Evidence Meeting 2 | Education: AI as a Tool is a Parliamentary Brief based on the All-Party Parliamentary Group on Artificial Intelligence (APPG AI) evidence meeting held on 18 March 2019 at the House of Lords.

This meeting was chaired by Stephen Metcalfe MP and Lord Clement-Jones.

We would like to express our appreciation to the following people for their oral evidence: Sir Anthony Seldon (University of Buckingham), Priya Lakhani (CENTURY Tech), Joysy John (NESTA), and Professor Rose Luckin (UCL Knowledge Lab).

We would also like to acknowledge the APPG AI Education Task Force for the input and feedback: Robert Bolton (KPMG), Dr. Wayne Holmes (Open University), Tushar Srivastava (Nurturey), Elena Sinel (Acorn Inspirations), Dr. Julia Jones (Found in Music), and Anis Mohammed (Infosys).

Rapporteur: Niki Iliadis | n.iliadis@biginnovationcentre.com

www.biginnovationcentre.com | info@biginnovationcentre.com | @BigInnovCentre
www.appg-ai.org | appg@biginnovationcentre.com | @APPG_AI

© Big Innovation Centre 2019. All Rights Reserved.
# Contents

EVIDENCE MEETING 2 OVERVIEW .............................................................................................................. 1
Details .................................................................................................................................................. 1
Speakers .......................................................................................................................................... 1
Questions ......................................................................................................................................... 1
INTRODUCTION .................................................................................................................................... 2
Context ............................................................................................................................................. 2
Skeleton ........................................................................................................................................... 2
1. TODAY’S EDUCATION SYSTEM ....................................................................................................... 3
   Key Challenges ............................................................................................................................... 3
   AI’s Role in Education .................................................................................................................. 4
2. AIED OPPORTUNITIES ................................................................................................................... 5
   For the Student ............................................................................................................................... 5
   For the Teacher .............................................................................................................................. 5
   For the System .............................................................................................................................. 6
3. AIED RISKS ...................................................................................................................................... 7
   Fear Factor .................................................................................................................................... 7
   Data Issues .................................................................................................................................... 7
   Inequality ....................................................................................................................................... 7
4. RETHINKING THE PURPOSE OF EDUCATION ................................................................................ 8
   Shared Vision ................................................................................................................................ 8
WRITTEN EVIDENCE APPENDIX ........................................................................................................ 9
ABOUT APPG AI .................................................................................................................................... 16
EVIDENCE MEETING 2 OVERVIEW

Details

- Date: 18 March 2019
- Time: 5:30 – 7:00 pm
- Location: Committee Room 2, House of Lords
- Participants: 148 registered attendees

Speakers

- Professor Rose Luckin, Professor of Learner Centred Design, UCL Knowledge Lab
- Joysy John, Director of Education, NESTA
- Sir Anthony Seldon, Vice Chancellor, University of Buckingham | Author of The Fourth Education Revolution
- Priya Lakhani OBE, Founder CEO, CENTURY Tech

Questions

- How can AI be used as a tool in different learning environments and across diverse subjects?
- What is the effect on the student experience? What is the effect on the teacher?
- How can it impact assessment?
INTRODUCTION

Context

The evidence APPG AI has been gathering since 2017 shows education at the heart of both the opportunities and the risks in the narratives forming around AI.

AI’s impact on our education system has the potential to be revolutionary. With AI, every child across the world can have access to learning that is active, personalised, and cooperative. At the same time, the introduction of AI in our society is challenging whether our current education systems are fit for the unfolding transformations. Are our children being equipped with the skills they will need in their futures? Can passive learners survive in a world of uncertainty and agility? Do we have the proper infrastructure, data governance, and oversight to ensure our children are protected from the potential downfalls of these technologies?

In 2019, APPG AI launched the Education Pillar to tackle some of these multi-faceted questions over the next two years. We will focus on:

- how AI can be used as a tool to improve learning,
- what skills we need to prioritise as a society,
- how school curriculums need to transform,
- and what the role of ethics in education should be.

