



Science and Technology Committee

Corrected oral evidence: People and skills in UK STEM

Tuesday 18 October 2022

10.25 am

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Members present: Lord Krebs (The Chair); Baroness Brown of Cambridge; Baroness Blackwood of North Oxford; Viscount Hanworth; Lord Holmes of Richmond; Baroness Manningham-Buller; Lord Mitchell; Lord Rees of Ludlow; Baroness Sheehan; Baroness Walmsley; Baroness Warwick of Undercliffe; Lord Winston.

Evidence Session No. 5

Heard in Public

Questions 31 - 37

Witnesses

Professor Dame Athene Donald, Master, Churchill College, University of Cambridge; Robert West, Head of Education and Skills, CBI.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of Witnesses

Professor Dame Athene Donald and Robert West.

Q31 **The Chair:** I would like to welcome our witness this morning to the committee's fifth evidence session for its inquiry into people and skills in UK STEM. Thank you very much, Robert West, head of education and skills at the CBI, for coming to join us and share with us your insights into the issue that we are investigating at the moment.

The session is being broadcast live on Parliament TV, and a full transcript will be taken, which will be made available shortly after the meeting, so that you can make any minor corrections that you wish to make.

We are running a little late, and so, without further ado, I am going to move into the first question, which is a very general one. Could you outline how you view the issues and policy in relation to lifelong learning and skills in the UK? Are there skills gaps and, if there are, how are they characterised? Is the situation getting worse? Are there any specific areas that you would highlight where the UK is in need of more skills and where current offers are insufficient to bridge the gap? That is quite a broad canvas for you to give us the view from the CBI.

Robert West: I will try to pick my way through that, certainly. The CBI speaks for 190,000 businesses. That includes over 70 universities and over 30 colleges. Together, we employ around a third of the UK's private sector workforce, representing businesses of all sizes. Bringing all that together, our belief is that upskilling and reskilling are the biggest games in town with regard to the UK's skills needs.

Upskilling was identified in the Government's levelling-up White Paper as one of the Government's 12 missions, and there was a commitment to improve skills in all parts of the UK by 2030. Reskilling is one of the biggest challenges currently faced by the UK economy. Our *Learning for Life* report back in 2020 suggested that, by 2030, over 30 million people, equivalent to 90% of the workforce, will need to be reskilled.

Our view is that all stakeholders—businesses, Government and providers—must do more to work more closely together to increase investment in improving skills. Government policy has to create the right conditions for businesses and individuals to prioritise training and to lift those barriers that prevent investment in skills.

What is required is both a short-term and a long-term solution. What often happens, it seems, is that we come up with one or the other, but do not necessarily take account of the fact that they are both needed at the same time. To give you an example of that, the Government's lifelong learning entitlement offers opportunities for businesses and individuals to prioritise training and to increase investment in skills, but the key message is that we still need to encourage a culture of lifelong learning.

At the moment, what we have is still an education system that broadly suggests that you are educated up to an age of 18 or 21, and then you

get a job. We all know that, in a world of changing technology, that is no longer the case, and so we need to do a bit more, starting at the youngest age, of encouraging that culture that you will learn throughout your life and that that is a good thing. We need to ensure that learners have clear pathways and funding routes that encourage learners to progress, particularly to levels 4 and 6.

Pre-pandemic, the CBI was already drawing attention to the fact that we have the lowest adult participation rates in something like 20 years and that investment in adult education continues to fall. It has been pointed out to us, quite rightly, that business investment in the UK, in skills in general not just STEM, is lower than that of our competitors. Similarly, so is the Government's investment in adult education.

In answer to a question that might be posed about why we do not invest more in skills, part of me has the answer: "Because we do not". We do not have that culture of investment. We do not have that culture that is nurtured at the youngest age of saying that lifelong learning is something that you will do; you will have not just one job but a variety of jobs. Therefore, we need a system that enables people to be upskilled and reskilled throughout their careers, with short-term and long-term solutions. What we have is short-term solutions with pressure on us, particularly at the moment. People need people now with the jobs and the skills. We understand that and of course, that is right, but you will not solve the problem unless you are also investing long term.

There is a skills gap. Certainly, our members tell us so. When evaluating long-term skills needs, a recent member told us that 270 jobs could go unfilled in the next five years within their organisation, if employees were not reskilled. Members are telling us that they are finding that the talent pool of skilled people is limited.

