APPG on AI

APPG AI EVIDENCE MEETING 2 - SKILLS

“I. DETAILS

• Date: 26 February 2018
• Time: 5:30 – 7:00 pm
• Location: Committee Room 2, House of Lords
• Participants: 133 registered attendees

II. PURPOSE

The All-Party Parliamentary Group on Artificial Intelligence (APPG AI) was set up by co-chairs Stephen Metcalfe MP and Lord Clement-Jones CBE to explore the impact and implications of Artificial Intelligence.

In 2018, the APPG AI has decided to focus on building a roadmap to understand the practical steps for addressing key AI implications. The group has prioritised six policy areas: data, skills, accountability, innovation & entrepreneurship, infrastructure, and trade. Each meeting will explore one of the six policy areas’ respective economic, social, and ethical implications.

Evidence Meeting 2 concentrated on: Skills.

III. SPEAKERS

• Jonnie Penn: AI Researcher, Cambridge University; Google Fellow, European Youth Forum; Co-Founder, The Buried Life
• Robert Bolton: Partner in KPMG’s Global HR Center for Excellence, KPMG
• Kevin Green: Chief Executive, The Recruitment and Employment Confederation
• Beverly Clarke: Author of “Computer Science Teacher”
• Ali Shah: Head of Emerging Technology & Strategic Direction, BBC

IV. QUESTIONS FOR INSPIRATION

• What are the right skills fit for an AI-filled world? Should we put more emphasis on STEM or soft skills and creativity?
• What are the practical steps of putting AI into schools?
• How can industry help in upskilling the UK workforce?
• How do we ensure groups who are at high risk of job automation reskill?
• What are the implications for lifelong learning?
• How can AI technologies be used as a tool to boost skills?

“The only skill that will be important in the 21st century is the skill of learning new skills” — Peter Drucker
V. BACKGROUND: SETTING THE SCENE

The UK economy and society depend largely on the skills and knowledge its people possess. For all individuals, skills are a significant determinant of social mobility and wellbeing. For all companies and organisations, regardless of size, skills are critical for productivity. In fact, BEIS estimates 20% of UK economic growth, in recent decades, is the result of improved skills across the workforce.\(^1\)

Consequently, it comes to no surprise that a key focus in the UK Industrial Strategy is to upskill its people.\(^2\) Throughout the 255-page document, the word ‘skill(s)’ comes up 219 times. If you exclude the cover pages, table of contents, and references – that means ‘skill(s)’ is referred to approximately once per page.

Building the right skills is key – for the success of the individual, the organization, and, ultimately, the nation.

But, what does this really mean? What are the right skills? What are the practical steps for building these skills?

And, of particular significance for the APPG on AI, how do technological advances - in fields like Artificial Intelligence - affect skills?

In our past evidence meetings, almost all 50 experts who provided oral evidence highlighted the importance of skills in preparing people for the transformations and disruptions AI is likely to bring. Although there has been a debate over how many jobs will actually be created and how many will be lost, our community seems to agree that skills play a critical role in ensuring individuals can remain competitive, successful, and fit for the labour market of an AI-filled future.

AI’s impact and implications on skills are twofold.

1. The types of skills individuals need to compete and succeed are changing.
   - Science, technology, engineering, mathematics, and digital skills – as these are the skills needed to build and manage AI technologies.
   - Transferable soft skills, including creativity, cognitive, and adaptability – as these are the skills humans will have a long-term advantage in.

2. The way individuals learn and develop skills is transforming.
   - The application of these technologies in various learning environments, to improve the development of skills.
First, AI is transforming the types of skills individuals will need.

Notably, the disruption triggered by profound technological progress is causing a misalignment between the supply and demand for skills. AI is disrupting both the demand side of labour (changing the quantity and quality of jobs available in the market) and the supply side of labour (challenging the skill gaps amongst a growing population of potential employees). Simply put, the skills available in the labour market do not match those required by employers in the evolving AI-driven economy.

In a recent poll of almost 200 Recruitment & Employment Confederation members, 58% said that shortage of candidates with the right skills would have the biggest impact on their business over the next five to seven years. Similarly, Gartner recently named the skills gap the biggest factor in why almost 60% of organizations have yet to take advantage of the benefits of AI.

So, exactly what are the skills employers seek yet individuals lack?

These skillsets can be thought of in two broad categories:

1. A new demand has grown for the skills needed to build and manage advances in AI technologies – most of which are linked to science, technology, engineering, mathematics, and digital competencies.
2. Moreover, there is also a growing demand for transferable soft skills (i.e. creativity, adaptability, and cognitive skills) as these are the skills humans will have a long-term advantage in.

Second, AI is transforming the way skills are developed.

The way individuals, across all stages of education, learn and develop skills is also transforming. In other words, individuals can use AI as a tool to develop the skills for success. A teacher can now use a machine learning algorithm which analyses and finds correlations between data points to quantify his/her student’s understanding of a specific topic. Children can have a digital tutor to
help them in courses they are struggling in. The applications of AI in education are enormous and so is the potential.