Although the primary audience for APPG AI are members from the House of Commons and the House of Lords, the group also aims to inform the general public and key stakeholders across business, academia, and civil society.

Skeleton

This Parliamentary brief is broken into four parts, highlighting the main takeaways from APPG AI’s first evidence meeting under the Education Pillar. The meeting, held 18 March 2019, was chaired by Stephen Metcalfe and Lord Clement Jones, and orchestrated by the Secretariat of APPG AI, Big Innovation Centre. It brought together key stakeholders to gather and share evidence on how AI technologies can improve learning environments.

First, the Parliamentary Brief provides a snapshot of the current status of the UK education system, shedding light on some of the key challenges we now face.

Second, the brief analyses how AI technologies can be applied to address the challenges identified in the previous section, focusing on how AI systems can improve the overall learning experience for the student, the teacher, and the system as a whole.

Third, the potential downfalls of implementing AI in learning environments are highlighted, as well as an overview of the economic and socio-ethical implications stakeholders must simultaneously address.

Fourth, the brief takes a step back, rethinking the purpose of education to ensure the road we are heading towards aligns with the vision of what our society seeks.

Finally, the brief ends with an appendix with the written evidence provided by Priya Lakhani (CENTRY Tech), Sir Anthony Seldon (University of Buckingham), Professor Rose Luckin (UCL Knowledge Lab), Joysy John (NESTA), and Dr. Wayne Holmes (Open University).
1. TODAY’S EDUCATION SYSTEM

Key Challenges

Our current education systems are facing several challenges. Above all, today’s education seems to be fit for an era of the past, not reflective of the economic and socio-technological revolutions we are currently experiencing. What we need is alignment, so the different components of the system—curriculum, assessment, and pedagogy—work together to improve the learning experience for the student, the teacher, and the whole society.

We need to move from what many call the ‘factory-model’ education system given rise during the Industrial Revolution to a new 21st century model. Most agree that memorising massive amounts of facts and being assessed via ‘one-size-fits-all’ exams should no longer be what we consider learning, especially when most students already have access to those facts right in their pockets. However, our schools are constantly being criticised for doing just that.

At APPG AI’s evidence meeting in March, four experts in AI and education were invited to unpack the challenges the UK education system faces and give their views on how AI can help address them. One of those to provide oral evidence was Sir Anthony Seldon, the author of the book *The Fourth Education Revolution*.

In the book, Seldon identifies five key challenges or limitations embedded within our education system:

- Failure to defeat entrenched social immobility, with children from underprivileged backgrounds restrained from climbing the economic ladder
- Inflexible progress through the education system, with all students moving through subjects at the same pace regardless of their capabilities
- Teaching overwhelmed by administration, with constant feedback from teachers that most of their time in the classroom goes to routine burdens that take away from quality teaching
- Large class sizes inhibit personalised and breadth of learning, with a focus on a narrow range of human intelligence and potential
- Homogenisation and lack of individualisation of personality, with a trend to nurture students more like each other rather than stress their uniqueness
A second panellist, NESTA’s Joysy John, agreed with many of the challenges Seldon highlighted. Referring to Nesta’s report exploring the future of AI in schools and colleges – ‘Educ-AI-tion Rebooted?’, she also emphasised two additional challenges:

- Narrow assessment inhibiting teaching and learning, with formal exams and informal tests the main mechanisms to assess a narrow range of abilities
- Difficulty of sharing insights between schools and colleges, with logistical barriers prevents a larger and more connected system benefiting from the network effect

According to Seldon, John, and many in the space, AI in education (AIEd) can potentially help address these challenges and help us move from the current out-of-date model to one reflecting the need for agility and transformation.

**AI’s Role in Education**

AI technologies have already begun to be implemented in some of our learning environments, producing new teaching and learning solutions that can make education a lot more accessible and personalised. Yet, compared to other sectors such as health, retail, or finance, it is still in its very early stages and an ecosystem of lifelong learning must be built in order to move forward towards a new model fit for today’s era.