Schemes like apprenticeships are great, but it is one solution, not the solution. One of our members told us the story of how, in the West Midlands car factories, they used to oversubscribe apprentices, knowing that there would be a number of skilled people there going out of the industry. That no longer happens. As I say, there is a cultural issue here and a need to look at short and long-term solutions. Lifelong learning is certainly key to that.

The Chair: I would just like to pause. I want to come back to you with a follow-up question of detail, but our second witness, Professor Dame Athene Donald, has joined us. Can you hear us, Athene?

Professor Dame Athene Donald: Yes, I can, and I apologise for being so technologically incompetent. It comes from sticking in a remote mouse, which completely killed all my audio. I am sorry about that.

The Chair: Welcome. I will come to you in a moment, if I may. I just want to have a brief follow-up with Robert on his very helpful answer. I wondered if you could just give us a very brief characterisation of what you mean by skills. What are the skills that are missing and that, as you referred to, could be developed by upskilling or reskilling? What are we talking about?

Robert West: It is interesting that you pose that question. Anything that is future facing poses a problem, because the job might not exist yet. We get a lot of members telling us, “We need digital skills. We need green skills”. We push them and say, “What exactly does that mean?” In the short term, we are starting to get clarity. Retrofitting and cybersecurity come up as well, but there is a short-term skills issue to do with HGV drivers. We can sort that out by looking at things such as skills boot camps, but what happens if we move towards the idea of driverless vehicles? What happens when we talk about skilled engineers to maintain those driverless vehicles?

What I mean by skills is skills for now, today, and skills for tomorrow. The challenge is that, sometimes, when you are dealing with skills for tomorrow, you do not quite know what those skills are.

The Chair: What kind of training would you want people to undertake? It sounds like you are asking for people to have the flexibility to be willing to undertake retraining in whatever is needed at that time.

Robert West: That is right. In addition to that, we need to lift the barriers to engagement within skills.

The Chair: Athene, we have just been discussing a general question of how you view the issues and policy related to lifelong learning and skills. Are there skills gaps? What are those gaps? Are there any particular areas where you feel the UK is in need of more skills and where the current offers are insufficient to fill the gap? Would you like to give us your brief response to that fairly general question?

Professor Dame Athene Donald: Indeed, and I apologise if I am going to repeat some of the things that have already been said but that I did not hear. Very much echoing the previous remarks, we need to look not at those people who go from school to university in a nice linear way, but the people whose career trajectories are very different. We need to focus on the 50% who do not go to university and who, in many cases, are not being well served by the current system.

We should recognise that about 40% of adults over 25 do not have any qualifications above GCSE, for instance. What is troubling is the amount of investment into this cohort—both those who leave school without high-level qualifications and adults who want to reskill in the way that you have just been talking about. Spending on adult education has dropped very substantially in the last decade. An IFS report said that spending on adult education and apprenticeships fell by 38% over the last decade, and adult classroom learning by 50%. Those are horrifying numbers. It is impacting people with the lowest-level qualifications most.

If you are working in a town where a major factory has just closed, for instance, you need to be able to upskill and reskill, and we do not have the mechanisms to make that easy. There are new schemes—Multiply, for instance, and digital boot camps. They may make a difference; it is far too early to say.

On digital, broadly interpreted—so not just people who code, but people who are confident with numbers, with digital and with spreadsheets—we

have a woeful lack. Some of this can definitely be attributed to the way that funding is assigned these days. When the numbers fell off aligns with changes in funding support.

When it comes to apprenticeships, the move seems to have been to higher-level apprenticeships and not the lower level. FE colleges play a vital role in this ecosystem, but are very much underfunded. If we are going to look at the levels of skills that are crucial, and if we are going to have a growth economy, as seems to be the current phrase, we will need level 4 and 5 skills—what used to be OND and HND. Compared with our competitor nations, we are very lacking in people who get those levels of skills, and yet they are crucial in, for instance, the innovation landscape.

Talking about innovation, not just highly qualified PhD-type scientists and engineers, but some of these other people are vital when it comes to things like absorptive capacity. The Royal Society did a report on absorptive capacity recently, which highlighted these problems. It is going to vary by region, so it is not going to be one size fits all, but we do have a very large skills gap, at the moment.

