**The future use of technology in education and learning in the Commonwealth**

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**The future use of technology in education and learning in the Commonwealth**

**ABSTRACT**. Modern Information and Communication Technologies (ICTs) have increasingly been used in education systems and for learning across the world over the last quarter of a century, and are frequently seen as being an important means of delivering the Sustainable Development Goals (SDGs), especially SDG4. However, rhetoric about their potential benefits has often led to uncritical adoption of inappropriate and costly technologies, that have not benefitted the poorest and most marginalised. This contribution draws on existing research to explore likely uses of such technologies in Commonwealth education systems in the future, and what needs to be done to ensure that these do indeed benefit all citizens, rather than the privileged few who have access to the latest technologies. It begins with a brief overview of existing Commonwealth initiatives, and then explores how ICT use for education and learning throughout the lifecycle is likely to change over the next decade. The next section suggests how Commonwealth organisations can best support governments and citizens in ensuring equitable distribution of relevant learning opportunities and mitigating the negative aspects of technology use in the future. In conclusion, it advocates for the need to focus especially on delivering effective learning opportunities for the poorest and most marginalised, and it highlights the challenges of a future in which machines and humans are ever more intertwined.

**Commonwealth organisations and the use of digital technologies for education and learning.[[1]](#footnote-1)**

This introductory section provides an overview of some of activities undertaken by Commonwealth organisations in support of technology in education, and then discusses the plethora of material available for governments and citizens to draw on from other sources.

## The past role of Commonwealth organisations

Many Associated and Affiliated Commonwealth organisations such as the Commonwealth Consortium for Education[[2]](#footnote-2) and the Commonwealth Education Trust (CET) have a core focus on education and learning;[[3]](#footnote-3) seven have the word ‘education’ in their titles.[[4]](#footnote-4) Until recently, the Commonwealth Secretariat also provided an important resource of expertise on education, not least through its Education Hub.[[5]](#footnote-5) Few of these organisations, though, have explicitly prioritised the use of technology in education and learning, although the Education Hub did, for example, produce a policy brief on Open Educational Resources (OER) (Green *et al*., 2017) and an e-discussion on ICT integration in education (Commonwealth Secretariat, 2015), and the CET has supported an online teacher development programme hosted on Coursera.[[6]](#footnote-6) This apparent lack of emphasis on digital technologies in education among Commonwealth organisations is clearly reflected in the Nadi Declaration emerging from the 20th Conference of Commonwealth Education Ministers in 2018 (20CCEM, 2018), which only mentioned educational technologies specifically in two paragraphs (48 and 50). This may be because technology use in education is increasingly taken for granted as a normal expectation in Commonwealth countries, but it may also reflect a lack of awareness among Commonwealth leaders of many of the challenges associated with its appropriate introduction.

 Three Commonwealth entities have, though, long played a significant role in developing or supporting governments and institutions in using Information and Communication Technologies (ICTs) in the context of education: the Commonwealth of Learning (COL),[[7]](#footnote-7) the Commonwealth Scholarship Commission (CSC),[[8]](#footnote-8) and the Commonwealth Telecommunications Organisation (CTO).[[9]](#footnote-9) COL, for example, has played an important role in sharing good practices in technology-enabled learning, has helped build expertise and content through its work on OER, and since 2000 has created the Virtual University for Small States of the Commonwealth.[[10]](#footnote-10) The latter supports policies in post-secondary education in the small states of the Commonwealth, and provides non-proprietary course materials through its Moodle site. The CSC, a UK Non-Departmental Public Body hosted by the Associated of Commonwealth Universities (ACU),[[11]](#footnote-11) has likewise played a significant role in training postgraduates in effective use of ICTs in education, in supporting largely online distance-based postgraduate courses across the Commonwealth, and in building an effective online alumni network through which former scholars and fellows can exchange information (Perraton, 2009). The CTO, founded in 1901, although by no means specifically an educational organisation, has also provided Commonwealth countries with a wealth of advice and training on the use of telecommunications infrastructure and ICTs more broadly, not least through its Programme for Development and Training. The CTO provides Commonwealth governments with resources on developing appropriate regulatory and policy practices relating to the digital infrastructure required in education, and training in other critical areas such as cybersecurity, child online protection, and indeed education and learning.[[12]](#footnote-12)