AI technologies indeed have the potential to address many of the challenges identified above. However, just like every other technology, AI is a tool and hence we first need to set the right structures and policies to ensure that potential is realised. Educators, policymakers, regulators, students, and parents need to work together to achieve the opportunities and prevent the drawbacks.
2. AIED OPPORTUNITIES

For the Student

AI technologies can bring a huge number of economic benefits on the individual, corporate, national, and global levels. According to NESTA’s “Educ-AI-tion Rebooted?”, the opportunities AI offers for education can be seen in three broad categories of AIED tools: learner-facing, teacher-facing, and system-facing.

For the learner or the student, AI technologies could have the potential to provide individuals worldwide high-quality personalised education, allowing every single individual to discover their own unique character and grow by letting their uniqueness progressively unfold.

Most examples of AIED technologies - like that produced by the third panellist Priya Lakhani’s company CENTURYTech - fall under this category. With CENTURY, students can have a personalised learning path made up of micro-lessons called nuggets. CAI, their AI technology, understands how an individual learns best and constantly adapts to provide the support or challenge each student requires.

Other types of student-facing AIED opportunities include smart content, intelligent tutoring systems, or peer to peer learning. With smart content, information or knowledge can be intelligently personalised or tailored to match the needs of each student. With peer to peer learning, students worldwide can connect and ask questions to one another to facilitate collaborative learning. With intelligent tutoring systems, students who need extra guidance on a subject can have a one-to-one personalised tutor that offers him/her real-time feedback and tracking of student strengths and weaknesses.

All of these applications aim to address at least five of the seven challenges addressed above, all with a similar goal: improve the learning experience for the learner and transform the way students receive and apply new information.

For the Teacher

There is also a group of technologies that are being developed to address the challenge relating to excessive teacher workload inhibiting them from providing quality teaching.

These set of technologies can help educators reduce administrative, routine tasks (i.e. assessment, plagiarism detection, administration, and feedback) and provide them with more time to focus on the students.

Furthermore, these technologies can help provide teachers with insights about students and ways to innovate their classrooms.

AI’s ability to analyse large amounts of data in real-time (a student’s performance in a
particular skill across subjects over the course of a year, for example) and automatically provide new content or specified learning parameters, allows teachers to better understand student performance and orchestrate more effective personalized learning plans.

By doing many of the easily automated tasks, AI technologies can enable teachers to spend more time with students and experiment with different learning environments to understand what works for their classroom. For example, there is now software available that has automated seating plans using AI insights. The platform tracks how students in a classroom impact each other and suggests a tailor-made seating plan to teachers that will promote a healthy learning environment.

Technologies such as these can serve as aides in the classroom. AI will likely not replace the role of a teacher as a whole but will serve as an invaluable extension of the human expert, helping teachers to more effectively meet the diverse needs of many students simultaneously.

**For the System**

A third group of technologies that are being developed seek to address the education system at high-level, particularly the current difficulty of sharing insights between schools and colleges to gain important insight. Professor Rose Luckin, our fourth panellist at the APPG AI meeting, stressed that the most powerful way AI can be used is to create an intelligent infrastructure.

AIEd technologies created for the system help those who manage our education systems, including education leaders and decision-makers, policymakers, and regulators. They can have a wide range of applications ranging from empowering informed decisions with predictive algorithms to allocating resources more efficiently to understanding best practice. They can be applied at the regional, local, and national levels.

Most of these technologies require the sharing of data between learning environments in order to be able to recognise patterns and trends. There have been a few examples where AI has been applied to massive amounts of data already collected to provoke data-drive decisions to improve school education, but the sharing of data is complicated and this is likely the reason there have been few developments in this space although the impact could be truly transformative.

However, most of all, AI technologies in this category can massively improve our Education Management Information System (EMIS), an organised group of information and documentation services that collects, stores, processes, analyses, and disseminates information for education planning and management. EMIS with AI could have the ability to automatically analyse the data and generate data dashboards at the school, local, regional, national, and global levels.
3. AIED DOWNFALLS

**Fear Factor**

Although the opportunities AIEd technologies – for the student, the teacher, and the system – can be revolutionary for the overall learning experience, there are a series of risks or downfalls educators and policymakers must confront. The panel at the APPG AI evidence meeting unpacked just a few.

