

Education Committee

Oral evidence: [Fourth industrial revolution](#), HC 1007

Tuesday 8 January 2019

Ordered by the House of Commons to be published on 8 January 2019.

[Watch the meeting](#)

Members present: Robert Halfon (Chair); Lucy Allan; Ben Bradley; Marion Fellows; James Frith; Emma Hardy; Trudy Harrison; Ian Mearns; Lucy Powell; Thelma Walker; Mr William Wragg.

Questions 122 - 188

Witnesses

I: Priya Lakhani, Founder CEO, CENTURY Tech, Martin Hamilton, Futurist, Jisc, Vinous Ali, Head of Policy, techUK , and Professor David Brown, Professor in Interactive Systems for Social Inclusion, Nottingham Trent University.

II: Matthew Fell, Chief UK Policy Director, Confederation of British Industry (CBI) and Iain Murray, Senior Policy Officer, Trades Union Congress (TUC).

Written evidence from witnesses:

[CENTURY Tech](#)

[Confederation of British Industry \(CBI\)](#)

[Jisc](#)

[techUK](#)

[Trades Union Congress \(TUC\)](#)

Examination of witnesses

Witnesses: Priya Lakhani, Martin Hamilton, Vinous Ali, and Professor David Brown.

Q122 **Chair:** Good morning. Thank you very much for coming today. Just for the benefit of the tape, could you please introduce yourselves and your organisations very briefly, from our left to right?

Professor Brown: My name is David Brown. I am Professor of Interactive Systems at Nottingham Trent University.

Vinous Ali: My name is Vinous Ali and I am head of policy at techUK, which is the industry body for the tech sector.

Martin Hamilton: I am Martin Hamilton, Futurist at Jisc. Jisc is the UK's digital body for tertiary education.

Priya Lakhani: I am Priya Lakhani. I am the founder and CEO of CENTURY Tech, which is an artificially intelligent learning platform deployed in schools, colleges and universities around the world. It learns how the brain learns and it is deployed to children. They learn on the system, any curriculum, any language, and it learns their knowledge, their skills, gaps in knowledge, gaps in skills, pace of learning, focus levels, memory function, all sorts of different variables to be able to essentially plug gaps in knowledge immediately and provide real-time data insights and analytics using big data technology to teachers.

Q123 **Chair:** Thank you. In a session we had with Sir Anthony Seldon, he said the Government simply do not understand AI in education. What is your view on that, please?

Professor Brown: I did not read that report, but my main focus, as a way of describing our focus, is personalisation.

Chair: It was evidence that he gave to us.

Professor Brown: Okay. My main focus is personalisation: can we use sensor data from computers; can we use embedded cameras, microphones, depth sensors, which commonly occur in classrooms; and take this information and label it and use artificial intelligence and machine learning to detect the level of engagement of students? Without engagement in the types of students I work with, there would be no deep learning or meaningful outcome. If we can detect engagement, we can optimise engagement and the potential for deep learning and alter the learning experience, the types of—

Q124 **Chair:** But do you agree with his premise?

Professor Brown: No, I don't.

Chair: You do agree or you do not agree?

Professor Brown: Sorry, what was the premise?



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Chair: The premise that Anthony Seldon said was that the Government simply do not understand AI in education.

Professor Brown: From all the information that I have read so far, there is a slow uptake in education of artificial intelligence and machine learning, where things are starting, especially at a European level with projects, and it will continue.

Vinous Ali: I would say that the Government have their eyes open to the opportunity that AI brings. You have seen that with the AI sector deal. You have seen it with AI specifically being talked about in the National Health Service and so on. With education, it is probably a slower burn, but I think that the opportunities are there and the Government understand that. It is about how you unlock those opportunities. How do you identify which companies you can trust? I know that we will probably speak about the ethics of using artificial intelligence, machine learning, et cetera, particularly in something as sensitive as education.

I would say that the Government are aware of the opportunities, but it is how they deploy it. How do they make sure that the teachers are trained to be able to use it properly and how do you win the prize of using it? From techUK's conversations with DCMS, it is certainly aware of that and it is looking at international examples, whether it is India, Singapore or Finland who are also making massive strides in this area. I think that it is a slower burn than in other areas like, say, the NHS.

Martin Hamilton: I would say that there is probably a little bit more of this already in use than perhaps people realise. For example, at Jisc we developed a learning analytics service, which is all about helping institutions to make interventions that will help learners who perhaps are at risk of dropping out or at risk of disengaging. We are talking about what Government can do. The Welsh Government have said that they think that this is such an important thing to be doing that they are going to give this to all of the learners at the Welsh universities. This is a project called Learning Analytics Cymru, which has just kicked off. If you ask what Government can do, I think that the example of Learning Analytics Cymru is that we can do quite a lot if we act in a concerted way. There may be parallels that could be drawn elsewhere in the UK.

Priya Lakhani: From several conversations that I have had with members of Government at the Department for Education, for example, I would agree with Sir Anthony Seldon; the Government do not understand artificial intelligence in education. The reason I say that is because CENTURY—and please by all means have a look at third party reviews on this on the internet—is probably the leading technology company when it comes to artificial intelligence in education globally.

The reason I would say that I agree, just getting into the detail, is what is it? What is artificial intelligence? What makes it different from a standard learning management system? What makes it different from a standard virtual learning environment, all this technology that we have seen in



schools, colleges and universities for the past few decades? There is such a difference between all the technology that has existed in the past few decades and artificial intelligence technology. If members of Government can come to me straight away today and say, "I can tell you the exact difference between the two", then that is great, but I have never heard anyone say, "We understand the difference. We understand the implications of artificial intelligence in education".

One area that I would request that the Committee looks at is, for example, when the Secretary of State and the Department for Education issued a technology report—I think that it was a few months ago—saying, "Here are the challenges faced by the education sector. Technology companies, you come up with some solutions to solve these challenges". What was very, very clear in all of those statements was that they do not understand artificial intelligence in education. I think that there is a reason for that. It is because there have been so few examples of actual artificial intelligence in education. The key difference is that this is a machine that learns by itself. It makes autonomous decisions. It is not just data science. It is predictive forecasting of how a student is learning and where the pitfalls are that they may come across. It uses big data technology.

There is a real nuance between standard learning platforms and looking at statistics in data that we see, how children have been learning and their grades and potentially behaviour and attendance and that cross alliance with grades. That is completely different to a machine that then will make decisions by itself to make interventions. That key difference has never been explained to the public, to head teachers, to all the stakeholders in education. I would have to say that I agree with his statement.

Q125 Chair: What should be done to reskill teachers so that they are aware of what is going on and what needs to be done in terms of artificial intelligence in schools?

Professor Brown: We have done quite a lot of studies where we have interviewed teachers as part of European projects and asked them, "What are the barriers and facilitators to the adoption of the technology?" Most of them have concerns about it being misconstrued as a replacement for themselves. Some of them are incredibly concerned about regular training, not just initial training but top-ups to training as well, and somebody to confer with, and just the expense as well in terms of schools. It is not the sensors themselves that I use for artificial intelligence to predict engagement. They are not particularly expensive—they are microphones, they are cameras—but they are embedded into platform agents, which are showing lots of promise. These platform agents include incredibly expensive robots and they are meant to be ubiquitous as well. You are meant to use them in the classroom and then the students can go home and log on to the management system, but it is going to be impossible, especially for the students I work with, with



profound and multiple learning disabilities, to afford some of those platform interfaces, including PCs, tablets and, at the top end, robots, too. That is one of their main concerns.

Vinous Ali: For teachers, part of the issue is that often technology comes in at the last stage. It is seen as a bolt-on rather than integrated into the whole system. As much as possible, you take teachers on that journey with you to say, "Okay, look at your classroom. You tell us what you need and we will help you build that technology and integrate it and train you on how to use it".

The biggest fear for me is that you get given this technology and it just sits there and gathers dust and is not used. The potential for it is not maximised, which means that teachers will probably say that it is useless and will stop using it and the students will not feel confident to engage with it as well. This is all about the fourth industrial revolution and the future of work. Technology is going to be embedded into every single job you can possibly think of and, therefore, from a very young age students need to be comfortable with that technology. In order to do that, they need to see their teachers being comfortable and confident with that technology. I think that it is about confidence and making sure that the teachers are taken along on that journey in terms of building that tech.

Q126 **Chair:** Because we have a fair few questions to go through, can I ask all the panel just to speak as concisely as you can? We really appreciate the evidence.

Martin Hamilton: I have a couple of observations. We talk about AI awareness here, but there is probably something more generally about digital skills in the workforce. If we expect our kids to learn digital skills, then their teachers probably need to have a deeper understanding than many of them do now. How could they get that? I talked about Wales. The Welsh digital competence framework is embedding this stuff in the curriculum. It is embedding it in teacher training. The Scottish digital teaching and learning strategy likewise. I do think that we have to ask ourselves to what extent there is—and it pains me to say this—an English gap. We can probably learn in England from what the devolved Administrations are doing.

One other thing, though, is about infrastructure. We talk a lot about what we could do with technology, but we hear from schools and colleges that the infrastructure is simply not up to scratch. There is a lot more that we could do there.

Priya Lakhani: What should be done to reskill teachers? What should be done is a really challenging question because we could come up with a long list of training. We built a course with ASCL, which is free. It is free CPD. It is accredited CPD that teaches teachers about artificial intelligence in the classroom. The issue and the challenge is time. They are so time constrained that trying to reskill them and teach them new things is incredibly challenging. I feel for all of our teachers and head



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teachers and SLT colleagues in schools because it is very difficult to now say, "Here is something else that you need to learn". Now you have to learn about e-safety, not just artificial intelligence and data.

Teachers rely on word of mouth, so that is really important. How can we highlight positive use cases? They trust each other, so how can they then essentially build the confidence themselves to try something new? I think that tech companies can do more—these tech companies like CENTURY that build this sort of technology. We ensure that we embed the technology in schools. No tech company should be just flogging technology to schools and then leaving them alone with it. You have to look at the usage. If the usage drops off, you have to go back in and train that school so that it is not a waste of money.

Q127 Chair: This is my final question before I pass to colleagues. Could I ask for very brief answers? Has there been, in your view, from the DfE or elsewhere, a general assessment of what needs to be done given the advance of the fourth industrial revolution—ie an overall strategic direction that this is what is going to happen, this is how we respond to it and this is how schools can prepare for it?

Priya Lakhani: There has certainly been the technology report that I spoke about a few moments ago where they talked about the challenges that schools face and how tech companies could address those challenges, but the fourth industrial revolution—

Chair: I am talking about the impact on younger generations.

