Beyond Current Horizons

technology, children, schools and families

Educational, social and technological futures: a report from the Beyond Current Horizons Programme

"The first need is to become aware of the world in which we live; to survey its forces; to see the opposition in forces that are contending for mastery; to make up one's mind which of these forces come from a past that the world in its potential powers has outlived and which are indicative of a better and happier future." (Dewey, 1958)

Keri Facer
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I hope that this document, and the materials we have developed online, can act as the starting point for many more such challenging conversations and that these conversations will lead to the re-design of education to meet the needs of all young people, families and communities over the coming years.

Professor Keri Facer
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Executive Summary

The Beyond Current Horizons programme explores the potential futures for education that might emerge at the intersection of social and technological change over the coming two decades. Its purpose is to map out current and emerging socio-technical trends, the critical uncertainties in our understanding of future socio-technical developments, and the challenges or opportunities that such developments might offer to educators.

What socio-technical developments are likely to shape the next two decades?

Should existing long-term trends continue, the following developments are likely to be critical in shaping the world within which education will be acting over the coming 10-20 years:

The information landscape gets denser, deeper and more diverse. Social trends toward accountability and security, the decreasing cost and increasing availability of digital storage capacity, the development of new forms of bio- and genetic information, the ability to digitally tag almost any physical object, space or person, the ability to represent information in more diverse media; all of these developments increase the capacity to simply 'know more stuff about more stuff'. We will potentially be able to gather, store, examine and circulate more data, in more diverse forms, about more aspects of ourselves, and our world, than ever before.

Creating the personal 'cloud'. In the near future the capacity to connect to a network, and be constantly connected to knowledge, resources, people and tools will be taken for granted in most countries with a robust technology infrastructure. Individuals will have the capacity to remain in 'perpetual contact' with diverse networks and communities, both physical and virtual. The rise in mobile and personal technologies and the lowering of barriers to data storage, mean that individuals are increasingly likely to 'wrap' their information landscape around themselves rather than managing it through institutions.

Working and living alongside machines becomes increasingly normal and our understanding of what we mean by 'machines' may change as non-human entities are more radically embedded into human bodies, and machines become semi-autonomous actors in social networks**.** Over the coming two decades, people are likely to become increasingly accustomed to machines taking on more roles previously occupied by humans across both professional and manual occupations and in homes and workplaces. Whether through devolving simple tasks or outsourcing the management of complex systems, such devolution of responsibility potentially brings a number of adjustments in our understanding of the respective roles of machines and humans. It may raise significant ethical tensions and generate public debate relating to questions of dependence and autonomy, and of privacy and trust, particularly when it comes to the use of complex systems to manage sensitive data and critical systems. Such debates may play themselves out particularly between different generations with different attitudes to delegating power and responsibility to machines.

Distance matters less, but geography still counts. The separation of 'information resources' from physical location will continue. On top of this, people are likely to become more familiar with and more used to working together at a distance. As technological developments help to increase a 'sense of presence' in remote interactions, and as social norms and etiquette for such interactions are developed between families, friends and in workplaces, being 'together apart' is likely to become a more familiar aspect of working, personal and leisure lives. This is amplified by trends towards increased mobility within and between countries for work opportunities, and towards increasingly 'distributed' families where family members live in different places.

However, geography is likely to continue to play a role in shaping the level of access that individuals and groups will have to digital networks: pricing and infrastructure, legal constraints and regulatory issues will still be influenced by physical geography. Similarly, people will still continue to use 'place' and physical location as a marker for identity, however 'virtual' their interactions, and the 'face to face' is likely to retain its importance for specific interactions. Physical proximity is also important in creating cultures of innovation and development, particularly from an economic perspective.

'Digital Natives' grow up and need to keep learning. On current trends, Western Europe will be characterised by an ageing population over the coming two decades, with over 50% of the population aged over 50 by 2030 with a further 40 year life expectancy. The adult-child relationships of the 20th century are likely to continue to be unsettled and evolve new forms; care will need to be passed up as well as down the generations; today's so-called 'digital natives' will, like their parents before them, need to learn to use new technological environments throughout their lives. Substantial changes to distribution of educational resources across the lifecourse will need to be envisaged as this cohort will be required to work (and learn) later in life. Moreover, such late life activities will be patterned by significant inequalities in health and wealth.