Professor Rose Luckin asked policymakers to consider the ‘fear factors’ associated within these technologies. Indeed, she admitted, there are risks. There is fear that teachers might someday be replaced by AI technologies although most applications being developed in the moment look to aide the teacher rather than replace him/her. There is also fear the implementation of AI technologies in learning environments will have negative impact on student development as there is still lack of evidence to understand long-term implications.

These fears are expressed by the stakeholders in the sphere – the parents, the educators, the regulators, and the wider society. Until these fears are addressed, AI adoption in education will not be able to meet the potential it promises. The APPG AI meeting focused on two of these fears or drawbacks in particular: data issues and inequality.

**Data Issues**

Data governance issues are of concerns for policymakers worldwide. How AI technologies collect, share, and use data is an area that is gaining significant attention as people are starting to question privacy, transparency, consent, and accountability.

These data issues are even more sensitive when we apply them to education, as we are talking about technologies that could potentially have a huge impact on our children.

For AI to offer the benefits it promises it needs data but there are many learning environments that do not yet have sophisticated processes for collecting and managing data. Until this is addressed, there is a risk that our AI technologies will be fed on unreliable data which might lead to skewed outcomes.

Other data concerns include data ownership and the risk of a few major players owning data for huge numbers of learners. Also, the impact on privacy and security is an ethical dilemma around how student data can be used while ensuring privacy preferences are protected.

**Inequality**

AIEd might deepen existing inequalities as those who are already disadvantaged and marginalised are unlikely to see AI in their learning experiences. This means that the benefits of AI technologies will be seen only by the wealthy, increasing gaps that already exist in our societies.

Policymakers must pay particular attention to matters around inclusion to ensure an infrastructure is developed where disadvantaged communities are not left behind in the AIEd Revolution.
4. RETHINKING THE PURPOSE OF EDUCATION

Shared Vision

All stakeholders – from students to parents, policymakers to teachers, industry representatives to regulators – need to be working together to create a shared vision of our education's purpose.

A key question that came up in the APPG AI evidence meeting was: What are we trying to achieve with our education systems?

Throughout history, economic and social change has affected the way our education systems have looked – and today is no different.

We must adapt our education systems to reflect these changes. We must ensure the adoption of AI technologies in learning environments are helping us achieve that purpose.

According to the attendees at the evidence meeting, our education systems should be empowering students to become more human. Our focus should be not to provide them with the skills they will need to find a good job (although employment is important for an individual’s survivability and wellbeing) but it should also be about making them realise how unique they are as human beings.

There are many challenges in the education system in which AI is not the answer to. For example, some of these challenges include weak infrastructure, lack of funding and investment, outdated curriculum, etc. Before we put AI in learning environments, we must first ask ourselves why.

To create AI technologies that truly address real problems within education systems and are part of our shared vision, we must involve all stakeholders from the design to the implementation stage – teachers, children, parents, educators, industry, policymakers, and the wider society.
WRITTEN EVIDENCE APPENDIX

Priya Lakhani OBE, Founder CEO, CENTURY Tech

Biography: Founder CEO of CENTURY Tech, Priya Lakhani is passionate about implementing artificial intelligence, machine learning and blockchain in education, learning and development. Priya has been a member of the Secretary of State for Business, Innovation and Skills’ Entrepreneurs’ Forum and an advisory board member to several educational/skills organisations. Priya was awarded Business Entrepreneur of the Year in 2009, The Mayor of London Fund’s Special Recognition Award 2016 and Officer of the Order of the British Empire in 2014.

Written Evidence

For decades artificial intelligence has been disrupting and improving most sectors of society and the economy, while until only recently education had remained largely untouched. AI is now being embraced in learning environments across the world, from leading English independent schools to Syrian refugees in the Middle East. AI-based tools are being used to improve both teaching and assessment at all levels of education, across all subjects, from primary schools to adult learning providers.