Priya Lakhani: No, I certainly have not seen a coherent response. School leaders talk about it more than the DfE does. They talk about creativity—learning agility is the term that I use—learning how to learn and all these sorts of skills. The All-Party Parliamentary Group on Artificial Intelligence came up with a report for education on the skills that are needed.

No, I have not seen that from the Department for Education. I think that school leaders, certainly the ones that I work with, hundreds of them, would very much welcome a report on that subject.

Martin Hamilton: It has been very encouraging that DfE now has an education technology policy unit, and that group has been working very hard to develop a strategy for edtech, which includes use of AI and includes, hopefully, something for infrastructure as well. Obviously, there have been some other developments that have rather derailed a lot of plans and potential initiatives and we can only hope that some of those will sort themselves out soon.

Vinous Ali: I agree with both those comments. Yes, it is good to see that DfE is making some progress, particularly on edtech, but there is no overarching strategy and I think that that is missing. It is not just about that technology but, as Priya says, it is about changing the curriculum so that it is not just about exams and knowledge-based learning but



embedding the skills that are needed for the future, like creativity and leadership.

Professor Brown: I am a university researcher. I work extensively in Europe. There are huge calls coming out at the moment to look at the impact of ICT, both positive and negative, and its potential to worsen the gap between those people who are coming from privileged families and under-represented families. The DT-Transformation bid that is coming out now is looking at the effects of ICT on the behaviour of students. It is looking at prosocial behaviour using games. It is looking at mental wellbeing and mental health using network smart-tech style objects and co-creation. It is looking at the different types of brain development you get with online materials, looking at the positives and negatives of social media, and skills and competencies. There are huge amounts of evidence in terms of the ability of virtual environments and games to increase functional skills and cognitive skills in our students. I think that all our panel agree that we have done huge amounts of work. It is getting through to some schools, but not all schools.

Priya Lakhani: I think that an overarching strategy would be welcome, but what has to be thought about is not just the skills that we might need where we are going to have phases of automation. That is not just it. We have to think about how we test our students at the end of formal education because unless we look at that particular system, schools will always drive their students to those tests because that is how they are measured. Even though we have to look at the skills and what employers might want and how to make sure that our students are the most competitive when it comes to the world of opportunity of jobs in the 21st century, we really have to look at those GCSEs, those A-levels, and those SATs. It is always going to be a case where schools will teach as to how they are measured. I know that many of them try very hard; I am not saying that they don't. They are painstakingly trying hard to teach other skills, but that must be looked at, too.

Q128 **Lucy Allan:** You may have covered it while I was out. I wanted to ask about how technology companies can better engage with the education sector. I will start with you, Priya. I know you were touching on that. Are they doing enough? What more should they be doing specifically?

Priya Lakhani: CENTURY was founded five years ago with the sole purpose of trying to reduce the 1.8 million children who are underperforming in UK schools to zero. It is a complete social impact venture. To be very frank, we have done more business—and I am calling it business because at the end of the day we need to keep the lights on; it is a very cheap product—in the Middle East and Africa and now in the US in 14 days than in five years in the United Kingdom.

There is no lack of will of technology companies to engage with schools in the United Kingdom. What we find is that there is a lack of confidence. Schools feel like they have been burnt before with technology. They have not seen the evidence that technology has improved. We are talking



about general technology. I am not talking about artificial intelligence here. Those particular platforms may be the one-size-fits-all delivery of technology, the learning management systems that simply digitise the manual process that education has been adopting for several decades. Those technologies have not performed.

What we have found is that even if technology companies want to engage, in England specifically—I think that I should talk about England only at the moment—we find that it is very, very difficult to engage with 26,000-odd schools. It is a very fragmented market and there is no real championship coming from the Department for Education apart from what we have seen in the last few months.

Q129 Lucy Allan: How do we do that? How do we seize the opportunity of all that you are offering but no one is picking up?

Priya Lakhani: The way that we have grown organically is that we have ignored traditional methods of trying to potentially talk to Government and so on. We have just said that to start off with what we want to do is we go to schools and we allow those schools to become champions. You essentially have a pioneer programme and you elevate the status of those schools and say, “Look, they are using technology. They are using it well. Here is the actual evidence and impact data”.

There is a programme that UCL has created called Educate, which I think is pretty unique in the world. You can partner with Educate at UCL. They will help you analyse the results of the impact of technology in the classroom and you can publish those reports. Then other schools start to see that as a role model. For me, personally, having worked on it for five years, it is the only way I have managed to stay and grow in the United Kingdom. I do not think there is a lack of will of technology companies wanting to engage. I just think that it is a case that schools are inundated. They are really tired. They have huge workload issues and they just simply do not have the time to sift through all of this.

Q130 Lucy Allan: Yes. Martin, do you want to add to that?

Martin Hamilton: Yes. If I could amplify Priya’s comments, the other thing that we should keep in mind is that the UK is a leader globally in education technology. I scribbled some notes down: 25% of Europe’s edtechs are based in the UK; the UK is number one for edtech VC investment. We are doing lots of stuff right.

We have this problem with access to the home market. Even if you said let’s approach a multi-academy trust as an edtech, we run an edtech support initiative and we work with a lot of start-ups and scale-ups. There are hundreds of MATs. There are 25,000-plus schools. It is extremely hard to find a route into those markets. We think that there are possibilities and that that nucleus of economic activity asks the question: should we be looking for a sector deal for edtech. That is a conversation that we have had a little bit with the future sectors team in



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BEIS. It may be that there is enough going on here that it makes sense to have a sector deal for edtech.

Chair: Ian has a quick point.

Q131 **Ian Mearns:** Just on that, there are still things existing called local authority school improvement services. It might be a route into schools in terms of an improvement in what is being done within their own local authority market. For instance, my school improvement service in Gateshead sells its wares into Sunderland, South Tyneside and Newcastle. That might be a route into that if you think of that as a whole because the market is too disparate.

Martin Hamilton: We think this is part of the rationale for having the sector deal conversation. There are local procurement organisations, and the devolvment of skills funding to local enterprise partnerships. There are a lot of these initiatives, but right now they are not quite as joined up as perhaps they could be.

Priya Lakhani: I have done lots of work with some local authorities and what is really interesting is that they often have a school improvement team that sits side by side with the team that go into schools and sell what is on their catalogue or in their portfolio. What is fascinating is that there is just such a lack of awareness about what artificial intelligence is. When people look at technology, they think, "That is just the same old technology we have been using for decades". There is definitely a question of how we can inform the local authorities and all stakeholders about what opportunities this new technology can provide so that we can essentially educate the sector about the opportunities available.

Vinous Ali: Just quickly to build on that, two things have come out of that. It is a question of co-ordination and a question of trust. On the co-ordination point, there are local digital skills partnerships, for example, popping up. Can they act as a co-ordinating role to signpost to schools that this is a really good example of technology being used in the classroom and this is a really bad example and this is how not to do it? We have already spoken about the teachers valuing real-life examples and learning from each other by word of mouth. What role is there for the local authorities or for Government to play to signpost and to co-ordinate?

Then it is that point about trust. You need to ask yourself three questions. Why am I buying this technology? How does it work with the other bits of kit that I already have? Why do I need it, basically? It is who you go to to ask those questions and whether you can trust those responses that you get back. Having a co-ordinator or a champion that can be that trusted point of contact in a local area is really valuable, I think.

Professor Brown: It is not just about schools, it is about higher education. All our European projects involve big companies around



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Europe, Aerospace Valley, and we worked with students with profound and multiple disabilities, how engaged they are but how anxious they are. It has been bought by Siemens and it has been bought by Fujitsu and the university itself investing in the types of technology that understand engagement, deep learning and how industry is picking up on it, so two contracts before Christmas and now the universities want to sell it to other universities, so it is really entering higher education at, I think, a rate higher than schools.

Chair: Lucy Powell has a quick point.

Q132 **Lucy Powell:** It is just a quick follow-up to that. The organisation that schools do look to to test and tell them whether something is worth them doing is the Education Endowment Foundation. I do not know what engagement you have had with them.

Priya Lakhani: We spoke to them quite early on. I think that the issue with that, with all respect to the colleagues there, is that technology companies that build AI have to be agile. There is this whole thing about agile development and it is fast development and getting things out into the market, testing, getting feedback, getting it out again, so you can make the product absolutely fit for purpose. If you stop for a year to go through a randomised control trial to see if that initial bit of technology works, you have lost one year of innovation. You are not allowed to change anything. No company will be funded to do that. Just so that you are aware at the Committee, we spent over £6 million developing this one technology platform. No investor is going to fund you to sit still for a year.

Although they are respected and there are some great toolkits on their website, it is just not conducive to the way that innovation works in fast-growing technology companies that want to deliver to this space. It is just a very difficult space to deliver to because obviously you want the evidence base. That is why I recommend the Educate programme as something the Committee should absolutely look into; I am sure you have already. It is a programme that has been working with tech companies. They work very quickly with tech companies. They deploy resources at the University College London and the Institute of Education to ensure that the technology companies are well supported in the area they need support, but it also does not just stifle innovation.

Professor Brown: If you work with the universities in European projects or national projects, the EPSRC, the universities are paid and expected to understand five controls to the effectiveness.

Priya Lakhani: Yes, our universities, too, yes.

Q133 **Thelma Walker:** Just to return to teachers' training, I was in education at a time when interactive whiteboards were introduced into schools and there was funding to go with that for the training as well. The training often amounted to three days over the year and often the challenge was



that my staff were all at different stages in terms of their knowledge, skills and ability. That was often linked, without being ageist, to the age profile of the staff. The training needed to be bespoke but it was not. In fact, some staff were actually frightened of the technology. We also had an IT suite, which I know existed in many schools and still does, where IT and digital skills were timetabled for, say, once a week. Obviously, that needs to change. Those were the main challenges for me then as a head teacher. If we are thinking about the future and preparing the profession, what would you want to see in any teacher training to equip them, to give them confidence, to cater for those members of staff who maybe have not grown up with an iPad?

Professor Brown: I think that one of my colleagues said it is about co-design as well, involving teachers right from the beginning but also involving the students. I have a group of older students with learning disabilities and we pass all of our research ideas through them and the teachers. Through the design, the development and the testing stage all of those people are involved, which also takes into account the need for regular training, top-ups, mentors and time to assimilate. In the current curriculum—I think that other colleagues have said this—there still is not the time to do that.

Q134 **Thelma Walker:** To make it integral across the curriculum is the challenge, isn't it?

Professor Brown: Yes.

Martin Hamilton: I think that there is also something about peer-to-peer learning. Often the knowledge about what is a good product, what I could successfully use in my teaching, will come from a perhaps quite informal conversation. It might be at a Teachmeet. It might be in an online community. Building on some of that Educate work, there is something called Edtech Impact, which is going to launch soon, which is a bit like a TripAdvisor for edtech. You can see how at the same time as we are talking about formal training and formal programmes a lot of that informal learning is perhaps quite valid, too.