Weakening of institutional boundaries. The disaggregation of information from institution, the capacity to interact easily at a distance, the apparent preference for merging 'working' and 'leisure' practices amongst certain age groups and in certain workplaces, the creation of personal 'clouds' of information, people and resources, the erosion of strict boundaries between education, working and retirement as people have to work longer and develop new skills later in life, the demand for adults to manage multiple working and caring roles and for employers to find ways of enabling more flexibility in managing work practices, the increasing merging of public and private provision of public services; all of these different trends suggest that the next two decades will see an increased weakening of boundaries between institutions previously seen as separate – between workplace and home, entertainment venue and educational establishment.

The decline of the 'knowledge economy' as a utopian future. Current trends suggest that the world of work is likely to become increasingly polarised as a result of the intersection of demographic and technological trends over the coming two decades. Highly competitive R&D activities and knowledge work will continue to be needed, but the capacity for digital technologies to enable businesses to 'offshore' all forms of work to the lowest cost environment, to produce many products and services at ever decreasing cost and by ever fewer people, and to standardise and manage diverse workforces, leads to the suggestion that highly rewarded, creative and autonomous work is likely to be restricted over the coming two decades to ever smaller global elites. In contrast, ageing populations and the rise in demand for individuals to play multiple working, caring and learning roles, are likely to see a rise in demand for caring, face to face and personal services roles, often roles which are poorly rewarded and valued. These developments may bring an end to current hopes of a democratic 'knowledge economy' and hasten the search either for changed social values to mitigate the potential inequalities of a polarised workforce, or for new sites of investment and development (such as in the environmental or 'virtual world' sectors).

'Silver bullets' are not expected for complex educational problems. Despite the continuing demand for quick fixes, neuroscience, computing and bioscience are not expected to provide easy solutions to educational issues over the coming two decades. Progress may be made in relation to specific disabilities or difficulties – for example, the development of better prostheses, new learning methods or targeted pharmacological enhancements for particular conditions. However, significant tensions may emerge around the ethics of such developments, their commercialisation and their wider application. Silver bullets, also, are not expected to emerge in relation to economic

affairs, with constraints on public finances expected to continue and no significant new sources of revenue emerging for education.

How far will these changes influence social and cultural values?

Social and cultural values will continue to be played out through technologies**.** New technologies can be appropriated for diverse social, political and economic ends. Developments in remote working and automation, for example, can be used both to open up opportunities for human centred, family-friendly working practices, and to make it increasingly easy for businesses to offshore work to the lowest cost, least demanding workforce. Developments in social media can enable individuals both to engage with new communities or can reinforce connections with existing interest groups, national identities and religious beliefs. Developments in online technologies may allow both rapid and open knowledge sharing and ideas generation between individuals, and the ability to identify and control circulation of information and material, the better to protect intellectual property.

Over the coming decades, emergent technologies will be mobilised to support all social, economic and cultural agendas, from progressive to conservative, from radical to traditional. In themselves, they are unlikely to sway social values inevitably towards one trajectory or another; they will not, in and of themselves, for example, be responsible for a shift towards individualism or collectivism, towards increasing tolerance or conflict. Indeed, other forces – economic, environmental, religious – are likely to act as more significant drivers of such cultural changes than 'technologies themselves'.

Within education, the socio-technical developments described above could be mobilised to create widely divergent education systems. The developments in remote interactions and in disaggregation of content from institution; the rise of the personal 'cloud'; the diagnostic potential of genetic and neuro-science; the ageing population; all of these, when combined with different social, political and cultural values lead to very different pedagogies, curriculum, institutional arrangements and cultural dispositions towards learners. For example, the following 6 scenarios were developed by participants in the programme as prompts for reflection about the divergent potential directions of education over the coming 20 years:

'informed choice' – a highly personalised education system structured around the individual collaborating lifelong with mentors and structuring education provision from diverse sources around their needs

'independent consumer' – a highly atomised education system in which individuals are able to choose from a complex menu of standardised provision from private, public and not for profit sectors

'discovery' – an education system that enables individuals to understand where they might most effectively contribute to particular social and economic associations, and to build reputations within those associations

'diagnosis' – an education system targeted at early identification of capacity and potential and the close alignment of individuals' educational experiences with projected future economic roles

'integrated experience' – an education system embedded indistinguishably in society, economy and community in which learners learn through ongoing apprenticeship

'service and citizenship' – an education system targeted at developing social cohesion and competencies for social participation.

What are people's aspirations for education in the future?