## Shaping technology use in education in Commonwealth countries

Against this background, it is important to stress that Commonwealth countries belong to many other international groupings, most importantly the United Nations and regional entities, such as the African and European Unions. They therefore have engagement with a large number of international agencies and funding organisations that proffer advice and training, especially through agencies such as UNESCO,[[13]](#footnote-13) UNICEF and the ITU, all of which maintain expertise at the interface between education and technology. Most of these have signed up to the rhetoric that ICTs are a powerful tool that can be used to deliver the SDGs, and especially SDG4 to ‘Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’.[[14]](#footnote-14) In part, such faith in the ‘power of technology’ has been specifically manufactured by private sector companies profiting from the sale of digital technologies, and eager to highlight their benefits whilst ignoring their downsides (Unwin, 2017). Many civil society organisations and international NGOs are also eager to be part of this rhetoric of hope, and contribute yet further advice and support to Commonwealth countries on the strategies they should adopt with respect to technology in education. It is therefore scarcely surprising that there has been a proliferation of ICT for education initiatives in Commonwealth countries. Unfortunately, many of these have failed to deliver the results expected, particularly with respect to the learning outcomes of the poorest and most marginalised children.[[15]](#footnote-15)

 Looking to the future, there is increasing global recognition that the use of new technologies is changing ways of learning, living and working. However, all too often technology is seen as having an instrumental power. The UN Secretary General and the Chief Executives Board (CEB) thus conceptualise technology, particularly Artificial Intelligence (AI), as changing the nature of work, and that this requires educational systems to be changed so that everyone can have the appropriate skills to find gainful employment.[[16]](#footnote-16) Such an approach is fundamentally flawed because these technologies do not yet have any power of their own to change things; technologies are created by people with particular *interests* to do specific things. More often than not, they are intended to create profit and drive economic growth. Educational systems are also essential precursors for appropriate technologies to be designed and legitimated in the first place. The world needs qualified people with appropriate interests to design technologies that will be used, for example, to reduce inequalities, rather than to increase them. At present most usage of ICTs is actually maintaining high levels of inequality across the world, or is indeed increasing them (World Inequality Lab, 2017).

**The future of technology in education and learning throughout the life-cycle.[[17]](#footnote-17)**

***The evidence base***

There is still no clear agreement of the real impact of ICTs on learning outcomes, despite all the ICT for education initiatives that have been implemented in Commonwealth countries over the last two decades (Jigsaw Consult, 2017; Unwin *et al*., 2017). There remain many advocates of its positive contributions, as with the work of COL on teacher training,[[18]](#footnote-18) the UK Open University’s initiatives such as TESSA[[19]](#footnote-19) and the TESS-India Hindi MOOC,[[20]](#footnote-20) RTI’s work in Kenya on teacher coaching,[[21]](#footnote-21) and Educators International’s work on phonics,[[22]](#footnote-22) to name but a few. The novelty of technology can itself be a factor in motivating teachers a d students to learn. The vast majority of technology in education initiatives are claimed as successes, but increasing research is revealing that the much-vaunted benefits claimed by advocates have often been misplaced, and not only that there are few clear educational benefits, but also that there can be considerable harm in the use of many so-called ‘educational technologies’ (OECD, 2015; UNICEF, 2017).