I would also like to drop into this something that is very close to my heart. If we do not facilitate young women entering some of these spheres, we are losing half of the population and half the talent. At the moment, we have a school system that probably discourages a sizeable number. I have talked to the AMRC—the Advanced Manufacturing Research Centre—in Rotherham, which is attached to Sheffield University. The number of female apprentices that are starting on its excellent scheme is tiny. Despite all its hard work, the problems start much earlier.

Q32 Baroness Walmsley: Good morning. What measures do you see the Government currently undertaking to address the STEM skills gap? Are they sufficient to address the requirements of government policy aims for science and technology, including net zero? Can you give any really successful examples?

Professor Dame Athene Donald: We are not doing nearly enough. I mentioned further education colleges, which are a crucial plank in developing what I think of as intermediate skills. They are very badly funded. They have been through umpteen changes in the way that they are funded and the expectations on them over the last decade or more. I saw a report that mentioned something like 28 reforms over a not very long period. It makes it very difficult: they cannot plan and are, as I say, underresourced.

If you are either an employer or a potential student trying to make your way through the incredibly complicated ecosystem to work out what courses might be for you, how you get funding or how the employer might sponsor you, it is really complicated. We have a long way to go, both in policy and in funding, to make that kind of path work.

Baroness Walmsley: Do you know of any examples of further education colleges getting round that problem?

Professor Dame Athene Donald: Not all FE colleges are or need to be the same. There is a real regional issue to this, because the skills that are needed in any region will vary. I know that you heard this evidence last week, but these are people who are less likely to be mobile or to travel, so the regional aspect is really important.

I am aware, for instance, of attempts in Greater Manchester to bring the FE colleges and the universities together. It is early days, so I have no idea how well that will work. I was talking to the vice-chancellor of South Bank University, who was trying to bring the schools and colleges in the region together to have a pipeline. Again, it is too early to know whether that will work.

One of my convictions is that, at the moment, we have HE and FE in opposition, and that is incredibly unhelpful. It should be a holistic ecosystem, which means that things are joined up and work for the local area.

Baroness Walmsley: Mr West, do you have anything more optimistic to give?

Robert West: I would echo that last point, which is what I said in my opening statement. That holistic approach of all these partners and stakeholders working closely together and pulling in the same direction is key to this.

The Skills and Post-16 Education Act offers positive examples. If you look at the Skills for Life campaign, you can see lots of opportunities that would benefit in STEM areas, such as Multiply and apprenticeships. One of the problems, though, is that they are focused on individuals, quite rightly, but not enough on businesses and what they might want in order to engage with these things.

Take T-levels, for example. We often hear that the first engagement with the T-level for a business is a request for a 45-day placement. Understandably, if you have not been talked to about why a T-level might benefit your business, it just feels like something that you are being asked to do.

I agree that people in the workforce need effective routes for upskilling and reskilling. We do not have a system that shows how progression can happen all the way through. Skills boot camps are examples of a good first step to fast-track individuals, and there are courses in digital and cybersecurity. Until recently, though, you could find green skills boot camps in my area, the east of England, only as an industry health and safety adviser. That is clearly not where the area of concern is. Even though there are a couple of courses in retrofitting, the green skills agenda is far more than that.

There is a challenge to win the hearts and minds of industry and business, but you are quite right to try to highlight where good practice going is on. Bridgwater College is one of the examples from our membership that I would highlight. It is doing work with companies such as EDF Energy, which is an example of a partnership.

As was said by the professor, that holistic approach, with FE and HE, education and business, and the Government working together more closely so that it is information not just for individuals but for businesses, is, for me, really the key to unlocking this problem.

Baroness Walmsley: I was going to ask what makes for a successful skills initiative but, from what both of you have said, it sounds like it would be providers, employers and schools all working together and passing information from one to the other. Would that be your view or is there some other factor?

Robert West: That is certainly the key to it, as I say, but there is also that need to lift the barriers that prevent people investing. In order to kick-start business investment in domestic talent, we could make radical changes to skills funding, such as evolving or scrapping the apprenticeship levy and trusting businesses to invest in their own workforce training. At the moment, that is a barrier that is preventing businesses saying, "This is what we need". As I said earlier, apprenticeships are a solution, not the solution. Not everything requires 12 months; not everything is for someone at a particular entry level.

Again, in terms of highlighting practice, more than 2,500 employers have developed apprenticeship standards. Our previous research in 2020 shows businesses investing £44 billion a year in training, so it is going on, but perhaps we are not picking out the best examples and highlighting those to lead the way for others.