Artificial intelligence has the potential to transform education by moving away from the one-size-fits-all model that has led to stagnation in classrooms across the world. Learning platforms that use AI, like CENTURY, provide genuine adaptivity for students. By learning how each student learns, everyone in the classroom can learn at their own pace, while teachers are equipped with data insights and analysis to allow them to perform even better as educators. Not only is learning itself enhanced, but the automation of admin tasks like marking and planning frees up teachers’ time to actually teach.

The abundance of data made instantly available can reassure parents that their child is adequately supported, challenged and making the progress they should be. Parents can use this to encourage home learning and become more involved in their child's education.

By using AI to personalise learning, students’ individual strengths and weaknesses can be addressed by focussing them on the most important areas for their individual needs. Those struggling in an area are directed towards materials to help them improve, while those who are need stretch are pushed towards harder topics and more complex questions. The dynamic system continually adapts based on student behaviours related to knowledge and skills, pace of learning, difficulty levels and memory function, among other factors.

Using CENTURY improves a student’s knowledge of a particular subject by 30%, while schools have attributed remarkable improvements on key metrics such as Progress 8 to its use. Teacher workload is reduced by an average of six hours per week, creating more time for teaching while improving teacher wellbeing.

Artificial intelligence’s benefits for student and teacher outcomes, low cost and ease of use, and its ability to be applied to any subject, curriculum or language in the world mean that it has the potential to transform education for students everywhere.
**Professor Rose Luckin, Professor of Learner Centred Design, UCL Knowledge Lab**

Biography: Prof Rose Luckin has been developing and writing about the Learning Sciences, Educational technology and Artificial Intelligence in Education (AIEd) for over 20 years. Her research explores how to increase participation by teachers and learners in the design and use of technologies. In addition to over 50 peer-reviewed articles and two edited volumes, Prof. Luckin is the author of Re-Designing Learning Contexts (Routledge, 2010), and lead author of the influential Decoding Learning report (Nesta, 2012). Rose is a member of the Welsh Assembly’s Successful Digital Futures group and was previously a member of the board of BECTA (the British Educational Communications and Technology Agency) and founder and chair of their Research Advisory Group. Rose is a member of the EPSRC college of reviewers and has advised the research councils of various countries on the design and use of educational technologies. Her research applies participatory methods to the development and evaluation of technology for learning. This work is interdisciplinary and encompasses education, psychology, artificial intelligence and HCI.

**Written Evidence**

**Opening remarks: Introduction – who are you and what is your background?**

I am professor Rose Luckin from UCL Knowledge Lab. I teach and conduct research into the way in which we can best benefit from using AI to support teaching and learning, and how the prevalence of AI in our future means that we need to revise what and how we teach and learn now. I have a degree in Computer science and AI and a PhD in Cognitive Science. I have built and evaluated AI technology for use in education. I have also taught in schools, FE and HE. I am also Director of EDUCATE: a London hub for Educational Technology StartUps, researchers and educators to work together on the development of evidence-informed Educational Technology. In addition, I am currently Specialist Adviser to the UK House of Commons Education Select Committee for their inquiry into the Fourth Industrial Revolution, Co-founder of the Institute for Ethical AI in Education. In June 2018, I published 2018 book: Machine Learning and Human Intelligence: The Future of Education for the 21st Century

**Main objective: Main evidence, concise and short.**

1. How can AI be used as a ‘tool’ in different learning environments and across diverse subjects?

   There are many ways in which AI can be used in education, from the provision of differentiated individual instruction that is tailored to meet the needs of each learner in specific subject areas, to intelligent interfaces that use natural language processing or ARVR to help learners with SEN interact and learn in new ways.

   Perhaps the most powerful way to think about AI in education is as the tool that can help humans become more intelligent. We need to consider AI in terms of its ability to provide an intelligent infrastructure through the judicious and carefully designed analysis of large-scale multimodal data collected as learners interact in the world. This intelligent infrastructure can inform teachers and learners about the specific details of their learning PROCESSES across
and within subject areas in a way that can support both teachers and learners. This type of intelligent infrastructure can help us all to be better at learning: a key skill for the future.