There are many reasons underlying this lack of understanding about the real impact of technology on education: the time taken for educational interventions to have a clear outcome; different research methods and approaches can yield very varied results; solutions designed in one context may not be appropriate in another; the diversity of technologies being used makes it difficult to attribute specific outcomes to particular interventions; the focus on measuring inputs rather than outcomes; biases in the research process that are driven by the success motive; and the failure to fund high quality and rigorous monitoring and evaluation.[[23]](#footnote-23)

***Likely Commonwealth-wide evolution to 2030***

Drawing on existing trends, six broad developments are likely to take place in the use of digital technologies in education and learning in Commonwealth countries over the next decade until the end of the UN’s Agenda 2030:

* *There will be much greater diversity in the use of ICTs in education systems and by learners wherever they are.* Those who can afford the latest technologies, either as individuals or as Ministries of Education will indeed acquire them. This applies as much in richer countries of the Commonwealth as it does in economically poorer ones. However, these technologies will not always be used wisely, and indeed in many contexts they may well reinforce existing ‘learn and regurgitate’ models of learning. However, where teachers have been well-trained in the appropriate use of the latest technologies, they may indeed be used in novel and creative ways to enhance children’s motivation, learning and skills acquisition.
* *Most education leaders and systems will encourage expansion in the use of ICTs.* This will be driven primarily by the interests of private sector companies, but increasing evidence of the potential benefits of such technologies may also drive change, hopefully for the better. The need for digitally skilled labour will lead to an increasing emphasis on STEM subjects (Science, Technology, Education and Mathematics), which may well lead to a critical shortage of social scientists and people trained in the humanities with the necessary skills to help societies understand themselves and evolve peacefully.
* *Well trained teachers will remain essential to the learning process, and their role will evolve rapidly.* In the best education systems, the role of teachers will continue to evolve positively so that they primarily become guides to help children live and learn throughout their lives in an increasingly digital world. However, a persistent lack of qualified teachers will limit the benefits that could be achieved through the effective use of technologies in schools. The biggest challenge facing education systems will continue to be the training, support and retention of inspirational and well-qualified teachers.
* *The mix of digital content and devices will evolve in ways that enable learners of all ages to have much greater choice and control of their own learning.* The amount of content available to learners will continue to increase, although a few major companies may come to dominate the formal educational market. Despite the increasing diversity of such content, it is unclear whether it will be used effectively by learners. The increasing trend towards video content will place considerable additional burdens on available bandwidth, which is likely further to disadvantage those with limited digital connectivity, despite the claimed benefits of 5G. As more people have their own digital devices, it is likely that there will be a shift to educational platforms accessible from any device, so that bring-your-own models of digital learning will dominate. However, this will serve as yet another driver of inequality, since rich learners will be able to afford more advanced and better technologies than poorer ones.
* *Advances in the quality and extent of digital technologies, especially Artificial Intelligence* *(AI), combined with the increasing power of big data analytics will enable more personalised and refined summative and formative assessment of learning outcomes.* Complete records of a child’s academic performance will be available to teachers and future employers. Moreover, increasing numbers of teachers will also have the latest AI and data analytic software to enable them to help pupils follow the optimal learning path to achieve their educational goals.[[24]](#footnote-24) Such technologies are also helpful in countering plagiarism and the provision of poor quality or illegal courseware.
* *Learning will become less school focused, and the role of parents and communities will increase in ensuring effective and relevant learning experiences.* An increasing number of education systems will fail without very substantial investment. This will lead to greater emphasis on learning outside formal educational institutions such as schools, as well as more emphasis on life-long learning in a community context. ICTs offer very great opportunities for delivering effective informal learning, that can provide highly personalised options for life-long skills acquisition.

