AI and the Future of Work
A Cross-Disciplinary Workshop
Notes

10.00am-12.00pm, 22 and 29 June 2020, Virtual

Introduction

About the workshop

Artificial intelligence (AI) brings opportunities and uncertainties for the future of work. There is a widely acknowledged digital skills gap in the UK. Enabling and upskilling the workforce to take full advantage of AI will be vital in both a post-Brexit and post-COVID-19 world. However, there remains little consensus on the ways that AI could or should intersect with work, or the place of AI in the wider political, economic and social discourse. Likewise, questions remain as to how Government will be able to support the investment in lifelong skills and training that will be required to shape AI for the benefit of all.

To begin to unravel these challenges, UCL and the British Academy held a two-part, virtual workshop to identify how researchers, policy professionals, employers and training providers can respond to the changing nature of work and support the labour market.

The workshop built on the impact of artificial intelligence on work, an evidence synthesis by the British Academy and Royal Society (2018), and addressed several areas of research interest (ARIs) identified by different government departments.

About these notes

These notes summarise discussions at two roundtable events hosted by the British Academy, UCL Public Policy and UCL Grand Challenges on Monday 22 and Monday 29 June 2020. This document is not intended to represent the views of the British Academy or UCL, nor does it represent the views of individual attendees of the event.

Part 1: What do we know, and what do we not know?

Context

Purpose of Part 1 and background briefing paper

Dr Jack Stilgoe, UCL

The aim of this workshop is to get a picture of what we know and what we don't know about the ways in which AI and work interact. We are not presuming that the causal relationship between advances in technology and changes to work is simple or unidirectional. Rather, we are interested in understanding how they are entangled, and in identifying gaps in that understanding.

In order to support discussion, all participants received a copy of a background briefing paper drafted by Em O'Sullivan, a PhD student in the Department of Science and Technology Studies, UCL. The briefing paper takes a wide range of information about AI and the future of work, and identifies a set of questions to enable a sharp discussion. Today's discussion will focus on two of the sections identified in the paper:

- *Future skills* – How do individuals view the challenges and opportunities of advancing AI technology for decision making about careers and skills development?

- *Quality and equity* – How might advancing AI impact the quality, equity and suitability of work?

Our aim is to address these questions, and in the process to tease them apart, expand them, and add new questions. Some of the directions that we might take the discussion in include:

- What skills might be required in a world in which AI is a ubiquitous feature of our lives? What will good work look like in a world with ubiquitous AI?

- What might the public be expected to know about AI and work? What might the public be expected to tell decision-makers about AI and work?

- How might advancing technology reinforce or disrupt existing economic systems? How might it change who has power in labour markets?

- Which policy areas will be affected by advancing technology and its interaction with work? For example, will it be relevant to immigration policy, or tax policy?

The briefing paper also includes a discussion on roles and responsibilities. This will be addressed in the second part of this workshop, next week. In that discussion, we will also look at more radical propositions that respond to advancing technology, such as a universal basic income or robot taxes.

The impact of artificial intelligence on work

Jessica Montgomery, The Royal Society

In 2017, the Royal Society convened a series of public dialogues on AI and the future of work. In these dialogues, two visions of AI and the future of work emerged, each occupying an extreme: AI will either be the end of employment, or it will enable a utopian society in which work problems are solved. In 2018, the Royal Society and the British Academy commissioned an evidence review to test the strength of the evidence behind these two extreme predictions.

The resulting publications, the impact of artificial intelligence on work, found that the evidence suggests that neither prediction is likely. Instead, it is much more likely that AI will have a disruptive effect on work – some jobs will be lost, some will be created, and others will change. It found that technology is not a unique or overwhelming force, and we can expect political, economic and cultural factors to all shape what type of change we see. Learning from the history of technological advances, the evidence synthesis also found that while technologies generally contribute to an increase in population-level productivity, employment and economic wealth, these benefits are only felt over quite long timelines. In the transition period there is disruption, and some people lose out.

The evidence synthesis also looked at the kinds of policy interventions that have been proposed in relation to AI and work. These include:

- *Education* – such as interventions into lifelong learning and upskilling
- *Working life* – such as social security reform to provide support to low-income workers disadvantaged in the short- and medium-term
- *Local growth and supporting businesses* – such as providing advice on businesses on how to make sure of AI technologies
- *Research and development* – such as policies to steer the development of particular technologies

Since the publication of the evidence synthesis, we have seen an evolving public discussion about AI. In 2017, we were at the peak of the hype cycle, with press coverage of AI focused on extreme scenarios. Now, in 2020, there has been a significant shift towards more nuanced discussions of how AI will change workplaces, through, for example, bias or surveillance. We have also seen an increased interest in international comparisons, and the UK Government's AI Sector Deal, which has 'good jobs and greater earning power for all' as one of its five foundations of productivity.