Priya Lakhani: I think that the one-size-fits-all delivery of training in any format, any age group, any place, is completely inadequate. For example, the ambulance service. The ambulance service is adults, different ages, learning about whatever they need to learn about. What I would recommend and this is banging on about AI all the time, but if you use an artificially intelligent application on your mobile phone or your iPad as a school, the whole point of that application is that the training about technology will be bespoke to you. It will learn exactly what you do and do not know and give you what you need to know and what you don't. If the training organisation or the technology company were to provide a couple of face-to-face sessions in addition to that to ensure that people could jump on their phones or their iPads so that that is not a barrier, logging in is not an issue to begin with, I think that we could start solving that problem.



That idea of everyone sitting in a room for three days and learning how a smartboard works is absolutely ridiculous. It is just how we teach our kids and then some of them stare out of the window bored in a maths lesson and some of them are struggling behind. We are treating adults that way as well. This is why AI is so important as a learning platform and as a learning technology because it can provide that bespoke education to anyone no matter what age they are and no matter what subject they are trying to learn about.

Professor Brown: If we explain the advantages to the teachers, where if you use artificial intelligence to personalise a curriculum—and a lot of the teachers I work with either in mainstream or special schools have students with a diverse range of abilities; they are a very heterogeneous group—if you can say AI can differentiate and personalise a curriculum for 30 people and how much time that would save you for the kinds of things that only teachers can do, if they see the advantage they might be more motivated into some kind of training themselves.

Q135 **Thelma Walker:** You mentioned ongoing mentoring before. Do you see the benefits of that?

Professor Brown: Yes, and we use champions as well; that combined with the advantages of their teaching practice. It is not construed as a replacement for them, but it is almost this collaboration. The first thing you look at in any article about AI will say the advantages of the collaboration between teachers and artificial intelligence. Teachers can personalise, teachers can do creative things—far more than machines still can do, and will do for a long time yet—and AI can do other things like personalisation and it can look at things like automating repetitive tasks, which frees them up.

Priya Lakhani: There is no need to train 600,000 teachers tomorrow on what artificial intelligence is, or how to use an artificially intelligent platform. There is no need to train all 600,000, or however many there are, tomorrow, but what we could do is we could look at the sector and look at schools and say that in every school, in every multi-academy trust, are there at least a handful of teachers that we can train, that are comfortable, that feel confident, and then use that Digital Champions idea where they can sit down with their peers. That is how you get organic growth in schools. If you mandate—

Q136 **Thelma Walker:** The only health warning I would say with that is that if you have the more confident teachers, some of the less confident teachers may become dependent on them and there will be the, "Help, I'm stuck, the computer has gone down". I think I have seen that happen, where there is a technician or somebody there to help.

Professor Brown: But if they understand the advantage to their teaching practices and how to augment them and save time and offer things that they never have. Everybody wanted a differentiated, adapted curricular for a long time. Now, AI can do that far more easily for a group



of 30 than it could do for a teacher, and it can really free them up creatively to do things that only at the moment human teachers can do, so it is a lot of education as well as training too.

Martin Hamilton: I think what we are really saying though is Industry 4.0 is marching ahead apace and we have a dual challenge for our schools, our colleges and universities. How do we prepare our learners for these near future careers, near future industries? Also, how do we reinvent what it means to be a college? How do we reinvent what it means to be a university?

Chair: A quick question from James before we come on to Lucy.

Q137 **James Frith:** Is there a sense that as well as the speed, as you say, of the Industry 4.0, that tech is going around schools and over and above our educators and directly teaching our children how to be digitally savvy, how to be consumers of tech, how to learn, how to respond as a consumer with AI that morphs according to their retail preferences or music choice that my daughter enjoys? Just a bit on that, because there is clearly a lot of learning that goes on with children using tech as consumers that has real benefit.

Priya Lakhani: What I would say is that the tech industry is not going to slow down for you to catch up. Education has to catch up. It is a question of whether we keep pace with change. I think children will learn. The biggest problem with that particular premise that I have is that artificial intelligence has the ability to create social mobility issues, so you will have, potentially, some of the wealthier children, the more advantaged children, using all those great applications that teach them more about their choices, their preferences, the news they want to read and so on, and you potentially have children who are disadvantaged not reaping all the benefits. That is why it is important, for example, that the educational institutions can try to teach children about these particular applications, about artificial intelligence, about the impact of artificial intelligence.

I would not necessarily ever want to leave it to just consumers in tech. I think you are right, though, it is absolutely going to go around it. The question for me is how can we leverage artificial intelligence technology today to do two things? That is, number one, to solve some of the biggest problems that our schools, colleges, universities face, that our PRUs face, our APs face. How can we leverage that to solve the problems? The second is a question that the Chair asked initially, which is that with this particular evolution and the fact that it is happening how can we also leverage the technology to ensure that teachers are then able to be more human, to stop wasting time micro-marking and micro-assessing to then try to equip our children with the right skills that they need for the change that is happening?

Q138 **Lucy Powell:** So just moving on to a slightly different angle rather than the edtech side—the students that we are producing. You touched on it



earlier, Priya, about the balance in our current assessment exam curriculum regime and what we are producing. We have heard a lot of evidence about this recently and one witness said that our current education system will produce humans that are no more than second-rate computers. Briefly, could I ask you to get off your chest what you might feel about the skills and the knowledge that we are testing our children on and that we are asking of them, and whether that is equipping them for the worlds that you all work in and that you see happening, and how that might change? I can see you nodding, Martin, so we will bring you in.

Martin Hamilton: I think there is a very fundamental thing. We have been talking about these near future careers and industries, robotics, AI and what part some of these things might play in education, but at the same time we have a huge problem with basic things like numeracy and literacy. If you do not have the basics right and in Key Stage 2 stats results we saw that huge numbers—about one-third of Key Stage 2 learners—do not meet expected standards of numeracy and literacy. It is an enormous problem. How can those people go on to have successful careers in an increasingly digital world? Everything requires those basics, so I think if we say, “What does Education 4.0 look like?”. If we cannot get literacy and numeracy right we have big problems.

Professor Brown: The project that I work in, which uses artificial intelligence, uses sensor data to tell me if that child is engaged and then it automatically alters the learning intervention. The challenge is the types of learning materials that they see to keep them engaged when they are being bored or frustrated. For teachers we also have smart, intelligent interactions with smart objects and they are in graphs and they are created by the teachers themselves. Of course they have to do that, but it is the integration of the personalisation offered by artificial intelligence together with the graphs with the subjects that they should be knowing, so it is taking the content that they have to teach and the curriculum and combining it with artificial intelligence to differentiate their existing curricula.

Q139 **Lucy Powell:** Okay. Priya, you touched on it earlier about whether the current measured outcomes are equipping.

Priya Lakhani: Yes. There is no official balance. The education system today is just not fit for purpose, so I am an employer of a fast-moving tech company and we interview so many candidates from all around the world, which is great, so we have people applying to us and we just find that we are forcing our amazing, talented teachers to teach children into a specific mould for a test. If we are going to test, that is all right but we do not test for adaptability. We do not test for creativity, really. We do not test for learning agility. We do not test for empathy. With all the issues we know that social media is creating and all the wellbeing issues that we know that our children are going to face, we do not test for any of that, so how are they forced to teach for that? I am not saying that they don’t, because they do, but they are doing it in their own time and



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this is why we have frazzled teachers and why three quarters of them want to quit in the next three years in this country. There is no official balance that is being promoted by the right institutions, let us say the Departments that need to promote these balances. There is no conversation about what I call a wholesome and enriching education.

I have two children and they go to school, they are doing the National Curriculum, and I look at it and I just say, "You know what, kids? Go on CENTURY", on my own platform, because, obviously, being CEO, I can give them access. "Go and learn that and when you go to school go to the heath, go and play". It is just nonsense what I see in terms of the curriculum. There is so much pressure on teachers to deliver something that no employer is going to sit there and say, "Thank you very much. You have memorised all of that. That is what we are employing for today". So there needs to be a balance. We have to focus on literacy and numeracy, I completely agree. We do not have the right standards in those particular areas. Our colleges are suffering because they have research students who have failed for numerous years and are forced to re-sit again to get that former C level, when they have the discipline to even go to college in the first place rather than go to the JobCentre. It is really interesting.

I think there needs to be this whole strategic piece of work that has to be done on what is needed, but, for goodness sake, we need to really look at how we test our children, because that is what we are driving schools to do day in, day out.

Q140 Lucy Powell: That is very good. Just briefly, as an employer, somebody in tech and at the fourth industrial revolution forefront, you are looking for more of those adaptive, creative communication skills that a computer cannot do?

Priya Lakhani: It is what I call the entrepreneurial mindset and not everyone has to be an entrepreneur, but you want someone who is able to think outside the box, who is able to problem solve, be proactive. You can tell in interviews when you ask certain questions who is able to cite their CV and go through their academic profile, or who is the sort of person you want sat next to you when a bug hits the system, the platform is about to go down and they are going to be able to come up with a really creative idea to solve those problems. You want someone who is going to sit in front of you when you say, "I want to build a blockchain application that is going to do X, Y and Z" that can think, "How does this apply? How does the new technology apply to that particular problem? How do we solve that problem?" Real problem solving skills that can exist within the current curriculum. It is just the way in which the curriculum has been developed, the way it has been built, the way that we are testing our children.

Q141 Chair: When you raised these things with the Government, what did they say?



Priya Lakhani: We have raised this several times.

Q142 **Chair:** What you just said to Lucy in a previous answer, you have obviously raised this with Government in the Committees you are on and so on. What is the response?

Priya Lakhani: The response in general, whether I have raised it or I have even heard other people raise it who run for example the unions is, “Yes, yes, we know this”, but you get a typical politician’s answer, don’t you, which does not quite answer the question that you have asked; it just does something else. Apart from you, you are all brilliant, but what we have decided to do is one thing that will happen, and it is going to happen within the next 12 to 18 months, so I might as well say it here because I doubt I will be invited back, I have shown it to the Chair, blockchain is a new technology, not new but certainly very new to education. There will be micro-credentialing, so all these students who are leaving schools and colleges will have an application on their phone that will host their micro-credentials, so those little nanodegrees where you can do all of those free courses or paid for courses on Udacity, Coursera, edX and so on, FutureLearn, all of those will be essentially on their mobile phone. That application will update, it will be immutable because it will be on the blockchain. Students will also then have a real time record from the likes of CENTURY, an artificial intelligent platform that will tell that application exactly their knowledge and skills, gaps in knowledge and skills, where they need to improve, their perseverance, their resilience, their effort levels. That will be on their mobile phone.