***Trends in technology use in learning in marginalised contexts***

The availability and impact of digital technologies will, though, continue to vary significantly between and within countries; the rich and privileged are those who can afford and thus benefit from the latest digital technologies. In deprived and low-resource contexts of the Commonwealth the following additional developments therefore seem likely in the short- to medium-term:

* *The range of innovative solutions for delivering learning through ICTs in deprived contexts will increase, funded in part by bilateral and multilateral donors, but many of these initiatives will fail to deliver anticipated educational outcomes*. Donors are increasingly placing emphasis on innovation and entrepreneurship in delivering development outcomes, but most innovations fail and such investments may therefore not yield the intended learning benefits (Farson and Keyes, 2003). There will also be a dramatic increase in the number of technological solutions available for delivering enhanced education, which means that it will become increasingly difficult for teachers, trainers and government officials to sift through the rhetoric of success, to judge what is indeed most appropriate in any specific context.
* *Device sharing will become more common for effective learning*. In the short-term, the poorest and most marginalised will still not be able to afford their own high-quality digital devices to support effective learning, and device sharing will therefore remain important in these contexts. This may, though, have the advantages of encouraging collaborative learning, and also the opportunities for inter-generational knowledge and skills sharing within households that could provide additional health and educational benefits for all family members.
* *Digital multi-purpose hubs and community centres will in the short-term remain important for enhancing learning.* Access to electricity and Internet connectivity are likely to remain limited for the poorest and most marginalised over the next decade. Consequently, the availability of such infrastructure in multi-purpose community resource centres, that can include libraries, training facilities, and health service provision, will remain important. Many such centres are currently poorly conceived and implemented, and it is essential that good practices in their implementation are therefore widely shared, so that the poorest can benefit.
* *Caching online content for offline use will benefit marginalised communities*. The downloading and caching of appropriate educational content where there is good connectivity, and its physical transport to, and use in, remote areas where schools or households remain unconnected will remain an important way for isolated communities to benefit from ICTs learning.
* *Life-long and life-wide learning become increasingly informal and mobile*. ICTs have very considerable potential to enable everyone to gain the necessary skills and knowledge needed to live fulfilled lives and gain remunerative employment. It is therefore important that children at an early age learn how to use such ICTs safely and appropriately to gain the skills and understanding that they will subsequently require. Increasingly, though, the proportion of learning that people gain during their lives in schools will decline, and the amount gathered informally and out-of-school will increase, especially later in life. Much of this will be achieved through the use of basic mobiles devices which are already becoming cheaper and more powerful.

***Trends in crisis-affected areas***

A further set of predictions can be made about the likely use of ICTs by people for life-long learning from childhood to old age in crisis-affected areas of the Commonwealth. Particular emphasis should be placed on supporting these groups not only because they are some of the most marginalised, but also because such crises are likely to increase in the future.

* *The greater availability of mobile devices and content will enable those fleeing crises to continue to participate in both formal and informal learning*. Mobile devices are useful for providing children on the move with access to learning opportunities. Learning initiatives using mobile devices to support refugees are increasingly common, and such schemes are likely to be extended in the near future. It remains important, though, to plan ahead for delivering such solutions, so that they can be implemented swiftly when needed.
* *Greater amounts of relevant online content and platforms specifically for crisis contexts will be available.* Children trying to survive in acute crisis contexts have burdens vastly over and above those who can go to school. If appropriate content for children in such crises is developed in local languages, it can provide an invaluable resource to help them continue to learn, not only about the context in which they are trying to survive, but also about subject matter and skills relevant to the curriculum that they were studying.
* *Online psycho-social and trauma counselling will increase in availability and use*. Online counselling and self-help materials are becoming increasingly available. Such practices could prove to be invaluable for children and adults in crises, especially when they have lost members of their families and friends (UNICEF, 2017). Again, though, these need to be culturally sensitive, and prepared in advance in the anticipation of potential crises.
* *Digital schools-in-a-box will become more widespread for use in emergencies and refugee crises.* In most acute crises access to electricity and connectivity is seriously disrupted, and school buildings are often destroyed or inaccessible. If resources can be made available, integrated school-in-a-box solutions could be developed to provide electricity, content and connectivity, and be made available in crisis contexts almost immediately.
* *Provision of knowledge about host countries.* It is very important that migrants and displaced people know about the places where they are travelling through or end up staying. Online content and resources, specially tailored to their needs, are therefore particularly important, and are likely to become more widely produced and available.