*These transformations – both AI transforming the types of skills needed and AI transforming the way skills develop – can take shape in two different contexts.*

The first context is the traditional learning environment, like a classroom in a school or a lecture hall in a university. The second context is the lifelong learning environment, that can take place in various forms such as a corporate workshop or an online module.

Given the vital importance of skills for our wellbeing, policymakers must take into consideration the disruption and transformations AI is causing in both contexts; and, consequently, shape policy which will help build the right skills fit for the future.

**VI. MEETING OVERVIEW**

The APPG on AI met on 26 February 2018 to further explore the topic of ‘AI and Skills’ and to start discussing practical steps for how to prepare individuals across the UK with the skills they will need ahead.

The meeting was chaired by **Lord Clement-Jones** and had a total of 133 registered attendees.

Five experts, from different backgrounds, were invited to provide oral evidence on AI’s implications on skills; and what government, business, and the wider public can do to prepare.

**Jonnie Penn**, an AI researcher at the University of Cambridge and MIT (focusing on the history of AI) and a Google Tech Fellow at the European Youth Forum, was first to speak. He focused on ‘four types of intelligence’ that have value in the modern world. Contextual intelligence, referring
to data and digital literacy, tends to be the category we put most emphasis on, Jonnie said. However, research shows that 17% of the UK population lacks basic digital skills and only 9% has heard of the term machine learning. Therefore, Jonnie urged policymakers to do even more to build intelligence in this area. Responses can be simple like implementing universal infrastructure to ensure all individuals have access to high-quality internet.

Moreover, Jonnie emphasized the need for creative intelligence in today’s society. Citing a recent interview with DeepMind’s Demis Hassabis, he shared that the best way for young people to prepare for the labour market of the future is to:

- learn how to learn, practice self-actualisation, and practice creativity.

He also discussed the need to create policies which focus on the building of social and emotional literacy, as well as intelligence related to health and wellness.

Jonnie called for older generations to provide youth with different platforms so they can participate in society. This way, the youth can be empowered to feel a sense of purpose and ownership over their futures.

“WE HAVE TO FIND A WAY FOR PEOPLE OF ALL BACKGROUNDS TO PARTICIPATE IN SOCIETY, AS IT CHANGES. WE HAVE TO LEAN IN TO DIFFERENT VARIETIES OF INTELLIGENCE BECAUSE NOT EVERYONE IS GOING TO BE A DEEPMIND EMPLOYEE.”

– JONNIE PENN

Next, Beverly Clarke took the microphone, speaking from the educator perspective and providing the group with a tangible example of how AI can be introduced into UK schools.

Beverly has recently partnered with NVIDIA and Computing at Schools to create a teaching kit for year nine pupils to explore what AI is, learn about its use cases and implications. The project is made of six lesson plans and there has been great interest from teachers across the UK who are now piloting it.

Beverly argued that more has to be done! AI must be formally included in the GCSE curriculum as it is one of the most important technological advance of our period. Her
goal is for everyone in the classroom to have a general understanding of what AI is by the time they graduate. She called for immediate funding to be released in order to successfully introduce AI into schools.

The Chief Executive of the Recruitment and Employment Confederation (REC), Kevin Green, was next to provide evidence. Speaking about the current UK labour market, he reminded the stakeholders that UK has a record 32 million people in work now. However, the threat of automation due to technological advances can disrupt the labour market and have profound consequences. PwC’s recent report estimates that up to 30% of UK jobs to be in high risk of automation in the early 2030s. Job automation will not only involve manual activity and jobs in the middle are likely to be affected, Kevin added, causing a hollowing effect which will result in a two-tier labour market.

“**We need to find new institutions that give advise to individuals, to help them progress and develop.**” Kevin Green

Government and business need to start thinking now about how to prepare for this shift because, as Kevin mention, today’s job automation is unfolding faster than ever before. Employers should rethink their selection processes when recruiting. Government must pass policy which will move away from knowledge-based exam factories towards a more balanced approach based on creativity, team work, collaboration, and self-driven learning. Furthermore, government needs to develop an all-age work advise service to facilitate transitions and progression. Lastly, the Apprenticeship Levy should be broadened into a training levy that can meet the training needs of workers in non-permanent roles.

Robert Bolton, a Partner at KPMG’s Global HR Center of Excellence, was the fourth expert to provide oral evidence on AI and skills. Looking at the workforce of the future, he focused on three key trends: (a) atomisation of traditional jobs, (b) an emerging skills agenda, including non-STEM skills, and (c) the end of a one-size fits all model. Robert noted the **shift from mapping people to jobs to mapping skills to work**, and asked stakeholders to focus on the
effects of AI on the task level. The future is about humans and machines working together, he argued, and companies must ensure the right systems are embedded to make such a relationship work.

“The future will be the man and the machine working together, but we have to reinvent the organisation to ensure productivity.” -Robert Bolton

More than just STEM skills, or ‘red skills’ as Robert called them, there are other types of skills needed in the modern world. These include: design thinking, systems thinking, innovation and creativity, evidence-based practice, and interpersonal skills. We must work together to boost skills across all these areas in order for UK to be prepared for the emerging workforce.