2. What is the effect on the student experience? What is the effect on a teacher? What is the effect on learning environments?

The impact of well-designed and judiciously used artificial intelligence on the student experience is that students will be better prepared for learning and better informed about their own learning needs and progress. THIS IS FUNDAMENTALLY IMPORTANT AS WE ENTER A WORLD WHERE HUMAN HACKING WILL BE WIDESPREAD – WE WILL NEED TO KNOW OURSELVES REALLY WELL TO STAY AHEAD.

If we get the use of artificial intelligence right, students can expect to spend more time interacting with each other and with their teachers and less time with their technology.

The effect on teachers will be profound. With a move away from the current emphasis on a knowledge-based approach to teaching to an intelligence-based approach. Teachers will need to gain Advanced Data literacy skills in order to interpret the analysis of the large datasets that will be available about their students’ progress. Teachers will need to MENTOR students understand what this data is revealing about their learning. Teachers can also expect to spend more time on CPD to ensure that their expertise is constantly refined.

Learning environments will also change as more emphasis is placed on collaborative activities. Interdisciplinary problem-solving activities will require teachers to work as teams to ensure that each problem is tackled from the perspective of multiple disciplines. Environments will need to be conducive to increased social interaction with teams of teachers working with larger groups of students on fewer but much more complex problems.

3. How can it impact assessment? How can it help identify what students are good at and help them excel in that? How can it help identify what skills are no so good at and help them improve?

AI enabled continuous formative assessment should free us from unnecessary high-stakes testing and, although we may choose to maintain some testing if it is targeted at the most valuable aspects of what students achieve through their studies. The most important aspect of assessment is the decision about what to assess and this is where significant change is needed. We need to decide what is valuable as the outputs of education for the modern world - then we can redesign our assessments so that we identify how best to support students in excelling at what we value. The means of assessing student progress can then be a blend of continuous formative assessment, portfolio production and self-presentation of the evidence each student values from the data that has been analysed while their learning has progressed.

4. Concluding remarks: What should the government do? What is your recommendation to Parliamentarians and what they should do?

3 Recommendations:

• Change the way we value our educational systems to focus on learners. At the moment our assessment focuses on schools, who compete in fairly pointless ways through league tables. We need to shift the focus of attention to learners and we need to move to an assessment system that values the Human Intelligence that we cannot automate. If we change what and how we assess learners, then the other changes that need to take place will follow.

• Accept that change is inevitable, and I mean significant change. Change is stressful. Therefore, we must build cognitive fitness and resilience into the curriculum and into ITT and
CPD and we must ensure that educators are prepared through increased CPD. Teachers are learners too.

- Address the enormous and specifically educational ethical implications before it’s too late. In particular, parliamentarians must recognise the implications of the digital gangsters that are the Big technology Companies: The Intelligent infrastructure I have referred to already exists but not in support of learning. Surveillance and behavioural data harvesting are pervasive and often invisible. The big tech companies are already highly integrated into education in terms of hardware and infrastructure.

**Sir Anthony Seldon, Vice Chancellor, University of Buckingham | Author of The Fourth Education Revolution**

Biography: Sir Anthony Seldon, Vice-Chancellor of The University of Buckingham since 2015, is one of Britain’s leading contemporary historians, educationalists, commentators and political authors. He was a transformative head for 20 years, first of Brighton College and then Wellington College. He is author or editor of over 35 books on contemporary history, including the inside books on the last four Prime Ministers, was the co-founder and first director of the Institute for Contemporary British History, is co-founder of Action for Happiness, honorary historical adviser to 10 Downing Street, UK Special Representative for Saudi Education, a member of the Government’s First World War Culture Committee, was chair of the Comment Awards, is a director of the Royal Shakespeare Company, the President of IPEN, (International Positive Education Network), Chair of the National Archives Trust, is patron or on the board of several charities, founder of the Via Sacra Western Front Walk, and was executive producer of the film Journey’s End.

Written Evidence

AI can be the best thing for humanity – or the worst. It all begins and ends with education.