Two additional developments are likely in the context of longer-term crises:

* *Digital learning centres and hubs in refugee camps will become more widespread and better resourced*. The presence of large numbers of people located closely together in refugee camps offers considerable potential for the use of digital hubs to provide learning and skills development opportunities for children and adults. These could enable refugees to become better educated, and thus have the potential to earn a sustainable living in the future. Such centres could also provide health training and other relevant advice, and could furthermore be used by adults to gain skills and knowledge relevant to employment.
* *Hybrid cultures of learning are also likely to be developed.* Refugees often want to return to their home countries, and children thus also need to gain learning experiences relevant to their original national curriculum. However, governments of host countries frequently prefer them to learn using their often rather different curricula. Digital technologies using AI to filter relevant material can usefully facilitate the development of learning pathways that focus on content and skills that are common to both home and host country curricula. In the longer term, it is also possible to envisage an expansion in the number of hybrid curricula that are developed specifically to support the learning needs of refugees in areas of protracted crisis.

***Mitigating the negative aspects of technology in education and learning***

Alongside these generally positive developments, it is essential to mitigate the potentially negative aspects of technology use, and their tendency to increase social, economic, cultural and political inequalities. There is now growing recognition of the challenges and potential harm that digital technologies can do, especially to young people, both in the classroom and beyond. In May 2019, for example, leaders of 120 schools in the UK launched a campaign to ban the use of mobile ‘phones anywhere on their school sites.[[25]](#footnote-25) Three broad areas of concern can be recognised.

First, there is a lack of consistent evidence to show that the use of ICTs in schools actually does increase positive learning outcomes. The OECD, for example, concluded in an important study in 2012 that ‘Overall, the results of the estimates presented in this report point to a generalized negative correlation between the use of ICT (in terms of either intensity or deviations from the mean) and PISA test scores’ (Biagi and Loi, 2012, p.25), and more recently, they have suggested that ‘the connections among students, computers and learning are neither simple nor hard-wired; and the real contributions ICT can make to teaching and learning have yet to be fully realised and exploited’ (OECD, 2015, p.15). A further, and much deeper, ethical question that also needs to be considered is the ways through which the use of ICTs in schools and life-long learning may be influencing the long-term relationships between humans and machines. This goes beyond the immediate remit of this essay, but the rise of transhumanism (H+) and the increasing reliance of young people on digital memories, rather than their own inbuilt memories, pose real challenges for education and learning in the future (O’Connell, 2018). This is returned to in the conclusion of this essay.

Second, there is widespread concern that digital technologies, particularly social media and mobile devices, can be a significant distraction that prevents students from learning. Although much of this is anecdotal, a growing body of research suggests that many students do indeed perform better in the absence of such devices (Kuznekoff and Titsworth, 2013; Beland and Murphy, 2015).

Third, the evidence is now incontrovertible that digital technologies are not merely distractions, but can cause serious harm to children; UNICEF (2017) has identified three main areas of risk: content, contact and conduct. In particular, they emphasise the threats of cyberbullying, online child sex abuse and exploitation, but other areas of risk also include digital addiction and the rising trend towards digital depression.

**The role of Commonwealth organisations in the future of technology and education**

Governments and individuals have the unenviable balancing act of trying to put in place legislation and practical strategies to maximise the potential benefits of new technologies for education and learning, while also minimising their negative impacts. The role of relevant Commonwealth organisations is to support them in this task.