Since 2018, we have also seen significant changes in our wider political and social context, including the Government's 'levelling up' agenda and the current COVID-19 pandemic, both of which have the potential to have a significant impact on technology policy.

Future skills

What do we know?

What do we know about how individuals view the challenges and opportunities of advancing AI technology for decision-making about careers and skills development?

- It can be very easy to overestimate what people know about AI. Greater outreach is needed, with a clearer focus on what the challenges and opportunities of AI mean for individual workers.

- It can also be very easy to overestimate what organisations know about AI, as well as the required technical capabilities of employees. Many organisations – including educators and employers – either do not think about AI, or the range of skills and competencies required, or are nervous about it. There may be a role for government (national, regional, local) in coordinating efforts.

- Gaining skills in AI can mean a wide range of things, including opportunities across the lifecycle of AI from design to use, as well as the softer skills that are required for translating and explaining technologies.

- All interventions with workers, employers and educators (to better articulate the opportunities of AI, or to retrain and upskill) should create space for a wide diversity of experiences, and should aim for co-design and co-production.

- The current COVID-19 pandemic may create a unique opportunity to engage workers, employers and educators with AI due to an increased engagement with technology and the widespread disruption to the labour market.

- The development of skills in the future will depend on generations with digital skills and a sound understanding of the application of AI. Ensuring this, and ensuring equity with these generations (see below), requires that we ensure that everyone has access to the equipment and infrastructure necessary for developing digital fluency.

- Improved access to lifelong learning is needed across the board, this is not a problem unique to AI skills.

- The pace of change in AI presents a challenge for education, retraining and upskilling, as skills rapidly become obsolete. A focus on adaptable curricula, transferable skills and continuous learning will be important.

- AI skills alone are not enough, and they are not necessarily easily transferable without sector-specific depth knowledge. Retraining and upskilling interventions will need to take this into account.

What don't we know?

What don't we know about how individuals view the challenges and opportunities of advance AI technology for decision-making about careers and skills development?

- There is little research comparing different countries.

- As AI gets more complex, the barriers to entry into an AI-related career may increase. There may be significant limits on how meaningful shorter upskilling and retraining opportunities can be, and AI-related careers may become even more exclusive.

- What are the differences between retraining or upskilling later in life for individuals with less and more digital skills and competence? How will this be different for 'digital natives'?

- What exactly are the skills gaps in the UK economy? Where are they located – by both sector and geography? What skills are most in demand now, and which are most likely to be in demand in the future?

- What are the impacts of the increasing presence of 'ed tech' companies in public education systems?

- What 'no code' and 'low code' jobs will be needed as AI technology develops? What skills will be needed for roles which understand the application of technologies, but do not work directly on development?

- What do we know about how adaptable different job types and sectors are, or might be, through retraining and upskilling?

- How will public trust in developing technologies and data change?

- What will the impacts of COVID-19 and exiting the EU be?

Quality and equity

What do we know?

What do we know about how AI might impact the quality, equity and suitability of work?

- The digital skills gap is a significant problem, and there is a deep gap between people who are comfortable with technology and/or who are digitally fluent, and people who do not use or have access to infrastructure like computers and broadband internet connections.

- There may be opportunities to close some parts of the digital skills gap because changing AI technologies require lots of different skills. For example, there are many roles that digital fluency is required where deep technical skills are not, that would open up work to a wider range of people.

- We know a lot about inequalities in the wider economy, even if we do not always know how AI might exacerbate or alleviate them.

- While the risks are often overstated, there is still a risk of creating an underclass of low-paid, low-skilled work. A recent report from Turing has pointed to an economy in which it is the middle-skilled jobs that are most affected, leaving highly paid, highly skilled work on the one side, and low-skilled work on the other. This will vary significantly by sector.

- Algorithms built by people display bias. Addressing this will be crucial to ensuring that we do not build inequities into systems that have the potential to become very powerful.

What don't we know?

What don't we know about how AI might impact the quality, equity and suitability of work?

- What kind of society do we want to live in? If we do not articulate this, we may find that inappropriate targets are set, for example based purely on GDP. A wide range of perspectives, including from the humanities and social sciences, should be engaged in the discussions about the kind of society and economy that advancing AI can be pointed towards.

- How much do we know about what people think constitutes 'good work'?

- How can we best communicate the benefits of AI? How can we accurately communicate the risks and limitations, and stimulate informed public debate about the trade-offs?

