l'Enseignement supérieur et de la Recherche 2015). However, perhaps more significantly, some countries, such as Finland, are revisiting how the traditional curriculum is constructed, in order to centre it on the kinds of skills that learners will need to navigate a world with fast changing technologies, rather than on the traditional subject/syllabus approach (Ministry of Education and Culture 2011). Is this the way to go? And will we see other education systems following this path?

## **Are we expecting too much from digital education?**

### **Digital education for better learning?**

The use of digital technologies in educational establishments does not necessarily translate into better learning. Recent evidence suggests that, in fact, there is no positive association between the extent to which learners use computers at school and their performance in mathematics, print literacy, or even digital literacy (OECD 2015). Although digital technologies have the potential to improve teaching and learning in a number of ways, they cannot achieve this improvement alone. For example, RAND Europe is currently evaluating an intervention for primary school teachers that uses a digital app to provide immediate and delayed feedback

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to pupils on mathematics tasks (RAND n.d). The app is the digital technology tool – or conduit – by which teachers can provide feedback. But this tool will only be effective if the feedback provided by teachers is of high quality. The use of the app alone will not be sufficient to improve learning.

### **Digital education for inclusion?**

Digital education is often described as an attractive way to reach more people in a faster and more inclusive manner. Digital learning can help bring education to those who cannot physically access it (e.g. learners in hospitals, prisons, remote areas) or who need flexibility in their attendance (e.g. those who study outside work hours). The current refugee and Ebola crises provide examples of the ways in which digital methods are a major delivery channel and can facilitate inclusion for large groups (Gill 2016). In these cases, education technologies are seen as a means (sometimes the only one) to allow vulnerable learners' participation in education. However, recent research on the massive open online courses (MOOCs) phenomenon in the USA and in Europe (e.g. Castaño-Muñoz et al. 2016) shows that the primary beneficiaries of MOOCs are those who already have a higher education qualification, a finding which raises questions about the likely inclusivity of digital education.

## Challenges to digital education

### Ensuring digital education comes with appropriate support for educators

It is not the case that digital technologies can replace poor teaching, but, rather, that digital technologies can enhance good teaching. Digital technologies can help make the students' learning experiences more engaging and can foster 'deep learning'. However, the role of the educator remains crucial to this outcome. Deep learning refers to the idea that students need to learn not only subject content areas, but also how to apply these to other situations in their life through problem solving, critical thinking and communication skills (National Research Council 2012). Digital technologies can promote deep learning if they provide the necessary tools. One example is to extend study time and practice by using a computer programme tailored to provide learners with simulations in which they can practice applying their new knowledge or skills. In this context, the tool provides learners with the opportunity to control their learning situations or it gives them ways in which they can learn collaboratively.

With the right support and training, educators can learn to use digital technologies to help create the conditions necessary for these deeper forms of learning to become more acceptable to their learners. Unfortunately, teachers currently identify the use of ICT in the classroom as one of the areas (and in England the single area) where they are in greatest need of professional development (OECD 2009, 2014).

In addition, due to the availability of information through technology, it is feasible to see the role of the educator as changing,

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from that of knowledge provider to that of coach. In the future, rather than providing the information, educators could concentrate on coaching and mentoring learners (Wojcicki et al. 2015).

### Recognition of credentials and rewards

In the formal education context, the 'digital factor' makes recognition of credentials more complex and of potentially larger scale than in non-digital distance learning. For example, how does the supplier ensure that assessments are undertaken in fair conditions in a distance learning environment? Solutions include the development of blended forms of learning, which combine digital learning and face-to-face events (e.g. tests in a classroom environment).

In the context of less formal digital education (e.g. MOOCs), additional recognition issues include the value of learning outcomes acquired through these forms of learning on an individual's studies or career prospects. Recent research shows that this is of concern to those who take MOOCs, as well as to employers and education institutions who are digital learning providers (Cedefop 2016; Witthaus et al. 2015). In some instances, these providers have proposed solutions, such as the introduction of learning 'badges', which are gaining value beyond the digital learning world and could inspire recognition in non-digital, non-formal and informal learning contexts.

## **What next?**

Are we witnessing a paradoxical reaction towards digital education?

On the one hand, members of the education community can be change pioneers rather than digitalising world followers. On the other hand, change takes time and may encounter resistance from the education community and beyond. Now is the time to step back and think about the challenges ahead and the opportunities offered by digital education to equip current society and prepare for the future, not only to answer the needs of the labour market, but also to shape it.

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## About the Digital Society Thought Leadership Programme 2017

This Perspective explores the ways in which the growth of digital technology is impacting education and skills. The authors state that technology is not only more prevalent in people's lives, but its growing use will affect schools' curriculum, new digital skills in jobs, and the changing use of services. However, they point out that education establishments are not keeping up with the technology growth, that new skills will have to be learnt outside of only digital skills, and that digital technology could lead to increased social exclusion for different sections of our society. This Perspective is part of a series of four exploring the opportunities and challenges that digital technologies are creating within society ahead of the 2017 Thought Leadership programme at St George's House, Windsor which has been designed and will be delivered by RAND Europe in conjunction with the Corsham Institute.

### Authors

**Axelle Devaux** (adevaux@rand.org) is a Senior Analyst at RAND Europe and deputy head of the Brussels office. Her research work focuses on education and training policies with a particular interest in ICT in education and the role of ICT to support vulnerable learners. She has worked with EU institutions for over 12 years and managed the evaluation and implementation of several EU policies and programmes in the education, employment and research policy areas.

**Julie Bélanger** (belanger@rand.org) is a Research Leader in education at RAND Europe. Her responsibilities include providing leadership for research projects ranging from early childhood education and care to higher education. Prior to joining RAND Europe she worked as an analyst in the Directorate for Education and Skills at the OECD where she focused on international education policies. Before this she was a senior researcher at the Canadian Council on Learning where she worked with provincial governments on issues such as large-scale school reforms.

**Sarah Grand-Clement** (sgrandcl@rand.org) is a Research Assistant in the Defence, Security and Infrastructure team at RAND Europe. While in this role, Sarah's research has focused on Middle East, North Africa and Mediterranean security, NATO, and European security issues, with a particular focus on the UK and France. Projects include a study on how new cyber and autonomous technologies shape the way we approach morality in conflict, the use of asymmetric defence in the Baltic states, and the geopolitical implications of the migration crisis on Europe.

**Catriona Manville** (manville@rand.org) is a Research Leader in the Innovation, Health and Science team at RAND Europe. She has managed and worked on a number of projects exploring policy issues around research and innovation in a digital age including healthcare delivery in a range of disease areas and the provision of smart cities. Catriona was a core member of the team in delivering the thought leadership paper, and the primary author of the report summarising the 2016 programme. Whilst at RAND, Catriona has also undertaken research, policy analysis and evaluation studies on higher education, focusing on teaching quality, student admissions and research assessment and funding allocation. She has led and worked on studies for clients in a variety of sectors including the UK Government, European Commission and Parliament, and higher education institutions.

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