Now, just imagine in two to three years’ time when you go to an employer, as a student, and rather than hand in a piece of paper or a CV that shows them your GCSEs and your A levels, if you choose to do A levels, or your apprenticeship or whatever it is, imagine if you just show them the record of this digital CV on this application? That will destroy high-stakes assessments because no one, no employer, is going to be interested in your GCSEs. They are going to be interested in what this application says and so who is going to form those applications? Who is going to run that application? If it is not going to be led by this Government then it is going to be led by the tech industry. Can we, as a country, afford to do that when some tech companies may not employ educationalists? They may not work with learning design specialists at Nottingham Trent or wherever they are. It is not a choice. It is going to happen, so we have to think. We need to get on this train quickly otherwise we are going to be left behind.

Martin Hamilton: If I might add, we saw an interesting example of this recently with 23andMe, the genomics company, consumer genomics, which has just been acquired by GSK and that has prompted some quite interesting thought processes for people, “I spat into a test tube, I got my DNA analysed and now my data is being sold”. Now you might say, “Well, GSK are going to use this for drug discovery, it is a good thing”. What if it was an insurance company? This question about data—data is



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so important in how we support our learners and their futures. These questions of data trust are principally: who do you give access to what data, to do what with it?

Vinous Ali: To go back to the original question about the skills, I think you do not need to throw out all of this knowledge. It is about how do you rebalance the curriculum so that the way you learn something is through collaboration, is through projects?

Q143 **Chair:** How do you rebalance the curriculum?

Vinous Ali: It is about the way you teach something, rather than saying, "Okay, here is a textbook, read this".

Q144 **Chair:** Give us a practical example. What would happen?

Vinous Ali: So, in a history class, rather than saying, "Okay, here is the textbook. Go away and learn what happened on what date" say, "Guys, you are on a battlefield. Go away, collaborate with each other, come up with a creative plan to say how you would win this battle and then let us look at history" and then you are teaching them creativity, you are thinking outside the box. Teachers do this already but like you say we are not testing for these things, and so therefore the onus is always going to be on how do you get the student to get a grade A, how do you get them to learn all of those things?

Q145 **Lucy Powell:** Would you agree that the balance has shifted the other way?

Vinous Ali: Yes, 100%. We just launched a report at the end of last week where you have all these predictions about robots taking our jobs, which are based on numbers and so on. We asked tech parents who are working in the sector who do not have a crystal ball but who might have insights into the way automation is happening in the workplace, what the future of work looks like, and they said often when we think about the fourth industrial revolution you go, "Oh, the fourth industrial revolution is going to happen and then it is going to stop". Well, we are going to see wave after wave after wave of change, so it is about how you teach these children to learn how to learn, how you teach them to adapt, be resilient, think creatively? I think that, at the moment, the balance is just not there in our schools.

Professor Brown: It is a combination of problem-solving, learning and other non-linear ways of working, which means that you have to go right back to the original curriculum, give them the tools to solve the problem, rather than just rote learning. That is what we do with games, that is what we do with artificial intelligence.

Chair: I have to move on, sorry. Emma?

Q146 **Emma Hardy:** I am particularly interested in how technology can help children with special educational needs, although I have to say I have a slight caution. I remember a number of years ago reading about the



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Rocketship school in the USA, which I found incredibly worrying, the way that they were set up and the way that the children were plugged in for so many hours throughout the day with very little human interaction. I am hoping that you can all reassure me that technology can help children with SEND that does not involve them being plugged in for an entire day at school.

Professor Brown: We have stopped for a long time just playing games. There are a lot of positive things about playing games. There are things, especially with people with severe learning disabilities that it can improve meta-cognition skills, choice reaction time, independent decision-making, functional skills, but now we have moved on to European projects where we give simple, accessible game-making toolkits where students work with teachers, and other peers and create games. It improves their creativity, their persistence in learning, especially those that are traditionally failing in the educational system. It improves their collaboration as well, their creativity and their engagement.

I completely agree with you, let us make sure that the positive aspects of game-making as a constructionist process are brought out. That is far more important than playing games, although playing games does have positive aspects as well.

Vinous Ali: In a classroom, you have such a diverse range of needs, and it is about how you take all those students to the same end point, even though the pathways might be different. Technology can really help there. Microsoft, for example, has a suite of tools that can break up syllables in words to help those who are maybe slower to read, to help them pronounce words, or magnifying tools for those who may be hard of sight. You have translator tools, for those for whom English is not their first language, and who may not recognise a word, that can automatically translate it without disrupting the entire classroom environment.

Then you also have artificial intelligence that allows learning to be personalised so that a teacher can recognise when a student is falling behind or not engaging with the material at the same speed as others, perhaps, and then can target those interventions as and when necessary. It is never about technology replacing the teacher. That is never going to happen, in my view. It is about how technology can work with the teacher to make sure interventions are targeted.

Q147 **Chair:** We could talk to you until 4.00 pm this afternoon, because it is incredible evidence, but we are going to finish at 11.15 am for our next panel. We are already running way over time, so we have a fair few questions to go. Emma, if you could just ask your next question, please.

Emma Hardy: I just wanted to finish hearing everyone's response to that.

Martin Hamilton: If I might, both my kids have additional needs and one of my daughters goes to a special school and the other is registered visually impaired, so we are very keen, as you can imagine, to see how



we can use technology to help even just in that family context. It has been a real revelation to see how something as simple as an iPad can transform someone's education. My daughter with a visual impairment gets handouts as e-mail attachments, she can read the stuff in her textbooks because it is delivered as e-books, so we tend to get carried away perhaps talking about artificial intelligence, talking about some of the more way-out possibilities for technology but some of the things we use every day can be transforming.

Professor Brown: Sometimes specialist schools as well.

Priya Lakhani: We have looked at thousands of children with special educational needs from special schools to mainstream schools that have children with special needs and also at alternative provisions, and we have to be very clear that tech is not going to solve every single problem. It is certainly not going to be available to every child with special needs at the moment. We have seen some children who struggle to use a particular technology, depending on physical disabilities. For example, we have some children who have ASD who love it so much that they are on it eight to 10 hours a week, but with about 90% success rate we can tell through your mouse movements if you have ASD without the school even telling us, which is really interesting. It is an interesting conclusion we came up with, with some anomalies in data where we found that we could track movements. What that means is that, on average, these children spend 20 to 30 minutes a week on the technology. That is it, 20 to 30 minutes a week. Now, if you spend 20 to 30 minutes a week on this technology it then provides teachers with deep insights on how the child is learning. So what the teacher is then able to do, because what happens in these schools is that teachers are often under-resourced, they do not have enough time with every child, the teacher then knows exactly what intervention is necessary.

Timely, targeted interventions happen a lot quicker using this sort of technology. It is not about plugging them in. I certainly would not send my kids to any school where they are going to just sit them in front of a machine all day, but it is about leveraging it to help.

What I was trying to pull up on my iPad but I cannot is we know how the brain learns, and so we have, for example, a diagram here. You cannot really see it, but it is two triangles. One is children with ASD, which is this purple one and I will show it to the gentlemen here, and the pink one is children with dyslexia. We can start to map with shapes how their brains are learning and so, using artificial intelligence, if we can learn how that child is learning the whole point is then how do we optimise education for that child, rather than just stick them in a box and say, "Here, you have a special need". We can essentially resource more effectively in terms of our teachers having better time—better informed time—with those particular students.

Q148 **Ben Bradley:** There is a similar kind of discussion, but around



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disadvantage. I represent an area that is particularly disadvantaged and there is a discussion around technology and AI in work in particular that is seen in a very negative light and that is at the top of the list in terms of jobs lost through automation in all of those charts. I am particularly interested in how we manage that gap. Looking through the written evidence, there are two things that came to mind. Martin, you pointed out the infrastructure gap—we were talking about it before when you came in about your own children and the use of things like iPads and Alexa and things at home that not everyone will get. I am more interested in how we manage that, or what the cost of managing that might be in schools.

Priya, you suggested that that gap might not exist on your platform. We talk a lot in areas like Mansfield about working class white boys not managing to reach the same academic standards. You suggested that you do not see that gap on your system and I wondered why that is, how that works.

Priya Lakhani: So in our system, which, when I thought about it it has been worth £6 million to date, economically disadvantaged children perform exactly the same as their peers. I have some of the top performing independent schools on my system, let alone looking at the public sector. That is because artificial intelligence does not care where you are from. It is going to learn what you do and do not know, how you learn it and so on, and then it is just going to basically personalise for you and then provide the right insight to the teacher. If the child spends 20 minutes to an hour once a week, 20 minutes on average, doing a couple of lessons for maths, English, maybe the sciences, the machine will figure out what they do not know in an instant. How does that traditionally work in a classroom without artificial intelligence? You test, you mark the test, a week later the child gets the test. A couple of weeks later, half a term later, you might figure out where the gaps are and you have to do this for 30 children in a class, 180 in a year group, 939 in the average secondary school. That is why it helps immensely.

We have schools in Wigan, for example, on our system where white males, pupil premium backgrounds, are a real issue and they are absolutely loving it, but it is a case of how we then champion these schools to ensure that the schools in Mansfield, for example, can then look at this technology and say, "This is something that we can try and not be afraid of it".

Q149 **Ben Bradley:** Can we come to Martin in terms of the infrastructure?

Martin Hamilton: So the infrastructure picture, DCMS Local Full Fibre Network programme has been rolling out connectivity to wholly served schools, and using schools to anchor connectivity in rural communities, so that is a real success story. The problem is when you get into the building, and we see from BESA—the British Educational Suppliers Association—that does an annual survey, two thirds of secondaries and two fifths of primaries say, "We have inadequate infrastructure". We hear



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about eight year-old PCs, I heard on social media last night from a college that is using 10 year-old PCs, so there is a lot that we could do even with just a one-off capital injection to say, "Let us get everybody on a level playing field". Capital injection to pull cabling, to install wireless access points, to replace those eight to 10 year-old PCs. I think that that would go a long way to creating the environment that the sort of innovation that Priya is talking about can prosper in.

Professor Brown: We ran two projects with black men under section 11, recruited all over there, and they had all experienced crime in their lives themselves and were in a secure unit. So we ran a project where they created right from the beginning their own story boards, their own subjects for game creation. None of them had violent themes. They all displayed incredibly creative ideas and attitudes. They completely shocked their tutors. It is about access really as well; I think that that is the main thing. Also personalising it. People are at different levels. As we have all said artificial intelligence can alter and create different levels of adaption for a group of 30 that might include people with disabilities or people from ethnic minorities in the same classroom, which a teacher can never do.