 The Commonwealth is distinctive in many ways, and generalised educational solutions developed elsewhere will not be appropriate for all 53 countries within it, or even for a sub-set thereof. One size fits all is not an appropriate concept; context matters. The Commonwealth combines rich and poor: whilst all countries have inequalities within them, the educational challenges facing Australia, Canada, New Zealand, Singapore and the UK are very different from those facing Commonwealth countries in Africa and Asia. It has a higher proportion of small island states than does the world as a whole: 31 Commonwealth states (58.5%) are in this category. It is heavily dominated by Africa (19 states), the Caribbean (12 states), and the Pacific (11 states). Its legal system is based on Common Law, as opposed to Statutory or Regulatory Law, which has significant impact for all aspects of life, particularly around education and technology; many people in Commonwealth countries also speak English as one of their languages, which has considerable value in developing educational and training solutions at scale.

 These characteristics mean that there is indeed an important role for Commonwealth organisations in assisting citizens and governments of its 53 states to identify and implement the good practices identified by global organisations in the specific contexts of their own countries. However, Commonwealth countries can also play a very significant role in reaching agreements and developing actions that can then be shared more widely at the global level. The Commonwealth comprises more than a quarter of the world’s countries, and a third of its populations, and its shared heritage means that it is often much easier to reach such agreements within it than it is at the larger scale of the UN.

 The larger Commonwealth organisations, such as the ACU, COL and the CTO working collaboratively together with member states, the Secretariat and smaller Commonwealth entities, could have a significant impact in shaping wider global action concerning four dimensions of engagement at the interface between education and technology. First, by focusing largely on economic growth as a means to reduce poverty, the UN-led Millennium Development Goals (MDGs) and their successor SDGs[[26]](#footnote-26) have led to a global increase in inequality, and this has been fuelled by the use of ICTs (Unwin, 2017). If the poor and marginalised are indeed to benefit from the potential of digital technology use to enhance learning, then it is essential that all governments focus attention primarily on the most marginalised, those with disabilities, out of school youth, women and girls in patriarchal societies, and refugees. This requires initiatives to provide digital connectivity first in the most marginal areas, and for technologies to be designed *with* these often-forgotten groups, rather than simply ‘for’ them. It also requires substantial investment in environmentally sustainable energy solutions to ensure that people living in rural and other marginal areas have sufficient electricity to power their digital devices. The Commonwealth experience in small island states, and some of the poorest countries of Africa and Asia provides an especially good opportunity to focus on these particular issues.

 Second, there is no point in re-inventing the wheel. Working together, sharing good practices, and drawing on the rich experiences of Commonwealth entities, can all help to reduce the costly mistakes and failed innovations of the past. COL, for example, has a track record of disseminating good practices in distance education, and could play a greater role in the future in co-ordinating wider Commonwealth educational agendas that involve the use of digital technologies. The UK Department for International Development’s (DFID) recently-announced directorate for a research and innovation hub on technology for education,[[27]](#footnote-27) could also play a very significant role in delivering such knowledge sharing specifically within Commonwealth countries.

 Third, it is essential for Commonwealth organisations to reinforce the message that effective progress will only be made when there is a balance within initiatives between maximising the benefit of the technologies whilst also mitigating their potential harm. As noted above, too much attentiopn in the past has been placed on the former, with insufficient emphasis on the latter. The Commonwealth’s shared legal heritage may well be a distinct advantage here, enabling the development of novel appropriate legal instruments to ensure this balance.

 Fourth, Commonwealth organisations’ long experience of working with teachers and trainers can be used to reinforce the central importance of effective pre-service and in-service teacher training in any technology supported education initiatives. There is little point in introducing technologies into schools or workplace learning programmes without teachers and trainers being appropriately trained in their effective use (Unwin, 2005).

**A cyborg future?**

Discussions over the interface between technology, the future of work, and the need for appropriate skills acquisition for workers in the future dominate much contemporary international discussion (CEB, 2018). In a decade’s time, however, these will appear to have been mundane and naïve. The real challenge for the future is the physical interface between machines and humans. Already machines can do most things far better than humans. Instead of adding machine ‘bits’ to humans, we will soon be adding human parts to machines. Human-machine memories may be programmable, without children even having to go through the experience of learning in schools (Papadopolous, 2019). Again, with their common language and legal systems, Commonwealth leaders are well-placed to take a global lead in discussing the kind of future we wish to create around the interface between technology and learning; they must explore the very challenging ethical debates that this involves.