When making decisions about the sorts of educational systems, policies and practices we might want to develop in the light of these potential socio-technical developments, it is important to acknowledge that a wide range of people have a stake in these decisions. Their opinions and aspirations are as critical to the design of educational futures as the technological affordances of any future world. Throughout this programme, the participants in the public and stakeholder engagement programme expressed the desire for education systems that:

- Promoted understanding, social interaction, caring and co-operation
- Tackled socio-economic inequalities
- Offered the highest quality learning experiences for all, with the quality of human interaction as central to these experiences
- Prepared individuals for the world of work

What are the key challenges for education posed by these potential socio-technical changes?

At the heart of educational processes is a concern with enabling individuals to learn to build, share, manipulate, communicate and generate knowledge. The developments described above suggest that we need to pay increasing attention to the role of socio-technical networks in these knowledge processes over the coming two decades. These developments suggest that:

- We need to assume that individuals will be constantly networked to people, tools and resources
- Network technologies will amplify and intensify the existing role of social networks in shaping access to, and production of, knowledge
- Existing inequalities will continue to be played out through socio-technical networks

The socio-technical developments described above also suggest that the coming two decades may see a significant shift away from the equation of 'learning' with 'educational institutions' that emerged with industrialisation, toward a more mixed, diverse and complex learning landscape which sees formal and informal learning taking place across a wide range of different sites and institutions. These developments suggest that:

- New providers from private, public and third sector organisations in the UK and internationally will offer widely accessible face to face, remote, work-based and informal education
- Distinctions between sites of education, leisure and work and between stages of education, working, caring and retirement will erode
- Informal learning, including inter-generational learning, will play an increasingly important role in social cohesion and educational provision

Since the early 1990s, the idea of the 'knowledge economy' has shaped education policy in the UK and around the world. This idea has led to a commitment to widening university participation, raising the school leaving age, increased investment in creative practice and STEM subjects, and the demand for a universal rise in formal qualifications and accreditation of skills. The 'knowledge economy' is, itself, dependent upon a particular interpretation of socio-technical developments: it assumes that there will be increased economic competition between countries, facilitated by global information and communications infrastructures; and that this competition can be managed in the UK by

ensuring that citizens are sufficiently skilled to take on high-value, creative and knowledge-generating employment while low paid jobs are offshored to other countries who compete on price.

The socio-technical developments described above, however, suggest that this vision of a thriving and universally beneficial UK knowledge economy focused on creative industries, knowledge work and innovation, may be increasingly hard to sustain over the coming two decades; and that its benefits are not necessarily likely to accrue to all citizens in the form of fulfilling, well rewarded employment. These developments suggest that:

- We may see an increasing polarisation in the labour market between highly paid global knowledge workers and low skilled, low paid service workers
- One response to this polarisation may be a shift in social and cultural values towards a valuing of ordinary work, and a recognition of informal and community economies
- Another response to this polarisation may be a shift toward new sites of economic activity and increased emphasis on locally focused entrepreneurialism

How might education systems need to change in the light of socio-technical developments?

These developments pose three key challenges for educators and education systems wishing to enable learners to flourish in the coming two decades:

They require us to redesign educational practices to meet the needs of networked individuals

They require us to develop systemic strategies to support learners to navigate a much more complex learning landscape

They require us to re-examine our educational goals in the context of economic uncertainties.

In respect of current formal educational provision, this implies the following aspirations:

1 The design of a 'curriculum for networked learning'
   - This should comprise, for example, opportunities for learners to learn and work within meaningful socio-technical networks not wholly within single educational institutions; to be assessed in interaction with tools, resources and collaborators; to develop capacities to manage information and intellectual property, build reputation and trust, develop experience of working remotely and in mediated environments; to create new learning networks; to reflect upon how learning is connected with other areas of personal, social, and working lives and manage and negotiate these relationships; to explore the human-machine relationships involved in socio-technical networks.

2 The creation of open, flexible and networked relationships across diverse educational institutions, both formal and informal
   - This would include, for example, compatible personal learning records owned and managed by learners that can be carried across diverse settings; interoperable systems and standards that enable learners to demonstrate attainment and experience across diverse settings; timetabling arrangements and tools that enable learners flexibly to build timetables across different providers to take advantage of learning opportunities in schools, museums, community settings,

workplaces, universities, and homes; a map of the diverse learning landscape that can support learners and mentors to navigate this complex environment effectively.

3 The development of a mentoring and networking workforce
   - This would include: a cohort of lifelong mentors or guides to ensure learners can take informed choices from diverse education providers and balance education, working, caring and personal development choices across the lifecourse and at key transitions; the diversification of teacher 'identities' to include experts in workplaces, community educators, school and university lecturers, and voluntary providers; a review of existing child protection and CRB arrangements; a cohort of educators skilled in establishing and working within social networks across institutions and ages.