Vinous Ali: I think if you look at the fourth industrial revolution there will be more jobs because of automation freeing up creativity. More jobs will be created than are lost, but that is not to say that no jobs will be lost. If you look across the environment, particularly in some regions, you will see that being place-based, regional disparities come up and so it is about how can Government target the interventions in the right places to make sure that the workforce of today is able to retrain and upskill or reskill in a completely new area?

What I would say is that the opportunities are there to be had, but it is about making sure that your interventions are targeted and underlying all of that is the data. Do you know what skills are going to be needed for the future? Do you know what employers today are looking for and how you can cater for that? I would say that artificial intelligence does not recognise where you are from yet. It is about: does that person have the confidence to go out and learn again? You are not talking just about in the schoolroom anymore. You are talking about throughout life. Often, even if there is brilliant technology out there, it is about instilling confidence within that individual, or signposting them to those opportunities that are available. That is where Government and policymakers come in.

Priya Lakhani: Just quickly on the infrastructure point, we have Syrian refugees in Lebanon using the technology on a mobile phone.

Ben Bradley: So we should be able to do it in Mansfield.

Q150 **James Frith:** I refer members to my Register of Interests. Dr Barbara Ribeiro from Manchester University told me in a visit to the SpiNNaker machine in recent weeks that man, as in human, cannot unlearn their



bias. Given that artificial intelligence inherits, if you like, instruction from human, how do we ensure that that human bias is not deeply ingrained within the design and manufacturing of artificial intelligence? I say this in appreciation of the need to do that fundamentally and I guess is one reason for your motivation of this new Institute for Ethical Artificial Intelligence in Education. It strikes me that we need artificial intelligence to benefit from the human struggle that has given us the civil rights movement, the equality legislation. How do we fold that up neatly into development of AI intelligence and ensure that AI does not just become the new battleground for inequality and privilege?

Priya Lakhani: That is such a good question. It is a question that I think everyone in the world is asking. You cannot guarantee that AI does not inherit bad instruction or bias. You cannot do that, but what you can do, and that is why the institute was formed with co-founders Professor Rose Luckin and Sir Anthony Seldon, is we need to encourage the technology companies developing artificial intelligence to be more transparent in how they are weighting their algorithms, how they are building the technology. We need to look at the teams behind the technology. Are they all men? There is a huge skills gap, we know that, in technology. Are they? Are there any teams where there is a real lack of diversity?

That is why it is really important. This institute's purpose is to build some sort of framework, guidelines, as to what we should look for as consumers, because the revolution really always happens with the consumer, right? What should we be looking for when we use technology? What is that technology company saying it is doing? What are they publishing about how they are weighting their algorithms? How can we encourage technology companies to do that more, and basically building a framework to allow that to happen? No doubt we have ended up already with AI learning off social media and so on.

Professor Brown: Machine learning, a branch of artificial intelligence, is learning from data recognising patterns and then making either predictions or making decisions with minimal human intervention. I think some of that, that you are saying, is factored out.

Q151 **James Frith:** There is pretty strong evidence of recent time when you consider just the names given to gopher technology or technology, AI, that is used in business. You have quite strong traditional male names being used for business or savings accounts versus gopher technology that is very often the data for the amount of swear words, for example, that are issued to technology that is then named with a female name and is about going for stuff. Sage, the company Sage, which has given evidence, which I have done some work with, have some really compelling evidence for that.

Priya Lakhani: That is quite right. It is about the training sets that you use. If a human chooses to use a certain set of training data that has bias in it and then weights the algorithms in a certain way then that will be a bias. If you set this loose on Twitter it is going to do what we saw, which



is really racist—so I would disagree. Machine learning humans, I have a whole team of them in London. They develop these algorithms, they weight these algorithms. They choose where the focus levels are more important, the effort levels.

Professor Brown: Our European project did exactly that. It took three cases: students with profound and multiple learning difficulties and autism; children from travelling families; and it also looked at girls at risk of gender exclusion, and all the algorithms and all the data that was trained upon and the patterns recognised and predictions made were made from those subsets of people with social exclusion. You are absolutely right. If the grant application you are going for has to have equality then they are the people you have to get the data from, train the data, make predictions from. You are right, and it is perhaps slightly different in industry than it is in academia, where I have to write those kinds of statements about equality and make sure my data is trained and predicted from there.

Vinous Ali: I think that that is why, to basically amplify Priya's point, it is so important to have diverse workforces. It is so important that you have a diversity of thought and experience around the table in terms of developing that technology, whether it is for education or anything else. If you just leave it to the data alone, if you are putting bad data in you are going to get bad data out and you are going to reflect the biases that are already present in our society and that are historical.

Martin Hamilton: There is another dimension to this, which is, if you like, data, trust and ethics at the core. We can talk about peer to peer experiences, products and if the teacher talks to another teacher and says, "Well, do you know what? I have tried this with disadvantaged students and it has expectations about literacy and numeracy that they cannot match" you have that level where you can make comparisons.

You also have probably—it might even go to a statutory dimension too, which is: can we trust this company; can we trust this product?

Q152 **James Frith:** Do you think there is space for a legislative remit to this in terms of the mandating, I forget the term you used—the mandating of the training instruction. Do you think there is space for legislation on that?

Chair: Just a brief answer, if I may.

Martin Hamilton: We have a challenge. Ultimately, we cannot turn back the tide, so a lot of these technological developments will happen and we can say, "We do not like this particular one" and we risk turning into North Korea—

Priya Lakhani: It is a global issue. Because technology is global you can do something here, but unless you have consensus from other countries, the Committee is the first place to set the framework and guidelines.



Q153 **Chair:** Can I get concise answers, if it is possible? I would like to ask you in terms of the benefits of edtech, home learning and engaging the parents at home, because we are doing some work on early years and how that could benefit and how to encourage parents to engage in their child's schooling. Are you able to give me a concise answer on that?

Professor Brown: Exactly. That is what we have done in our European project and what we found is students with PMLD and SLD face much less support and their parents are much less confident.

Q154 **Chair:** Can you explain the acronyms?

Professor Brown: So when students use our artificial intelligence learning platform at home they use it independently. Parents are expected to support them and buy the equipment. It is a lot less likely when we are dealing with students with profound disabilities than it is for mainstream students.

Vinous Ali: I think that there are so many courses, tools and games and so on, online, with that sort of educational slant and parents at home can utilise that to supplement education or to engage with their children at home and to pick up points. Once you have tools in school that can really pinpoint weaknesses a child might be facing then you can have targeted, "Go away and look at this at home" or, "Go away and do this" and engaging that parent and teacher relationship to have that conversation, to see what parents can do at home. There is so much online that is for free that parents can use.

Martin Hamilton: I would say that, just as increasingly we look at work as a thing you do rather than a place you go, we should take a similar approach with education. Education can happen anywhere. Learning can happen anywhere.

Priya Lakhani: I think we can use similar technology where schools provide parents with their own support and it is personalised to them. They can see how to engage with their child, how to help their child and it gives them all of that relevant data insight.

Q155 **Chair:** Can it help parents who do not usually engage or do not engage in the way that others might?

Priya Lakhani: I think it is the access as well. One of our schools up north, when we were discussing about Mansfield earlier, was saying that parents sometimes feel embarrassed when they go to parents' evening, and you say, "Your child is struggling with Pythagoras theorem" and the parents are sat there thinking, "What is that? I don't understand that" and they feel embarrassed. That is why some of the time the parents cannot engage because they do not quite understand what the teachers are talking about and what their child is learning. I think that we need to open lifelong learning access application to parents, and teach parents what a growth mindset it is. How many of our teachers spend every day trying to embed a growth mindset in children who go home and say,



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"Mummy, I'm not good at maths" and she says, "Don't worry, darling. You got that from me". They undo the growth mindset because they do not know how to talk to their children that way.

I think we can use technology. Parents are on applications. They are buying on Amazon, they are shopping, they are buying accommodation with Airbnb; we can create something there.

Chair, can I say one thing that is really important? I am so sorry to do this, it is very rude, but I missed something that I think is really important and must be said.

Q156 **Chair:** As long as it is said in 30 seconds.

Priya Lakhani: So quick, there are two subjects that champion the skills that we spoke about today and they are music and PE. Teachers and head teachers are crying out for more music and PE, but they are finding they struggle with EBacc and the emphasis on EBacc to encourage those particular subjects. Those two particular subjects do encourage a lot of the skills that we talk about, so I would ask the Committee to potentially revisit looking at those two subjects, the emphasis of those two subjects in our schools in England, because potentially encouraging teamwork, collaboration, playing in an orchestra and so on, could help our children learn some of the fundamental skills that they need.

Vinous Ali: I would add art and design as well.

Q157 **Chair:** So the subjects are music, art and design?

Priya Lakhani: Also PE. They are subjects that have been squished out really.

Lucy Powell: Also drama.

Chair: Thank you very much indeed. It has gone way over time. We were warned this morning that it would go over time, but we really appreciate it and thank you for what you are doing. We will start straight away with the next panel, so thank you.

Examination of witnesses

Witnesses: Matthew Fell and Iain Murray.

Q158 **Chair:** Good morning. Thank you so much for coming today and for being so patient. I apologise for over-running. As you can see it was a valuable session.

Can I ask both of you where you think we are in terms of the fourth industrial revolution and adult education, reskilling adults in our country?



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Iain Murray: To kick off, we have given a very positive welcome to the National Retraining Scheme. We very much welcome the fact that the Government have taken a collaborative approach by asking the TUC and CBI to work in partnership. The kind of social partnership approach you see in much of the rest of Europe to delivering skills policy and skills messages is the right approach.

I think it is too early to say how effective it is going to be. It has taken some time to develop and to roll out. The other thing I would say is the National Retraining Scheme is not the be all and end all. There are lots of other challenges around adult skills that I think I would like to pick up on in the following conversation that need to be looked at.

Matthew Fell: Good morning. Matthew Fell from the CBI. Where are we on the fourth industrial revolution? I would say a huge opportunity for the UK as a country, but there is a significant amount of change and disruption that we would need to go through with it. Opportunities I would point to are a significant upside in ability to close some of the productivity challenges that we face in the country and in particular I think that that can help address some of the regional variances that are particularly acute in the UK. The challenge comes from the fact that estimates range from something in the order of 15% to 30% of current jobs possibly being disrupted and displaced by technology. That is clearly a significant proportion of the workforce and, as my colleague, Iain, has said, I think that that is where a particular focus to make sure that people have opportunity to retrain and reskill for those areas is very significant.

Insofar as the adult learning aspects of that go, I think making sure that current skills provision is adaptable, so it is available on a part-time basis, and that it is available in a much more flexible and adaptable way than it is just for the younger generation, because clearly if people are in work it needs to fit around their working lives as well. That is where I think the adult skills area could most usefully adapt.