Baroness Walmsley: Just finally, we have heard rather alarming evidence that the skills portfolio is constantly shifted around between different government departments. Do you think that there is a sensible place for it to sit in order to prevent this policy churn? Professor Donald, do you have a view on that?

Professor Dame Athene Donald: DfE's brief has changed recently, of course, taking on universities as well. If training, broadly defined, sits within DfE, that is a logical place. What is much more serious is not so much that it sits in here or there, but that it does not talk to any other parts. The fact that DfE and BEIS are not getting together in this area and asking, "Where are the needs? What are we going to do about it?" is more of the problem than precisely where it sits. It is the lack of communication.

Robert West: I agree with that wholeheartedly. The problem is that skills run through everything, and STEM runs through everything. That is why we get the STEM/STEAM debate, because people know it runs through everything. It is frustrating that no one seems to hold the pen, but you want the Home Office to be involved in STEM skills, looking at the Migration Advisory Committee and opening up the shortage occupation list. You want the Department for Work and Pensions to be involved in skills and job creation schemes in this particular way.

As was said, we need people to be talking to each other. A number of employer representative boards, including our own, have called in the

past for the creation of an independent agency that looks at skills. Maybe that is worth exploring.

Q33 Baroness Blackwood of North Oxford: Mr West, you have been very clear in your answers so far that there is a strong role for the private sector to get deeply and more effectively involved in training and retraining. It is our job to make some key recommendations off the back of this report. What more could the Government do to incentivise the sector to invest in training? You have mentioned a few things—maybe raising best practice in industry. What would be your top asks?

Robert West: They would be raising best practice; removing barriers such as the apprenticeship levy, which forces people to look at one particular answer to a solution, so a more flexible approach; and the encouragement of more modular courses that allow people to offer short-term courses that, as I say, respond to short-term as well as long-term problems.

Those are things that need to be done, but communication is at the heart of this. Getting out that information on businesses' terms is most important. I go back to the Skills for Life campaign. I have been told that there is an employer landing page, but I have also commented that it is a bit like *The Hitchhiker's Guide to the Galaxy*, when you say, "The information is out there. You just have not found it yet". More work needs to be done to talk to businesses as to why they might be involved in Multiply, apprenticeships or T-levels and to look at what is preventing that.

The local skills improvement partnerships are another area where it could work, but only if you ensure that all businesses have a voice. These committees tend to be set up, and the people who turn up turn up, but you do not necessarily get the voice. Particularly SMEs are very time poor and resource poor, but they play an absolutely key role in development, particularly within STEM. We need to look at what is preventing them coming along. Is that because they do not have the resources to back-fill if somebody is released to attend that engagement? We need to identify who the stakeholders are and, if people are not engaging, why and whether there is a quick, easy solution.

Baroness Blackwood of North Oxford: What I am hearing from you is that you do not yet have the evidence on what all the barriers are.

Robert West: It is different for different people. As I say, for small and medium businesses, we know that cost is one. We also know that the environment causes problems. There is a concern that I term, "I coach; you poach". "I'm worried about investing in training, because if I train that person they will then go to someone else". A lot of people are moving around.

This affects further education as well, in terms of not being able to find tutors. If you are particularly skilled within a STEM area, you will probably find that you are working in industry and earning more money than you would in FE. There are a variety of barriers, but the key thing is to

identify those barriers and, where you see them, to remove to ensure a more varied, flexible approach.

Baroness Blackwood of North Oxford: Professor Donald, did you want to add to this question of what the key asks to Government would be to incentivise the private sector?

Professor Dame Athene Donald: I very much agree with what has been said. It is not going to be one size fits all. There are different needs in different sectors. I am sure you will come on to the lifelong learning entitlement, and we need to know how that might make it possible to do not a full-year course but something modular or shorter, just to get upskilled in something specific. At the moment—and this reflects my opening comments—there is insufficient adult upskilling provision. Anything that will help that will enable people to move forward as technology moves forward.

- Q34 **Baroness Warwick of Undercliffe:** My question follows very naturally from some of the comments that you have both been making, because it is about apprenticeships. Perhaps you could say a little more. You both expressed doubts about the way in which apprenticeships are currently working, and that it is only one solution, not many, but it is partly a solution. Could you tell us how well it works at the moment, both for employers and for workers who are trying to gain new skills? If you think that it is working, at least in part, should it be expanded?