4 The provision of intelligent information and improved forums for public debate on the educational implications of socio-technical change
   - This would include: widely accessible and rigorous information on the field of brain science, genetics and computer science in education; and public forums for educators, parents, children, industry and community to debate and design educational responses to the ethical questions raised by, for example, changed human-machine relationships or the role of global education providers in the education arena.

How might education systems develop an ongoing and sustainable response to socio-technical change?

Socio-technical changes are not inevitable. Energy crises, lack of raw materials and economic and population changes brought about by climate change, could provide major disruptions to the course of the socio-technical developments described above.
At the same time, socio-technical change is never 'done', and as such, exploring the potential future developments to which education might wish to adapt or challenge is never an activity that is 'finished'. Instead, it is an ongoing process requiring constant monitoring, reflection and discussion.

Critically, this acknowledgement of ongoing socio-technical change and of potential uncertainty relating to such change, suggests that education policy makers faced with developing resilient education systems in the 21st century need to recognise that:

- There will be no single educational response that will prepare learners or educational institutions for all potential future developments. Rather than creating a template of 'a school for the future', then, to which all other schools might aspire, the education system needs to commit to creating a diverse ecology of educational institutions and practices. Only such diversity will ensure that, whatever changes come about we have already begun to respond and prepare for them
- Such diversity will emerge only if educators, researchers and communities are empowered to develop localised or novel responses to socio-technical change – including developing new approaches to curriculum, to assessment, to the workforce and governance, as well as to pedagogy.
- As such, building informed debate about current, emergent and potential socio-technical change is critical to creating education systems that are able both to adapt to such changes, and, where necessary, to challenge them.

This implies a new role for education policy, namely that it should be committed to:

- Creating true public space at all levels of the system to inform, explore, model and debate educational futures and educational values.
- Promoting, encouraging, archiving and sharing the development of widely diverse educational responses in order to ensure that there is diversity in the system to allow adaptation whatever changes emerge, rather than seeking out and disseminating universal and uniform solutions.

This report is a starting point for informing and stimulating the debate on how education institutions might respond to the diverse socio-technical changes we have described. These changes provide significant opportunities for educators and others to begin to re-imagine and debate the role of education over the coming decades. We hope that this debate will continue in a wide variety of other forums, and, collectively, through the website at www.beyondcurrenthorizons.org.

A note on methods

In order to address the problematic challenge of attempting to 'research the future' the programme has adopted three interconnected approaches: first, we have attempted to elicit an understanding of 'probable futures' (the developments that are currently in train and which we expect to continue); second, we have explored a range of 'possible futures' (the emergent, marginal and unexpected developments that might take place when current trends intersect); and third, we have examined people's 'preferable futures' (the hopes, aspirations and dreams for education and educational outcomes of educators, parents, young people and a range of other educational stakeholders).

These three different perspectives both help us to resist the idea that there is a single future that we can simply 'uncover' with sufficient evidence (or which can simply be predicted by identifying the specific technologies that are currently in development) and provide a framework for understanding the current expectations of researchers, developers and educational stakeholders of the likely contours and developments of the coming two decades.

Over 18 months, the programme has:

- Brought together world-leading researchers and thinkers, practitioners and stakeholders to explore future socio-technical developments which might have significant implications for the goals, institutions and practices of education
  Over 60 reviews of existing evidence and potential developments have been commissioned and over 100 researchers and leading thinkers consulted in 5 key areas: Generations and Lifecourse; Identity, Citizenship and Community; Knowledge, Creativity and Communication; Working and Employment; State, Market & Third Sector Relationships

- Promoted debate and discussion about the implications of such potential developments with educational stakeholders from industry partners and policy makers to teachers, parents and young children:
  Online consultation involving 1500 individuals, formal surveys of over 500 individuals, events bringing together over 100 practitioners, parents, young people and others, consultation with over 130 organizations and leading industry, practice and research figures

- Developed a set of challenging long term scenarios for the future of education in the context of social and technological change 2025:
  Scenarios were developed in outline with an Expert Advisory Group made up of leading scientists and social scientists from the fields of education, economics, demographics, computer science and representatives of key

government agencies. They were then refined and revised by the BCH team.

- Made all materials generated during the programme available to the education community to support long-term futures thinking in and for education.
  Available at www.beyondcurrenthorizons.org

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