Q159 **Chair:** Apart from the training scheme do you feel that there is a strategy from the Government in terms of recognising the effect of the fourth industrial revolution and a strategy to do something about it? I know we have an industrial strategy and so on, but specific to re-skilling?

Iain Murray: Obviously the National Retraining Scheme is specifically targeted at the impact of automation on the labour market and the discussions that the National Retraining Partnership has had since it was established at the beginning of last year is looking at how automation will impact on different parts of the economy. I do not think that it is going to be a one-size-fits-all impact and I think that a lot of the detail of the discussion that has been held so far is about distilling down sectors such as retail that are already seeing fairly rapid impacts of automation on the labour market, but some other sectors, for example, logistics and transport, where in years to come with driverless vehicles there is going to be huge change. At the moment we have quite major skills shortages



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because we do not have enough drivers, so there is a very complicated picture.

From the TUC's viewpoint, some of our major concerns around the capacity of the skill system to meet the needs of people to retrain is that we have seen quite a major decline in the number of adults who are accessing learning and training. The latest surveys show that adult learners have declined from about 4 million to 2.2 million in a decade. That is linked to lots of policy measures we think are wrong. Some of them relate to a major decline in the funding for the FE and the skill system. I know many members of this Committee have made representations to Government about that.

We have seen a system where the Government have also introduced a hybrid HE tuition fee loan system into the FE colleges with any adult who wants to do a qualification at level 3 and above are required to get a loan. Treating that group of students in the same way as young undergraduates is not working. People are not taking out these loans and data version among adults, especially low-paid adults, means that these loans have not been taken up.

We have seen a major decline in the number of adults who can access retraining. We are stepping back rather than stepping forward in many respects.

Q160 Chair: Are you aware yet of the details of the National Retraining Scheme; and how it is going to work in practice?

Iain Murray: Yes, we are. We are both aware that the Government have not made detailed public announcements, but there have been lots of detailed discussions, detailed papers around eligibility sectors, how the service will operate around access to online learning, subsidised retraining. In my view, and I am sure Matthew may concur, we are fairly clear. We have been pushing the Government that they should be articulating a bit more to the wider public about where we are at. There are going to be some major trials going forward this year, which will be testing out how the scheme will be operating.

Matthew Fell: I would agree with that and add to it. We are clear that the focus is on those industries and on those roles that are most likely to be at risk from disruption by technology. The idea behind the scheme is that it has a combination of information, advice and guidance. It has a retraining element and then there is some brokerage between companies where those skills are less in demand than they have been historically and some brokerage to where there could be opportunities to re-deploy those people through retraining and so on. That concept is there.

There is a period over about the next 12 to 18 months where we will find out more. Some of the issues that will be on my mind that we want to get clear on that is around how we get the timing of those interventions right. Is it on the outbound or the incoming employer, for example? Who



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does that? How that transition is going to work particularly if you are moving from a completely different sector of the economy to another and you might not have relationships with those sorts of firms.

The final fault for me on this would be how to inject some pace into this, because we are all very acutely aware that all of this change and disruption is happening right now, so how do we get this system and scheme up and running as rapidly as possible to help ease that disruption?

Q161 Lucy Powell: Just following on from that. It is not totally clear how much money has been allocated to the National Retraining Scheme; do you know?

Iain Murray: The Chancellor allocated £100 million in the Budget in the autumn, but that £100 million is largely to test out and to build the actual service. The commitment that was in the industrial strategy was to have the full National Retraining Scheme up and completely rolled out nationally by the end of this Parliament. So, £100 million is, in effect, to build and to trial the service.

There are debates within different parts about how much should be invested in this. The TUC will be pressing for a substantial amount. It was going to work but—

Q162 Lucy Powell: What do you think it would cost to have a full roll-out of something like that?

Iain Murray: I could not put an exact figure to it, but you are talking billions.

Lucy Powell: Billions a year?

Iain Murray: Yes. It is major. You can have different variations of this programme. It depends how tightly it is targeted. A lot of that will depend on eligibility. If it is going to be a major programme that a large number of adult employers are going to be able to access, that will obviously make it a different type of programme to a programme that is focused more on certain adults depending on their education qualifications and the sectors they are employed in. You can have a variation of investment depending on—

Q163 Lucy Powell: You are scoping that out at the moment, are you, jointly? How is that working?

Matthew Fell: That is right. From my perspective, part of where the next 12 to 18 months will get to is part of this discovery piece, because one of the things that we will be keen to see is you do not want to reinvent and duplicate what is already there. You can access good parts of existing skills provision so you do not want to add to those. The discovery bit will be: what are the particular gaps that do not currently exist right now to deal with exactly this piece of it?



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The other part of that discovery will be around what is it that this scheme is absolutely required to step in and do versus what is it that companies themselves might want to do. So there are plenty of examples. For example, in retail, which we have mentioned, where that reskilling and retraining is taking place within a company if the individual is going to be redeployed within the same firm that feels instinctively like that is the company's role and responsibility to reskill and retrain those. There is a point about defining scope, which will answer the question about how much.

Q164 Lucy Powell: You are probably overstating worries about duplication because this landscape, as we have already discussed, has been decimated largely. Obviously, our inquiry is about the disruptive continuous waves that are coming in terms of industry and so on. Is that one of the key focuses to think about where people need to change career, change job, change industry altogether?

Iain Murray: There have been quite a number of presentations academics have done—some analysis—and they say around what the more nuanced impact will be of automation, not just in different sectors and subsectors, but in different occupational groupings and how the National Retraining Scheme will have to—how the journey that somebody goes on along from entering the programme will have to be tailored to meet a range of different needs and a range of different characters.

Lucy Powell: It is still very much in the early stages by the sounds of it.

Iain Murray: No, I do not think so. What we will see this year is that there will be pilots and trials, testing out the people going through the National Retraining Scheme. The past 12 months have very much focused on getting agreement around what that service will look like and quite detailed conversations and discussions about what that journey will be from somebody who—one of the challenges is not just about getting people to partake of the National Retraining Scheme, but how you incentivise people who do not think of that risk of automation. Many people in the labour market are not thinking, "Oh my job is going to go in five years' time" because they are thinking about dealing with life.

Q165 Lucy Powell: It still sounds quite vague to me, but maybe you can come back to us about that if there is more detail. How much of it will focus on real quality, making somebody achieve the fullest of their potential, because, in my experience, a lot of government retraining schemes is pile them high, sell them cheap, "We will pay for you to be a forklift truck driver but we will not pay for you to do an HGV course", which would give you a much longer career earning more money, for example. We will pay for you to do something relatively cheaply that might give you an extra small amount in your pay packet rather than the long term. Is their focus on quality here?

Iain Murray: I think there certainly is. The other thing to highlight is that there are pilots that have been running for the past year in a number



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of regions—the Career Learning Pilots, which is informing the development, and the National Retraining Scheme. They are testing out what happens if you offer the different discount on the cost of training, ranging from 50%, 75%, and 100%. These are fairly high-quality courses delivered for education colleges. That is also informing the development of—

Q166 Lucy Powell: Are you looking at long-term value to the individual in terms of their—

Iain Murray: Absolutely.

Matthew Fell: The key part about the information and guidance piece is for that individual to then be aware of those sorts of trends, exactly what are the future careers, the future qualifications that are going to get you there.

Q167 Chair: The Chancellor said that there would be a new careers guidance service. As Brenda from Bristol might say, “Not another one” because we have the Careers Enterprise Company and we have the National Careers Service and many other organisations. Do you have any more details about that? What do you think about that? Is it necessary?

Iain Murray: It is definitely necessary. If we have had problems with careers with young people and people leaving school the situation for adults and—

Chair: But is that not what the National Careers Service is supposed to be for—for adults—the existing one?

Iain Murray: It is, but some of the findings that have come out during the last year is that adults have very little access to face-to-face careers guidance. One of the facets that we are looking at with the development of the National Retraining Scheme is: how do you engage adults, many of whom have not been in formal education training since they left school? You can have the role of trade unions and the role of union learning representatives in engaging people in the National Retraining Scheme, but we are also looking at how the National Careers Service can develop to support a more holistic careers guidance service for people through the National Retraining Scheme.

That also has bigger questions around the National Careers Service for all adult employees and not just for people who we think may be affected by the impact of modernisation.

Chair: There are a load of schemes in the DWP as well in terms of adults and job training careers. I am just concerned that we are going to set up another organisation putting in more money.

Q168 Thelma Walker: I was just going to add to that. It mentions a right to midlife—not crisis—career review. Do you think that is realistic, that it is possible?



Iain Murray: They do in other countries.

Matthew Fell: It feels to me that we have not quite got this right. I certainly would not be sat here saying that we have everything that we need and that we have it completely cracked. That does not feel like an accurate description of the state of play to me. If there is a risk of adding more in I would be saying let us try some new things and get this right because it is quite clear to me that it is not completely spot on at the moment. It also feels to me almost inevitable. We know things are moving at ever increasing pace. It is more likely that people will have more different jobs and different careers at an ever increasing pace in their lives in the future than is the case now. Therefore all of that tells me, whether that is exactly the right intervention or not, we do need more of this and it is right to try different things.

Iain Murray: Trade union reps do use that format of midlife career reviews quite often, and we have European funding at the moment. We are doing a project in partnership with a number of other countries looking at how you can develop the best practice model of midlife skills reviews or career reviews.

Thelma Walker: The provision seems good to me, but it just does not seem to have its belt and braces on.

Q169 **Ian Mearns:** I am interested to see how this is going to pan out in different places around the country, because we do have an unbalanced economy within the UK and even within England at the moment. We have had evidence from the CBI, which shows they believe that particular geographical areas are more at risk of the development of different technologies into the future. Mansfield has been pointed out, Sunderland, Wakefield. I do not know why Sunderland is on its own as opposed to the rest of the north-east or some region at Tyne and Wear. But it is interesting that it shows that. I am wondering from both of your perspectives how important are regional, sub-regional or local industrial strategies to providing adults with opportunities to reskill and upskill?

Matthew Fell: It is hugely important, the regional place-based element. It is important for a number of reasons. One is, as you have already referred to, the level of regional variance, both across the UK and also the variance within regions is more significant in the UK than in most western economies.

The second reason it is important is in all the quite detailed work that we have done to understand those regional variations, by far and away the single biggest driver of those is educational attainment; that is the single biggest driver of those variations. Getting that right is important.

The third thing that I would point out to you is that it is a trait and a characteristic of the UK economy that we have limited labour mobility across the country. The statistics are only something in the order of 3%



of people a year move across different regions. The place-based element is super important.