As someone who spent 20 years as the head of two of the country’s top academic schools, and the last three years as head of the university which comes top of the government’s teaching excellence framework, I have no pleasure in recording that neither government nor parliament comprehends at all the full impact of AI on education. Not only on the way education will be delivered far better than at present, but on the jobs and skills that we are preparing our young people for.

In my recent book ‘The Fourth Education Revolution - will AI liberate or infantilise humanity,’ I argue AI has the power to transform today’s ‘factory’ education model. There are five key challenges our current education system faces: the inability to defeat entrenched social immobility, students forced to progress at the same speed, teachers overwhelmed in mountains of bureaucracy, lack of personalise learning, and a focus on a narrow set of knowledge and skills. AI will impact on all five levels of teaching and learning at schools, colleges and universities: selection of material, organisation of time and learning spaces, delivery of the material to optimise and stimulate learning, assessment and feedback to optimise learning, and finally, suitability of each student for progression to the next level of study.
AI can be the solution. AI can help ensure our education system liberates humankind providing them with a truly transformative learning experience. However, there are potential dangers we must address. These include data misuse, manipulation, technological unemployment, and a passive learning mindset. Ultimately, the benefits of AI in education will far outweigh the downsides, and we need to pave the roadmap for how to reap the former while mitigating the latter.

The revolution will not happen without the support of policymakers. Policymakers need to comprehend the scale and speed AI will transform education and steer the national education system in a way that truly prepares our younger generations for their futures.

**Joysy John, Director of Education, NESTA**

Biography: Joysy is the Director of Education in the Innovation Lab, bringing together Nesta’s work in education across innovation programmes, research and investment. Joysy is the former Chief Industry Officer of Ada, the National College for Digital Skills where she led the College’s industry engagement and online learning website. Prior to this, Joysy headed up international strategic development for EF Learning Labs, led business development for Emerge Venture Lab, Europe’s first education technology accelerator and advised Level 39, technology incubator based in Canary Wharf. Joysy is passionate about education, entrepreneurship and women’s empowerment. She helped launch three non-profits focused on education. She founded Founders Fit to help startup leaders find the right cofounders.

Written Evidence

Nesta, a global innovation foundation, has published “Educ-AI-tion rebooted?”. This report explores the future of AI in education and focuses on the questions posed by the APPG on AI.

Question 1: How can AI be used as a ‘tool’ in different learning environments and across diverse subjects?

AI tools in education exist and are already being used by a small number of our schools, colleges and universities in three main categories:

- Learner-facing (eg. adaptive learning platforms)
- Teacher-facing (eg. automated assessment tools)
- System-facing tools (eg. tools to learn about the performance of our school system as a whole).

Our research found many more learner-facing tools than teacher-facing or system-facing tools.

Question 2: What is the effect on the student experience? What is the effect on a teacher?

AI is well placed to help tackle five stubborn challenges in education that affect the experience of students and teachers:

1. Excessive workload.
2. ‘One-size-fits-all’ learning, with inflexible pathways.
4. Difficulty of sharing insights between schools and colleges.
5. Inconsistency of education provision and low social mobility.

AI also presents potential challenges around issues such as bias, transparency and privacy, and teachers need training and support to help them have the skills and confidence to work with AI tools and other educational technologies.

Question 3: How can it impact assessment

Artificial intelligence is changing how we assess, for example, automating complex assessment offers the opportunity for more continuous assessment without additional burden on teachers, which may lead to the end of exams as we know them.

Artificial intelligence tools can also change what we assess by broadening the skills and aptitudes that can be tested across large numbers of students. For example, Edulai, a tool being piloted in the higher education sector, uses AI to assess skills such as critical thinking, problem solving and communication.

As well as assessing students there is also a potential role for AI in assessing the education system as a whole by dramatically broadening the range of what can be assessed at scale. To ensure that this empowers rather than controls assessment data must be treated responsibly and be combined with the insights of humans.