- What is the role for government in coordinating, communicating and intervening?

- How can we involve people with very little interest or skill in technology with conversations about technology policy? These people risk being significantly impacted by advancing technology, but rarely have a seat at the table.

- What will the impacts of COVID-19 and exiting the EU be?

Part 2: What should we do?

Context

Summary of Part 1 and purpose of Part 2

Professor Rose Luckin, UCL

The first part of the workshop focused on the questions of what we know and what we don't know about AI and the future of work (summarised above). We identified a wide range of useful questions, focusing on future skills and quality and equity. Most importantly for the second part of the workshop were questions such as:

- *Quality and equity* – What kind of society do we want to live in? What constitutes 'good work'?
- *Future skills* – Where are the skills gaps in the UK economy – by sector, by geography? What kinds of non-technical skills will be needed to enable people to work well with technology?

The second part of this workshop will consider these questions, asking what should be done to address them, and whose responsibility it is to address them, considering geographical and sectoral variations.

Provocations

The wider political and policy landscape

Anna Bradshaw, The British Academy

Our conversations today take place in the wider political and policy context. Four key issues in that wider landscape to keep in mind during our discussions are: (1) the policy ambitions of the (still relatively new) government, including 'levelling up' and, possibly, changes to the civil service; (2) the ongoing process of leaving the EU; (3) the current COVID-19 pandemic and the coming recovery and expected recession; (4) major global protest movements including the Black Lives Matter movement and the youth strike for climate.

The role of employers

Rob McCargow, PWC

A recent survey by PWC of over 20,000 adults in 11 countries found more than half expect AI to change their job, and over 60 per cent are positive about the impact of technology on their work. However, while most (77 per cent) respondents would re-train in order to improve their employability, only one third are given the opportunity to develop their general digital skills. It is the responsibility of employers to upskill their workforce, providing opportunities to their employees; PWC is looking to upskill its entire workforce. However, the unilateral action of individual businesses will not be sufficient. We can look to examples of good practice, like the Digital Skills Bridge in Luxembourg that brings together businesses, government and third sector organisations to develop a national strategy and a support mechanism for employers.

The role of education

Vanessa Wilson, University Alliance

One of the key purposes of education is to prepare learners for work. This purpose will be of increasing importance in the short and medium term as we move out of the immediate COVID-19 crisis into a possibly terrible recession, and in the long term as we see an ever-increasing role for technology at work. Key questions to ask include: (1) At what level – primary, secondary, tertiary – should preparation begin? (2) How do the curricula and teachers' skills keep pace with developing technology? (3) How can we equip current workers to survive and thrive? (4) Whose responsibility is it to ensure that the workforce of the future is appropriately skilled? (5) How can we make AI technology attractive to current and prospective students? (6) How can we ensure that technology is harnessed to level up and create parity of opportunity, instead of repeating or even exacerbating current inequities?

Discussion

Policy and education

What might be the responsibility of different groups in advancing action on AI and the future of work related to education?

- The skills that will be needed include both technical, STEM skills and the wider pool of adaptable critical thinking, analysis and communication skills that come from other disciplines. The comparatively extreme narrowing of the curriculum in the English education system may, therefore, be an obstacle to developing the skills required by the workers in the future.

- Educators need to think about how to train learners for jobs that do not yet exist. Educators need to be able to teach adaptability, critical thinking skills, how to learn, and make technology approachable.

- A key question for policy makers, when developing education and skills policy should be what does a good AI professional look like. There may be a whole range of solutions, from basic foundational skills in digital literacy, through the ability to operate with machine learning systems, to advanced skills in building and understanding these systems.

- There is a significant piece of work to be done to consider how skills might be developed throughout primary, secondary and tertiary education.

- Any changes to education and training will have workforce implications for teachers, lecturers and trainers. This may be a particular challenge given how rapidly technology changes, but a focus on adaptable, transferable skills could provide a more stable starting point.

Policy and employers

What might be the responsibility of different groups in advancing action on AI and the future of work related to employers?

- Most businesses want to innovate, but the diversity of businesses means that policy should play an enabling role, not a prescriptive one. Larger businesses and larger employers have much more capability to upskill their workforces than SMEs. Strategies for supporting SMEs will need to look very different, with consideration for differences across sectors.

- Engaging with SMEs may be difficult. In particular, it will be challenging to reach SMEs who do not think that AI has anything to do with them. Possible strategies for engagement could include utilising FSB and membership organisations, and providing tangible case studies of the benefits.

- There may be significant opportunity to engage regionally, as clusters of employers can work with local government, e.g. financial services in London or the car supply chain in the Midlands.