Tying that into a local industrial strategy then ought to be key to that. The idea behind these local industrial strategies is to identify what are the things that we are going to be great at, work out what are the actions that are required of business, of Government and of others, and everybody get behind that and unify. A key part of that ought to be if these are the things that we are going to be great at in the future, what are the skills that we require now, and in the future, to enable those things. So a focus on those would be hugely important.

There are a few issues that make that happen at a local level. Ian, you may well be sighted on this but I understand, speaking to my colleagues in the north-east, that the CBI and other organisations have been in the forefront of trialling some of the new careers advice in schools with younger people; particularly in secondary schools right now. Through these so-called Gatsby benchmarks we now have a much clearer picture of what works and what makes a difference.

In the north-east, there are huge amounts of business engagement going on in order to help provide and facilitate some of that, particularly those workplace encounters that are so critical to making a difference to life chances and so on.

Then just the practical things that go on with that as well, about just proper contact points, how you dock, and do we have the right time available for that business, school and other partners to engage and interact. That is making some quite striking progress, particularly in the north-east where it has been trialled. Even in the space of a couple of years the difference in that secondary school performance has gone up. That whole local context, hugely important.

Q170 Ian Mearns: You are focused on the educational aspects there, but at the same time we are also dealing with the fragmented landscape of who is driving the investment programmes, who is looking at the overarching strategies for particular areas, because in some areas you have elected mayors, in other areas you have local authority partnerships, but in every area you have a LEP cutting across all of that. Who is in charge and who should be in charge?

Matthew Fell: One observation I would make is there is a little bit of a danger of deepening regional disparities, depending on whether or not you have the right architecture, as you have just described it. It does feel to me, outside of education—if you look at other areas like infrastructure for example—those areas that do have a representation, a strong figurehead, whether it be a mayor or similar sort of figure, those are the parts of the country that seem to be faring better at the moment in terms of making their case and getting investment channelled towards them.



Whether it is a mayor or not, that is probably for others to decide. The importance of a key figurehead to be able to provide an identity and a focal point for a region is hugely important in driving these agendas.

Ian Mearns: If I can make a political observation, I have always found it interesting that the area of England that has the longest standing piece of regional government is London but that is neither here nor there.

Q171 **Thelma Walker:** Just looking at the top 10 urban area with higher share of jobs at risk of displacement due to AI and digital technology, I am unhappy to see that Huddersfield and Kirklees, which is my area, are going to lose 25% of the jobs there at risk by 2030. I am looking as well at that top 10, and eight out of 10 of those areas are in the north. That, along with the cuts to local government—and Kirklees has had 60 pence in every pound go since 2010—how do you think my region or my area of Huddersfield is going to cope with that double whammy?

Chair: Ben has a very similar question, is that right? So if you come in together and then answer both.

Ben Bradley: Mansfield is top of that list, which is my constituency, in terms of jobs being displaced. I see the additional challenge. First, in terms of how you deliver the infrastructure, or whatever it may be in the East Midlands, we do not have a mayor. We are very disparate and the imbalance with Birmingham is very real. Equally, the last time people in my constituency were told about national retraining, and all the rest of it, was when the pit shut in the 1980s and it did not go very well. That led to decades of slightly emotional political history that comes with it.

Who has to lead getting people to engage with it because back then it was a case of these jobs are going to go and this is something we need to do. Now you have the additional challenge of people not even being aware that it is happening or the need for it. Who needs to drive that? How do we get that engagement?

Iain Murray: Can I just pick up on the point about the cuts to local government because it is important that we do not see the National Retraining Scheme and other schemes as the be-all and end-all? One of the things that the TUC has been calling for is that the decade of austerity has meant—and especially the cuts to local government—that there are hugely disproportionate adverse impacts on local economies. Part of the strategy is that we need to turn that around and revitalise local communities and part of that is by revitalising the funding of local government and many other local institutions.

We also believe that the local strategies are a viable approach to addressing that and also to tying up what the local priorities are and also what the retraining agenda is. One of the big challenges for the National Retraining Scheme is how it is going to be contextualised to local and regional areas.

As to leadership, we have seen the combined authorities but with elected mayors—Manchester and Liverpool or wherever—showing that having a



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high-level strategic approach can pay off. Next year they will be getting the adult skills budget devolved to them. Some of them are doing quite exciting things with that and are looking at how you can use the adult and skills budget to ensure that low-wage people get access to more training.

There is a big challenge around the other parts of the country that do not have that infrastructure in place—

Q172 Ben Bradley: I am just noting, looking at the list of the top 10, I do not think that any of those parts of the country have that. What do you make of where that engagement has to come from, how we have to communicate with people?

Matthew Fell: A few thoughts, I will have an attempt at addressing both of the questions. This is tough stuff, would be my first observation. There is a combination of issues here. I would say the importance of being clear on local identities and what you are going to be great at in the future is hugely important. To go back to that point about clarity. That is the idea behind a local industrial strategy and a local industrial plan—being clear what it is that you are going to be great at.

Then making sure that the skills are being taught, both for young people for education—the skills of the future—and then adult skills and the early retraining and reskilling, and it is necessary to get behind those. That is the starting point, the foundation for where you get better at this.

Q173 Emma Hardy: I am interested in the knowledge-plus approach to learning and it follows on from what all the other panels have said about this false division between knowledge and skill. Can you tell me a little bit about knowledge-plus? How exactly would that work in practice? What would you see?

Matthew Fell: First, we have in the past used the term “knowledge-plus”; we are not fixated by the name of it, but what it does say is that employers are concerned about much more than just a narrow focus on qualifications. That is not to say qualifications are not important. Of course they absolutely are, so we want those to be as rigorous as possible. Then employers are also interested in the ability of individuals to apply that knowledge. Thirdly, and probably as, if not more, important, the behaviours and the aptitudes of those individuals. The way that we teach is as important as what we teach, so that it starts to build up a set of skills and experiences around ability to listen, problem solve, to teamwork. Because those things, if we are projecting forward into a world of work where the pace of change is going to be ever-increasing, will require disruption. It is those type of capabilities that we think are important to build and help people develop so that they are adaptable, they have an inquisitive mindset, and they are resilient to change and so on. That is what we mean by the terminology “knowledge-plus”.

Q174 Emma Hardy: I am going to mention one of my favourite things now,



and I hope you are going to agree with me, which is the importance of oracy, for speaking and listening and communication. I wondered whether you would agree, as the CBI, that this is a crucially important aspect as well. That people come to businesses being able to communicate well and having effective speaking and listening skills.

Matthew Fell: Hugely important because that is fundamental to ability to integrate, ability to learn and ability to adapt as well as to get your ideas across. Yes, I would say that is hugely important.

The regular surveys that we do, just to put this in context, suggests that for approaching half of all businesses that readiness for work, as I have just described it, is probably the single most important factor that they look for in young people when they are looking to join their organisation. The package of these skills is hugely important.

Iain Murray: Could I just add one point about that? I do think this debate is very much located in the early education system, whether school or college. There is very little debate about how we can ensure that people who are having to retrain or change job and acquire new skills are supported to develop the key skillsets—whether it is creativity, collaboration, or problem solving. One of the issues that we are discussing through the development of the National Retraining Scheme is that it is not just a question of somebody going on a six-week course or something and then change job.

There is a growing appreciation that, yes, there are the technical qualifications that are necessary for people to change sectors or occupation in the face of automation but there are some of the bigger challenges: how do you support them to develop the kind of skills that would be needed in the world of the fourth industrial revolution? On that front, the work that union learning reps are doing quite often is quite powerful because they are engaging with people who very often have left the formal education system decades ago. Not only have they not done any training, a knowledge-plus to them is quite an abstract concept. But union learning reps are supporting people to take up courses and to do learning. It is enabling them to achieve these skillsets without them having to think, “I am achieving a knowledge-plus”.

Matthew Fell: It is a good reminder why I certainly would not suggest we get fixated with that sort of terminology because it is a bit abstract and it could be off-putting to others. It is just describing those type of skillsets that we are looking for.

Q175 **Emma Hardy:** I was reading a proposal, which I thought was exciting—and I admit I have not studied this in detail—but it was the idea that all businesses would give everybody paid time off to study any subject of their choosing. I know that if you are lucky enough to be in an organisation that has trade unions you can do it through a union rep but not everybody does. What is the CBI’s thought to that because I feel like we are waiting to the last minute to say, “This industry is about to close,



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and you need to train in something else” rather than seeing lifelong learning as something you just continually do? Would the CBI support an initiative like that for an employer to say to their staff, “You can have time off for paid learning of your own choice”, even if it was not necessarily about the job they are doing? So that individual might be thinking about where they are going in the future.

Matthew Fell: My instincts tell me just be cautious of a one-size-fits-all model for what is right for different types of businesses, different ownership structures, different types of workplace. You can envisage it working very differently in a professional services organisation—it is probably much easier to achieve with office-based staff, for example, and a flexible working environment—than in a more heavy industrial engineering company, for example, which might have fixed shift patterns and where the nature of the work is different. I would caution against a single model that could be imposed on everybody.

My other thought would be that it is worthwhile just reminding ourselves how much is already going on in organisations, particularly with an eye to some of the reskilling and retraining that we are talking about here, with this idea of fourth industrial revolution across many different sectors. You think about retail: there are huge amounts of retraining going on for people who currently work in warehouses and stores and historically would have been involved in packing, for example, lots of reskilling going on there to operate machinery that does automated packaging and so on. There are similar stories, for example, in the waste and recycling sectors, where again, historically, you would have pickers and things like that. All of that is done by machinery now and you are looking for technicians in some of those recycling facilities.

You see it in technology and telecom sectors, where technology is being used to channel customer service enquiries and so on, but rather than just being generalists, what is happening now is that everybody is becoming a specialist in those areas, and the machine learning is channelling the customer query to the specialist and that is making that person’s role much more important. I would say that there is lots going on in many different sectors, where this upskilling is already taking place.

Iain Murray: I am worried about that, because we would probably have a different view—for people to have the right to have some time off for training. We do have something still in place called the right to request time off for training, but it is a very difficult right to take advantage of. The TUC believe that we should be looking at some of the initiatives that are available in many other countries, where a right to request time off is quite often located within a kind of personal learning account or a life-long learning account. We have seen that President Macron has introduced a new personal training account in France. It is very early days.

Q176 **Chair:** Would you be open to the idea of possible tax incentives for self-training and life-long learning for the employee?



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Iain Murray: Yes, I think so. There are different models for how you would fund it, whether it is a life-long learning account or the personal training account. I think Singapore has looked at that. There is another kitemark kind of approach to that, where the Government does provide a certain level of funding for all adults over the age of 25. There is just a basic assumption that everybody should have a life-long learning account on the basis that they need it, and tied into that are certain entitlements to paid time off. We believe that, as the national training scheme develops over the years, tying it into something like a life-long learning account would have great benefits.