Lastly, we must finally realise that there is no longer just one model for employment. New models must be built to account for gig workers, longevity, and other new socio-technological forces.

Robert called for policymakers and government to:

- Embed the ‘learning to learn’ approach within all education policies, from lower education to higher ed.
- Encourage lifelong learning, via direct government provision but also employer incentives encouraging the adopting of platforms for career long learning.
- Nudge the right organization leadership practices. The adoption of a simple 5Cs framework is a good place for organisations to start: what is the employer doing to address Cost, Capacity, Capability, Compliance and Connections of the workforce over the short, medium and long term.

The last member of the panel was, Head of Emerging Technology & Strategic Direction at BBC. Speaking from the perspective of a practitioner of AI, he urged stakeholders to break down the conversation around AI into concrete parts that are easy for the public to understand.

Ali has realized that it takes a broad set of skills to make, manage, and sustain AI systems; and, thus, it is
absolutely vital to create diverse teams that represent diverse backgrounds in order to have successful systems.

He urged all stakeholders in industry, academia, and government to ensure ethical implications are embedded within all curriculums, BBC, for example, is training its product managers and engineers on what unintended consequences might be, as well as the opportunities and risks of AI. Ali stressed that such an approach is important in order to create technology that all will benefit from.

Lord Clement-Jones thanked the panel and reiterated the need to build policies encouraging wider skills and lifelong learning.

The panel agreed that it is important to consider the broader skills and their importance in future scenarios. Beverly noted the need to think of the social, moral, spiritual, and cultural aspects of these technologies, and make sure these discussions are embedded within all curriculums. Kevin suggested we move education from silo thinking into activities in which students are encouraged to use a combination of skills to engage with a specific topic. Jonnie, building on this point, suggests we use different types of intelligence to start testing various prototypes - to see what works and what doesn't. The society, including the youth, must be included in the process of shaping the future. Through mechanisms such as the establishment of 'Citizen Jurors,' we can give everybody a voice.

Justin Madders MP, highlighting the importance of lifelong learning in this transition period, asked the experts how well our current education structures and institutions are ready for these transformations.

Robert argued that we need to restructure many of our current processes. He urged the room to start having conversations on things like the working week, universal income, and taxing reform to start preparing for the road ahead.

Leverhulme Centre for the Future of Intelligence’s Stephen Cave asked a question that much of the room seemed to be thinking. Looking beyond what skills will be needed to work in an AI economy, he asked: “what skills are necessary to live in an AI society?”

AI will affect all parts of our lives, not just work, and it is important to start understanding how AI impacts our daily lives and meaningful interactions. Ali agreed with Stephen that this
is vital for the wider public to start considering. He urged the media to take responsibility in helping build this understanding.

The microphone was given to John Lazar and he raised an interesting point, asking the panel how the general term skills can be broken down in a granular function for society to really be able to start measuring which skills need to be repurposed.

Robert stressed the difficulty yet importance of breaking down the term ‘skills.’ A skill such as design thinking should be deconstructed to specific qualifications, in order for individuals to grasp what it means to have such a skill, how to develop such a skill, and so on.

Towards the end of the session, Lord Clement-Jones, reflecting on the Evidence Meeting, asked whether the AI-skills agenda is separate to the digital understanding, or if the two are interlinked.

Jonnie suggested that two are closely connected. He said: “The conversation around skills is based on prosperity. Ultimately, we are trying to decide what skills we need to prosper.” Referring to Stephen Cave’s earlier comment about AI’s implications in citizenship, he continued to argue we should be having broader conversations on what we want in this world, what we mean by citizenship, what we qualify as prosperity, etc. Once we’ve had these conversations, if we decide that our vision is a society made of digital narratives (“which at the moment is simply not the case”) we should than turn to specific policies like universal infrastructure.

Citizenship should be thought of as a job, he suggested. Citizens should be encouraged to prototype their ideas. **Young people want to aspire and be valuable in society; and, hence, adults should provide a narrative for younger generations to speak and participate in shaping the future.**

Rumman Chowdhury made one of the final comments, asking who holds the burden of the cost of reskilling and what will be the role for those who do not want to be coders or data scientists.

The room agreed that not everyone should be a programmer, and the UK system needs to start valuing uniqueness and creativity. People have different purposes and it is our responsibility to establish structures in our schools, and other learning environments, in which individuals can grow and progress utilising these purposes.

Lord Clement-Jones thanked the panel and the wider audience for their engagement with this timely and important issue in our society. He stressed the need for a **bottom-up approach to really understanding what our values are and what we should be striving towards.**
VIII. ACKNOWLEDGMENTS

Our supporters - Barclays, BP plc, Deloitte, EDF Energy, KPMG, CMS, Oxford University Computer Science, Microsoft, PwC - enable us to raise the ambition of what we can achieve.

The APPG AI Secretariat is Big Innovation Centre.
IX. FURTHER READING & ENDNOTES

4 Venture Beat, 2017. *The Biggest Roadblock to AI Adoption is a Lack of Skilled Workers*.
7 Computer Weekly, 2018. *NVIDIA Aims to Tackle UK’s AI Skills Gap by Educating Year Nine Students*.