**References**

20CCEM (2018) Nadi Declaration. Education can Deliver. London: Commonwealth Secretariat. <http://thecommonwealth.org/sites/default/files/inline/20CCEMNadiDeclaration.pdf>.

ACU (2019) *The Road to 2030: Building a Better World Through Higher Education*. *Strategy 2019-2025*. London: Association of Commonwealth Universities. <https://www.acu.ac.uk/about-us/acu-strategy-the-road-to-2030>.

Beland, L-P. and Murphy, R. (2015) Ill communication: technology, distraction & student performance, London: LSE Centre for Economic Performance, Discussion Paper 1350, <http://cep.lse.ac.uk/pubs/download/dp1350.pdf>.

Biagi, F. and Loi, M. (2012) *ICT and Learning: Results from PISA 2009*, Luxembourg: Publications Office of the European Union. European Commission Joint Research Centre, JRC Scientific and Policy Reports.

CEB (Chief Executives Board for Coordination, UN) (2018) Report of 36th Session. New York: UN. <https://www.unsceb.org/CEBPublicFiles/CEB-2018-6-HLCP36.pdf>.

Commonwealth Secretariat (2015). ICT Integration in Education. Commonwealth Education Hub Discussion. London: Commonwealth Secretariat. <https://www.thecommonwealth-educationhub.net/wp-content/uploads/2015/06/ICT-Integration-in-Education-Final-Summary.pdf>.

Farson, R. and Keyes, R. (2003) *The Innovation Paradox: the Success of Failure, the Failure of Success*. New York: Free Press.

Green, C. and Vollmer, T, with West, P and Mishra, S. (2017) Commonwealth Open Educational Resources Policy Brief. London: Creative Commons, Commonwealth Secretariat and Commonwealth of Learning. <https://www.thecommonwealth-educationhub.net/wp-content/uploads/2016/11/Policy_Brief_OER_2017_07.pdf>.

Kuznekoff, J.H. and Titsworth, S. (2013) The impact of mobile phone usage on student learning, *Communication Learning*, 62(3), pp. 233-252, <https://doi.org/10.1080/03634523.2013.767917>.

O’Connell, M. (2018) *To be a Machine*. London: Granta Press.

Thubron, R. (2018) Chinese schools using facial recognition to analyse students’ emotions. *Techspot*. <https://www.techspot.com/news/74719-chinese-school-using-facial-recognition-analyze-students-emotions.html>.

Jigsaw Consult (2017) *DFID: Mapping education technology*, <https://www.jigsawconsult.com/stories/3-dfid-mapping-education-technology>.

OECD (2015) *Students, Computers and Learning: Making the Connection.* Paris: OECD Publishing, <http://www.oecd.org/education/students-computers-and-learning-9789264239555-en.htm>.

Papadopolous, L. (2019) Google "Brain Implants" could make learning obsolete in 20 Years, says AI expert: we could have implants in our heads that automatically download all knowledge into our brains, *Interesting Engineering*, <https://interestingengineering.com/google-brain-implants-could-make-learning-obsolete-in-20-years-says-ai-expert>.

Perraton, H. (2009) *Learning Abroad: A History of the Commonwealth Scholarship and Fellowship Plan*. Cambridge: Cambridge Scholars Publishing.

UNESCO *et al*. (2015) *Education 2030: Incheon Declaration and Framework for Action*. Paris: 2015.

UNICEF (2017) *State of the World’s Children 2017: Children in a Digital World*. New York: UNICEF. <https://www.unicef.org/sowc2017/>.

Unwin, T. (2005) Towards a framework for the use of ICT in teacher training in Africa, *Open Learning: The Journal of Open and Distance Education*, 20(2), pp. 113-129.