Perhaps I can pick up another point here about T-levels. We have heard some cautious optimism, but also concerns that they cannot and do not yet replace BTEC qualifications. I wondered if this tallied with what you have heard, along with the fact that perhaps a lot of employers do not even know how they work at the moment.

Robert West: Let us start with the T-levels. We have heard the concern that they are not yet able replace BTECs, but it is early days. The principle that we promote is that you do not replace something until there is something better in its place. That is really the guide towards it. T-levels are at the beginning of the journey, so are we putting barriers in the way by removing qualifications that exist while T-levels start to gain some traction?

Again on information for businesses, businesses understand BTECs better than T-levels, in the same way that they understand HNDs better than higher technical qualifications. It is not to say that you should not go down those roads, but you need to understand that it takes time.

As I said, the 45-day placement causes alarm. You can find other ways of dealing with placements, but you still need to engage with businesses on their terms to show why they should be involved in those in the first place. That is what I feel about apprenticeships as well. Again, apprenticeships are still seen as something for younger people, not for people in work. There can be barriers in the way. If you have been working in a particular industry for 30 years, an apprenticeship might be the best option for reskilling or even upskilling you in a particular area.

But we have sometimes heard that, for older workers, an apprenticeship feels like going back. Again, this is back to that thing of culture. You do not want lifelong learning to feel like what you are doing now is something that you should have done earlier. There is a need to look at the brand of apprenticeships and how you sell that to people in work as the right solution, but it is certainly a step in the right direction.

My final point on apprenticeship standards is that it just takes a long time for things to get done. The example that one of our members gave us was that the vehicle maintenance standard does not cover electric vehicles. They are moving their fleet to electric vehicles now, so they have an apprenticeship that they support, but they are having to look at a top-up to get somebody ready to do that particular work. Anything we could do to speed up the process of apprenticeship standards would be good. Any work we could do to improve the brand of apprenticeships and T-levels, so that they are seen as lifelong learning, would be welcome.

Baroness Warwick of Undercliffe: I am sure you have made these points before to various government departments and so on, but what do you see as the problems about removing some of the barriers that you have described?

Robert West: One of them is to do with engagement and time for engagement. Again, this goes back to the earlier point I made about small and medium-sized enterprises being involved in the development of standards. A lot of the standards are developed by some of the larger organisations, and smaller organisations need to ensure that they are fit for purpose for them. It is about being employer-led which, from what I have heard from our members, they understand to mean employer-responsive, not necessarily employer-directed. If there is a way of not having to attend endless meetings developing the standards, but understanding that their voice is being heard, that could be of particular benefit.

Professor Dame Athene Donald: On T-levels, part of the problem comes back to the fact that not everywhere is the same. Even if businesses might want to take people on for those 45-day placements, that is much harder to achieve in rural areas. Urban conurbations probably work quite well but, in rural areas or deprived coastal towns, it is probably going to be much harder to find those placements, so we have to be very aware. I would absolutely agree that getting rid of one qualification before we know whether another one works is unwise.

My college, Churchill College in Cambridge, has had a very long tradition, long before the apprenticeship levy, of taking on apprentices in areas such as maintenance. Plumbing is a skill; you know what it is and it is quite easy but, as you move to asking, "What are we going to do about installing air source heat pumps in the college grounds", you run into problems, because it is a new technology. The apprenticeship schemes do not keep up and you then have to have this modular add-on. As a college, we are very happy to invest in people learning how to install solar panels – as we have done – or whatever it may be, but there are

other areas that are quite niche and specialised, and not everywhere is going to provide an appropriate apprenticeship.

The energy transition came up earlier. If one thinks about what you need in Hull, which is a centre of wind power, versus what is going to happen around Sizewell C, the skills that you need to make those changes are going to be very different, so you would have niche areas there too. It is really hard to imagine that we can solve everything by one scheme, which is what you have heard already. Removing the barriers is partly about allowing more flexibility and coming back to the idea that people will constantly need to upskill as technology changes, which should be seen as a plus. The best employers invest in that, but some, perhaps for financial reasons, are unable to.

- Q35 **Baroness Sheehan:** Professor Donald, may I start with you on my question about the lifelong learning entitlement—the government initiative that offers the potential for adults to take the equivalent of a student loan later in life to access retraining by 2025? Could you say whether this is an initiative that you welcome? Is there anything specific that you would recommend to the Government in implementing this?