Key recommendations (see report for full recommendations)

- Public funding for AIEd R&D through Innovate UK, prioritising teacher-facing and system-facing tools, and funding to help growth and adoption of the most promising AIEd tools in UK schools.
- Government should help form an EdTech test-bed to enable companies to test AIEd in real settings and support closer collaboration between schools and colleges, AIEd companies and research.
- A clear point of government leadership for AI in education and a publicly declared government ambition to create a system of responsible education data sharing by 2030.
- Public bodies responsible for exams across the UK should launch a challenge prize around the use of AI in assessment.

**Wayne Holmes, Lecturer, Lecturer, Institute of Education Technology, The Open University**

Biography: Dr. Wayne Holmes has been involved in educational technologies and education research for more than 25 years. He is now a Lecturer in the Institute of Educational Technology (IET) at The Open University and the Author of “Artificial Intelligence in Education: Promise and Implications for Teaching and Learning.” He has received his PhD (DPhil) in Education (Learning and Technology) from the University of Oxford and has degrees in Film (BA Hons), Philosophy (MA (Distinction)) and Education (MSc Oxon). He also has a fellowship of The Higher Education Academy. Before joining the IET, Wayne was a
researcher and taught at the UCL Knowledge Lab, UCL Institute of Education. He was also a Senior Teaching Associate at the University of Bristol.

Written Evidence

The potential for AI applied in educational contexts is well known: “It promises to reduce barriers to access education, automate management processes, analyse learning patterns and optimise learning processes with a view to improving learning outcomes.” Audrey Azoulay, Director-General of UNESCO. In fact, whether it is welcome or not, AI is already impacting on education. However, at the recent UNESCO event “Artificial Intelligence for Sustainable Development” (March 2019), where we heard from AI experts and education experts from around the world, it became clear that there exists a gulf in understanding. Many AI experts, although undeniably well-intentioned, shared stereotypical models of education and learning; while many education experts think of AI as just ‘another’ technology, not realising how it is poised to permeate everywhere and is constantly evolving. As a consequence, currently most AI developments in education are student-facing. That is they aim to “improve upon” human teachers by providing automated “personalised learning”, without acknowledging the potential implications (no wonder teachers are beginning to fear for their jobs!). In addition, currently there is little evidence of these systems’ efficacy, and little consideration of their long-term impact on students (if only because of the reduction in human contact) or on educational contexts (what about classroom management of students at different places in the curriculum?). In any case, this approach, using AI to reproduce and attempt to improve upon teachers’ practices, is profoundly unambitious. Instead, why are so few investigating the potential of AI to reinvent – not reproduce – teaching and learning? Why are we not leveraging the power of AI to support – not replace – teachers, potentially creating AI-powered superhuman teachers? Why are we not developing tools that release us from the dominance of 19th century-style examinations, by enabling a more nuanced and informative approach to assessment and accreditation? And why are we not already teaching our students (and, frankly, everyone in the country) about what AI really means for all of us? Finally and critically, as Audrey Azoulay comments, “the penetration of AI in education comes with concerns about ethics, security and human rights” – which is why we need a global framework for the ethics of AIED, which goes beyond the ethics of data and algorithms, by being firmly rooted in the ethics of education.
ABOUT APPG AI

The All-Party Parliamentary Group on Artificial Intelligence (APPG AI) was set up in January 2017 with the aim to explore the impact and implications of Artificial Intelligence.

The APPG AI is co-chaired by Stephen Metcalfe MP and Lord Clement-Jones CBE.

The Group Officers are Chris Green MP, The Right Reverend Doctor Steven Croft, Baroness Kramer, Lord Janvrin, Lord Broers, Lord Holmes of Richmond, Lord Willetts, Baroness McGregor-Smith, Justin Madders MP, Mark Hendrick MP and Carol Monaghan MP.

The Group supporters – Accenture, Blue Prism, British Standards Institution, CMS Cameron McKenna Nabarro Olswang, Creative England, Deloitte, Ernst and Young, KPMG, Megger Group Limited, Microsoft, Osborne Clarke, Oracle, PwC, and Rialto – enable us to raise the ambition of what we can achieve.

Big Innovation Centre is the APPG AI Secretariat.