Unwin, T. (2017) *Reclaiming Information and Communication Technologies for Development*. Oxford: Oxford University Press.

Unwin, T., Weber, M., Brugha, M. and Hollow, D. (2017) *The Future of Learning and Technology in Deprived Contexts*. London: Save the Children International. <https://resourcecentre.savethechildren.net/authors/unwin-tim>.

World Inequality Lab (2017) *World Inequality Report 2018*. World Inequality Lab. <https://wir2018.wid.world/>.

1. All links cited in footnotes and references were accessed between 16 and 22 May 2019. [↑](#footnote-ref-1)
2. <http://commonwealtheducation.org/> [↑](#footnote-ref-2)
3. <https://www.cet1886.org> [↑](#footnote-ref-3)
4. <http://thecommonwealth.org/organisation-directory> [↑](#footnote-ref-4)
5. All too often such ‘Hubs’ are created with insufficient understanding of the needs of potential users, and they regularly fail to live up to expectations. [↑](#footnote-ref-5)
6. <https://www.cet1886.org/teacher-development-2/> [↑](#footnote-ref-6)
7. <https://www.col.org/> [↑](#footnote-ref-7)
8. <http://cscuk.dfid.gov.uk/> [↑](#footnote-ref-8)
9. <https://cto.int/> [↑](#footnote-ref-9)
10. <https://vussc.info/> [↑](#footnote-ref-10)
11. Interestingly, though, the ACU (2019) makes no specific mention of digital technologies in its 2019-25 strategy. [↑](#footnote-ref-11)
12. <https://cto.int/training/learning-resources/> [↑](#footnote-ref-12)
13. <https://en.unesco.org/themes/ict-education/action> [↑](#footnote-ref-13)
14. <https://sustainabledevelopment.un.org/sdg4> . See also UNESCO *et al*. (2015) [↑](#footnote-ref-14)
15. Unwin *et al*. (2017). [↑](#footnote-ref-15)
16. UN Chief Executives Board for Coordination, Report of 36th Session, Rome, October 2018, <http://www.unsceb.org/content/report-36th-session-october-2018-rome>. [↑](#footnote-ref-16)
17. This section draws heavily on the author’s recent reports on the future of technology use in education in deprived contexts for Save the Children (Unwin *et al*., 2017), and for UNICEF (unpublished). These reports contain comprehensive references to the relevant literatures, and are based on widespread consultation with colleagues who have long experience in the field. [↑](#footnote-ref-17)
18. http://oasis.col.org/handle/11599/676 [↑](#footnote-ref-18)
19. <http://www.tessafrica.net/> [↑](#footnote-ref-19)
20. <https://www.open.edu/openlearncreate/course/index.php?categoryid=45> [↑](#footnote-ref-20)
21. <https://shared.rti.org/content/national-rollout-coaching-tangerine-kenya> [↑](#footnote-ref-21)
22. <http://phonicsrwanda.net/about-us/> [↑](#footnote-ref-22)
23. <https://unwin.wordpress.com/2018/07/16/why-we-dont-really-know-very-much-about-the-influence-of-icts-on-learning-and-education/> [↑](#footnote-ref-23)
24. Chinese schools are already, for example, using facial recognition to analyse students’ emotions and behaviours in an effort to improve performance and monitor the effectiveness of teachers (Thubron, 2018). [↑](#footnote-ref-24)
25. <https://news.sky.com/story/corrosive-mobile-phones-should-be-totally-banned-in-schools-11723484> [↑](#footnote-ref-25)
26. This remains true despite the welcome addition of SDG10 which is intended to focus on reducing inequalities. [↑](#footnote-ref-26)
27. See <https://www.great.gov.uk/export-opportunities/opportunities/multi-country-directorate-for-a-research-and-innovation-hub-on-technology-for-education>, and <https://blogs.worldbank.org/edutech/new-research-hub-use-technology-education-developing-countries> [↑](#footnote-ref-27)