Professor Dame Athene Donald: It is an excellent idea in principle. It is not yet signed off. I have concerns: if you are already in full-time employment, but not in a very well-paid job, and you have a family and dependants, are you really going to be able to take out a loan to do something? It may be one of these schemes that do not work in practice, just because it is impractical. When the university funding system changed, we saw how part-time students completely fell away. We may see a good scheme not come to fruition, because it is just not financially viable for many people.

We also have to look at how, as I mentioned earlier, it will cope with modular courses—not having a full year out doing something, but 12 weeks or something. There will also be people who may be capable of getting a degree at the end of the day, but cannot do it from where their qualifications are. It is an entitlement to four years, which may not always be sufficient.

Robert West: Just to add to that, the lifelong learning entitlement offers an opportunity for businesses and individuals to prioritise training and increase investment in skills. Again, we are back to the key message that we must encourage a culture of lifelong learning to make schemes like this exist.

The thing that I would recommend to Government is to ensure that learners have clear pathways and funding routes that encourage learners to progress, particularly to levels 4 and 6. It is really all going to be down to what the menu of choice is and whether individuals and businesses see a value in what is being offered.

- Q36 **Lord Rees of Ludlow:** I would like to ask about whether there are currently enough educators and trainers with STEM expertise to fulfil the demand for skills training. If not, what should the Government do to ensure this problem is addressed? I guess the question is really in two

parts: one is the very low salaries, in particular in further education colleges, and the other is the lack of science teachers at the secondary school level. These are linked questions that are rather different.

Professor Dame Athene Donald: The problem in schools is absolutely critical. We do not have the teachers we need. My memory is that something like 9% of primary school teachers have a STEM background, which means that there are an awful lot of teachers who are having to teach even quite basic stuff without necessarily having the confidence to do it, and then go on to inspire the next generation. I know that STEM Learning does a lot to support these people.

At secondary schools, the situation is even worse, particularly in a subject like my own and yours, which is physics, where there are just totally inadequate numbers of teachers with physics degrees. My memory is that it would take every physics graduate for the next 10 years going into physics teaching to fill the need. The shortfall is appalling. Of course, physics underpins engineering and so many other disciplines. Physics is an extreme example but, without having the teachers in the schools who can inspire children to go on to do some of these STEM subjects later on, in whatever form, we are in terrible trouble. The numbers of teachers entering initial teacher training this year are also appalling, with something like a 40% shortfall of new teachers.

If we are going to look at what could be done to improve the situation, the fact that retention of teachers is dreadful is also an issue that should be looked at. A theme that comes up time and time again to aid retention is CPD, but CPD that is properly funded. Some schools cannot afford to release teachers to do some of the training, so mandatory and funded CPD would make a big difference.

In further education colleges, the pay is worse than for secondary school teachers in many instances. The way that FE colleges are funded means that people do not even necessarily know whether a course will continue into the future, because the funding that a college receives is retrospective rather than forward looking. We have an enormous problem in the supply of teachers who are competent in STEM at every level.

Lord Rees of Ludlow: Do you see a short-term solution?

Professor Dame Athene Donald: No. If we do not have people entering schools and FE colleges, we are going to have to change the attitudes towards the profession to make it more attractive, and that is not going to be a swift turnaround. The decline in physics teachers has been long term.

Robert West: In answer to whether there are currently enough, no. We hear that from our provider members at the CBI. There are two things going on here that both need addressing. One is that there is a labour shortage, and the other is the skills shortage. It is about not having people who are able to do that particular role, but also not having people with the skills to do that role most effectively.

We talked about pay being a barrier, but it is more than that, as all these things are. It is about working conditions and professional development. "What lifelong learning do you have as a teacher of STEM?" That needs to be considered.

In fact, teaching in the 21st century probably needs a review as well. One of our members was talking to me about wanting a review of the curriculum, especially on technology and IT, with a broader sense of what a career in STEM really is and more practical lessons. That is probably going to require teachers and lecturers with a different set of skills than you may have had before. There is no short-term solution, but there is certainly a need to put in place some of those building blocks to ensure a pipeline of talent in STEM going through into the education system as well as into industry.