- There is a significant movement towards understanding how business should be driven by purpose, and the responsibilities of business towards the environment. An argument for businesses' role in building a digital skills base could be made from the same starting point. This is not to say that businesses should not appreciate the potential financial benefits of AI.

- Workers should be empowered not only to develop their skills, but also to change their workplaces with the skills that they have gained. To do this well, workers need to understand their position in wider networks.

- There may be an interesting role for consumer preferences and public perception in changing AI practices, if consumers or the media demand greater transparency in AI supply chains in a similar way as has occurred over environmental sustainability or ethical labour practices.

Policy, education, and employers

- Once people are in employment, there is still a significant role for education and training, as technological change means that people will need to upskill and reskill throughout their working lives. This training should be well-integrated into work, and educators and employers should work together to develop training.

- There is a significant role for university-business relations and knowledge exchange, as well as how government can support this. There may be a role for government in supporting collaboration and ensuring that hard-to-reach employers and smaller teaching universities and colleagues can engage.

- A policy like the Apprenticeship Levy that applies more widely could be used to fund skills training across the entire workforce.

- It would be useful to look at international comparators for systems in which policy enables educators and employers to work together to provide workers with the skills they need and learners with opportunities to apply their learning.

Policy and individuals

What might be the responsibility of different groups in advancing action on AI and the future of work outside of educators and employers?

- AI is only one of the factors that will cause major changes in the nature of work over the next decades, and it is not the first time that work has undergone a transformation related to technology. For example, changes due to AI will sit alongside changes related to climate change, and many systems have already undergone significant shifts from paper to digital systems. The role of AI should be considered in this wider context.

- Ensuring that AI enables greater equity will require a basic standard of access, including minimum digital literacy and access to infrastructure including broadband internet.

- Inherent bias in data must be addressed and AI systems need to be representative of the population to ensure no one is disadvantaged.

- There is a significant role for academia, think tanks and other third sector organisations in innovation and challenge.

- There is a significant role for public culture and the arts in provoking and enabling a conversation about AI, encouraging people from all backgrounds and workers from all industries to contribute their thoughts.

Closing remarks

Reflections and next steps

Dr Jack Stilgoe, UCL

This discussion has, in many ways, made the questions we were asking helpfully less clear. The roles and responsibilities of policy, educators, employers and individuals are complex and overlapping. It reminds me of a quotation from Carl Sagan that I use with my first-year students:

> *We've arranged a global civilisation in which most crucial elements profoundly depend on science and technology. We have also arranged things so that almost no-one understands science and technology.*

While many people take this quote to mean that the public need to become more like scientists, I don't think that Carl Sagan would have agreed. Understanding the place of science and technology in society also means understanding a whole range of issues, from data quality and the hidden labour of AI to bias, equity, and ethics. What today's discussion has clarified is that our approach to understanding AI and the future of work needs to be interdisciplinary and inclusive.

Our current moment of crisis presents a risk and an opportunity. In order to maximise the opportunity, we need to do two things. First, we need an approach that is interdisciplinary, intersectoral, adaptable and thoughtful. Second, we need to know where we are going. We need to know what good work in a world with ubiquitous AI looks like.

UCL and the British Academy will take all of the discussion over this workshop to start to flesh out a larger project that, we hope, will begin to do these things, and to answer some of the fascinating questions we have raised. Thank you.

Attendees

Co-chairs

Professor Rose Luckin	UCL Knowledge Lab	
Dr Jack Stilgoe	Department of Science and Technology Studies, UCL	

Attendees

Giulia Cuccato	Government Office for Science (GO-Science)	*Part 1 only*
Jordan Cummins	CBI: Confederation of British Industry	*Part 1 only*
Sherif Elsayed-Ali	Element AI London	
Carly Kind	Ada Lovelace Institute	
Professor Alison Littlejohn	UCL Institute of Education	
Cheryl Lloyd	Nuffield Foundation	*Part 2 only*
Gareth Martin	Altius	*Part 2 only*
Rt Hon Stephen Metcalfe MP	All-Party Parliamentary Group on AI	
Rt Hon Steve McCabe MP	Work and Pensions Select Committee	*Part 1 only*
Rob McCargow	PWC	
Dr Natasha McCarthy	The Royal Society	
Somnath Mukherjee	Avanade	*Part 1 only*
Jessica Montgomery	The Royal Society	
Em O'Sullivan	Department of Science and Technology Studies, UCL	
Sanna Ojanperä	The Alan Turing Institute	
Nimmi Patel	TechUK	*Part 1 only*
Dr Will Taylor	The Alan Turing Institute	
Anna Thomas	Institute for the Future of Work	*Part 1 only*
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