Q177 **Chair:** Just before I ask my colleague, Ian Mearns, who is going to talk about what goes on in Austria, Germany and Switzerland, can I just ask you this: do you think that the T-levels are right, what is going on in the preparation and, given the fourth industrial revolution, are they properly linked together?

Iain Murray: At the TUC, we have given broad support to the development of the T-levels. We do think that we are in dire need of a high-quality technical education system. Most other countries have an apprenticeship system and they also have a technical education system and then they have a university system. We are broadly supportive of it. I think the timescale is quite challenging.

Probably our concern is around the levels of funding in the FE system at the moment. Can it have adequate funding to deal with the introduction of T-levels and, in particular, support for the workforce in the FE sector? It is a sector where the teaching staff and support staff are not adequately remunerated and conditions are not great.

The other challenge is that it is welcome that there is a fairly lengthy work placement, but it is important that all students get access to that.

Matthew Fell: A similar story for me. I definitely support the idea that there is a need for this. The idea of having a vocation with real prestige attached to it is hugely important and lacking at the moment. We need to address that, so it feels like the right solution.

The areas to focus on are, first, to help with that prestige. A very important change recently is that the equivalent number of UCAS points are attached to a T-level as for three A-levels, for example. Then the bit to really focus on is driving up employer awareness of T-levels, which we know is only moderate at the moment. Even more than that is the awareness of the workplace training element of it.

Q178 **Ian Mearns:** We have recently, as part of this inquiry, visited Baden-Württemberg in Germany and Switzerland to learn about their dual education systems. Do you think a greater emphasis on vocational training is critical to preparing students for an automated economy, or do you think that there is a balance to be struck, because there is a very separate line that they are going down?



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Chair: Yes, just covering what Ian said on the German and Swiss system.

Iain Murray: I certainly do support that. It is fairly late in the day, but I think that there is a growing appreciation of the fact that we need to emulate some of the vocational systems in other European countries. It is not just T-levels, we also need to be looking at higher-level vocational qualifications.

Q179 **Chair:** Do you think we can get to the stage where either we have 50% of our students going on to vocational, as in Germany, or even 70%, as in Switzerland, or we get to the stages in Austria where they offer every single young person a guaranteed apprenticeship place? Can we get back to that here, and if so, how?

Iain Murray: I think if the political will and funding is there. I do not think it is going to be an overnight thing; it is going to take us a long time. These countries have spent centuries building up their systems.

Matthew Fell: My first reaction, I would be a little bit nervous about picking a number that we feel is right and then sort of chasing that, because I think we have seen some of the problems that that has caused in other areas.

But, Ian, back to your question, I think probably an element of both, rather than either/or. At the moment, the vocational route is under-represented, not valued as highly, so making sure that that gets at least on a par, if not more so, so that there is almost like a bit of a competitive race, if you like, chasing both the academic and the vocational routes. That is where I would go on that.

Q180 **Ian Mearns:** It has to be said though that the historical and cultural context is very different there in terms of companies universally taking responsibility for training their future workforce, which has not always been the case in the UK context.

Chair: In Germany, they do it from 14. When I was there, I said, "Why do they do this?" because we have problems getting companies here to do apprenticeships or whatever. They just said that the companies believe that it is their responsibility to do so, that this is how it should be done and they invest in the student from a very young age in order to ensure that they have the skills they need for the country.

Iain Murray: Just to say, I do think that there are some major cultural differences. There is a social partnership approach where, at national sector and regional levels, Government, employers and trade unions are tied into the system, so there is ownership of that across the piece among employers and the workforce and Government.

Matthew Fell: I am not sure I completely recognised that characterisation of a lack of willingness to do things. If you take the level of engagement of businesses in schools, for example, that is huge in the



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UK. Of course there is always more you can do, but that fluctuates around—

Q181 **Chair:** It is dramatically different in Germany and Switzerland.

Matthew Fell: The other international observation I would make, going back into the education piece, is that a number of the variations you will see is less of an emphasis on the rote learning aspects that we talked about earlier. That is an important feature of some of the international aspects that I would make sure are captured as well. That does re-emphasise the importance of the experience of how you are taught as well as what you are taught.

Q182 **Ian Mearns:** I accept that there are many companies in the UK that take their social responsibility very seriously, but it is not universal. Where it is embedded into these state systems—in Baden-Württemberg, for instance, or in Switzerland—there is a really different approach. What they do not have in those countries are whole sectors where the future workforce has not been trained for decades, which does exist in the British context.

Matthew Fell: I am not going to sit here and dispute that. Is there more to do? Yes, absolutely. It is not a lack of willingness to engage—I think there are huge amounts of willingness to engage, whether it be through the school system or through apprenticeships. Probably the biggest barrier of all is knowing how to dock with the system, essentially; if you have clarity of contacts, what is required, knowledge of how you can best help, what you need to do. I think that that is the bigger barrier. I do not see a lack of willingness or desire to do that. It is hugely important. I think, almost without exception, every business that you go to talk to would point to education and skills as certainly being in the top three issues that they are always keen to talk about. I think there is willingness there; it is about making it easier to dock and engage with the system—that is the biggest issue.

Q183 **Thelma Walker:** The thing that hit me on our visit to Germany was the level of choice that individual young people had and the flexibility of the route that they could take to move in and out of the vocational and the academic. It did not matter whether it was vocational, whether or not they were an apprentice, or whether they took more of the traditional academic route, it was all highly valued. That has stayed with me, that valuing, not a two-tier system, but equally valued. I think that that is something that we should aim for.

Matthew Fell: I would absolutely agree with the sentiment of that. Equal value and the flexibility between the two paths, if you like, is hugely important. That is the observation I made about T-levels carrying the same weight as UCAS points, so if an individual wants to take a T-level as a more vocational route and then, for example, go on to university, that pathway should be open and available to them.



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Iain Murray: When they were originally announced by the Sainsbury panel—which we strongly welcomed—one aspect of the T-levels was that there seemed to be an emphasis that people could transition between T-levels and the academic system. I am not sure whether that has been lost a little bit in the year since it was originally announced. That is something you see that is a feature of vocational academic systems in other countries, that young people can be doing the technical education route, but then can take a decision to then track over to the school route that takes them into university. I do think that that is something that the T-level approach should—

Q184 **Thelma Walker:** The commitment of business as well in Germany, going back to the guilds, it is historical, which we had and seem to have lost.

Iain Murray: We saw a decline in our apprenticeship system from the 1970s to the 1990s. In the mid-1990s there was a decision to try to revitalise that road. One of the challenges we have compared with some of these countries is that we still do have a lot of poor-quality apprenticeships in parts of the economy. I welcome the recommendations that this Committee has made around addressing that, but until we crack that, the attitudes of young people and in particular parents have been influenced by the legacy of the experience we have seen of some low-quality apprenticeships. It is important that we accelerate that and that we clear out low-quality apprenticeships. Moving to a system like the German system, where they are of a very high status, is a longer-term ambition.

Matthew Fell: It is probably a focus for a separate discussion, but there are clearly well-known and well-reported challenges right now with apprenticeships and the apprenticeship levy. One of the issues there is about the pace of approval for the high-quality apprenticeships, new apprenticeship standards that Iain is talking about.

Q185 **Chair:** Are you talking about higher apprenticeships?

Matthew Fell: All levels, but just getting that flow rate through the system has been a little bit of an issue. It is definitely getting better, but cracking that will be just one part of making sure we do have high-level, high-quality apprenticeships in place.

Iain Murray: I suppose the other point to make is that we do have a lot of high-quality apprenticeships in parts of the economy that are on a par with the apprenticeships you see in these other countries, where there are large manufacturing companies or motor companies.

Q186 **Chair:** Where are you in terms of apprenticeships and what some are describing as rebadging of existing training schemes? You have management apprenticeships, higher management apprenticeships. Is this a good thing, or is it basically not what the apprenticeship levy and programme was meant to be doing?



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Iain Murray: It depends on the circumstances. It is right that employers should be able to use their levy funds to offer proper high-quality adult apprenticeships. There is some good work going on there; that is not just management training. We published a case study looking at where Network Rail and RMT are working in a joint partnership to support high-quality adult apprenticeships for the existing workforce. I do have some concerns around large numbers of management apprenticeships. I do have some concerns that if we move too much away from apprenticeships being a traditional route for young people to enter the labour market, there needs to be safeguards around that.

Chair: That sounded very diplomatic, that answer. Matthew.

Matthew Fell: On that question, the worst scenario of all is that if you just have money that companies would have otherwise spent on any form of training just sitting in an unused pot. That feels to me like the worst situation of all, so better that it is spent on issues such as this management training or something like that. That would be preferable, and also making sure that the system does incentivise a growth in upskilling and apprenticeship opportunities for young people as well. The two should go hand in hand, but making sure it does not sit in an unused pot. That is the worst situation of all.

Q187 **Ian Mearns:** The funding is possibly there in some scenarios, but is the infrastructure there in order to provide much more widespread good-quality training? Is that infrastructure currently in existence?

Matthew Fell: Not uniformly, I would say. It is particularly a challenge for small and medium-sized organisations, particularly because they are likely to have a lesser number of individuals. They are less likely to have the purchasing clout, if you like, if they go and engage with a local FE college to be able to say, "This is the type of skills provision that we are looking for and feel we need". Making sure that there is a mechanism almost for like-minded firms to be able to collaborate on those—that would be extremely helpful. It is easier for the largest organisations to be able to certify, because they have the volumes, "This is the sort of programme that we are looking for" for the skills that they feel they require and so on.

Iain Murray: The demise of the Sector Skills Council has just left a bit of a gap here. We still do have some viable Sector Skills Councils, like Semta, for example, which are covering advanced manufacturing. I do think it is an opportunity, and I know Semta has made the case that, if there were opportunities to use the levy a bit more flexibly at the sector level, there could be collaborative arrangements that would maybe incentivise more small employers to take on apprentices. For example, one of the ideas that a senior trade union official has discussed with me is that in some parts of manufacturing there are huge numbers of young people applying for apprenticeships, whether it is in automotive systems or BAE Systems, or Rolls-Royce. A lot of them do not get it. If you had a system in that locality that advised these young people to apply for



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apprenticeships in other companies, then some of that could be done with a bit of imagination and a bit of collaboration.

Q188 Ian Mearns: Is there not a hole in the market though? Because it is all very well having an FE provider providing one part of the training, but it is then who is going to provide the on-the-job training within the small and medium-sized enterprise. Isn't that a problem?

Iain Murray: I do not think so. Training providers and FE colleges, they are funded to deliver that.

Chair: Thank you again for waiting and giving us some very useful information for our inquiry. I wish you both very well. Really helpful, thank you.