Lord Rees of Ludlow: There has been a move to try to persuade people in mid-career to move from some other career into teaching. There are many people who have worked in a company or in the Army, and who would be excellent teachers with a bit of training. Do you see the possibility of getting people to come in, in middle age, to compensate for the leakage from the profession among young people?

Robert West: The key word that you used there was "compensate", but we need to address it rather than plug the gap, although that is a particular way of doing that. We talked earlier about how, within STEM, we are not really tapping into the pool of people available. Young women take up something like 28% of the STEM area; are we talking to female students about a career teaching STEM as well? Anything like that would be a potential solution to plug the gap, but we really need to address the root of this one, which is what the pay, conditions and professional development opportunities are that would make you want a successful, long career in education.

Q37 **Baroness Brown of Cambridge:** Thank you for coming this morning. I would like to ask whether our international competitors are doing this better. What should we be learning from them? Indeed, have we done any of this better in the past? Are there other things that we should learn from previous initiatives or previous Governments that we should be doing again or reinstating?

Professor Dame Athene Donald: The country that people always cite is Germany. I mentioned level 4 and 5 qualifications and they have a much higher proportion of people who do longer courses. Leaving aside the schooling system, where there is a much clearer vocational path at school age, there are companies that are much more invested in their workers than some UK companies. Making sure that they are appropriately trained and upskilled is much more in their culture. It comes back to something that was said previously about culture, and somehow we do not have that culture here. That is not particularly easy to turn around, but a lot of messaging would help. There are issues around funding, making sure that courses are appropriate for employers in the region and all the rest of it. All of that is relevant too.

If you read novels from the 1930s, people are very invested in going to evening classes to improve their skills and that kind of thing. That attitude has vanished. Somehow, the way that the UK collectively thinks about training, education and skills has changed over the decades. I do not know how much government can do to turn that around, but in some ways the focus on getting more and more people to university has perhaps made it easier to forget the people who do not want to or perhaps should not go to university. We have lost that culture of just improving yourself in general.

Robert West: I endorse that: culture is at the heart of the issue. In international terms, we need to be a little careful that we are not comparing apples with oranges. Having said that, there is undoubtedly good practice that we can learn from. We have talked about Germany and SkillsFuture Singapore sometimes comes up to us as an example. Depending on who you talk to, India is or is not doing skills well. A skills taxonomy is something that Australia and the US have addressed as well.

There are things that we can learn, but it is not simply a case of lifting something and putting it back here, because it needs to fit within the context that we are operating in. As has been said, at the moment that is to do with a seeming lack of commitment to adult education and lifelong learning, and STEM still being seen as something that is done by boys getting their hands dirty with Meccano sets. We are not selling STEM enough in the way that it is being delivered by businesses today.

Baroness Brown of Cambridge: Do we do ourselves a disservice by giving the message that STEM subjects are hard and, therefore, people think, "There might be easier ways to find a good career"?

Robert West: There is nothing wrong with making anything challenging, but you are right in that, if the focus is on how difficult STEM is—this goes into maths as well—as opposed to how you are using it, that is not the answer. I was visiting an institute of technology recently, where the principal was saying to me how strange it was that there were these students who were doing these STEM subjects and using maths in the most wonderful and effective way, and yet they struggled with their maths GCSE. Her view was that the problem was with GCSE maths and what it was testing, as opposed to their ability to use that.

I would not say that suggesting it is challenging is a particular issue. Again, it goes back to my point of putting up barriers: you are putting up barriers by saying, "This is hard. You will not be able to do it", as opposed to, "This is challenging and it is a really exciting thing to be doing". It is all about communication.

Baroness Brown of Cambridge: Are schools dissuading students from taking STEM subjects because they think it will be harder for them to get really good grades? Are we measuring schools now so much on the grades that their older students get?

Robert West: That could be the case. It also stretches back to what you introduce a young person to in terms of STEM. When my daughter was at school, she was never shown an engineering factory or a technology

outlet. I took her around those, but it was too late; she has a career in insurance now. There is something about how we introduce STEM and who we introduce it to.

As much as I have been asking, "How do these things work for the benefit and the interest of businesses?" you could ask, "Are we thinking about what elements of STEM are attractive to people, or are we just trying to fill the same gaps that we always have been trying to fill and not moving on as the technology moves on?"

Baroness Brown of Cambridge: Dame Athene, are we incentivising our schools and colleges well enough to make them really focus and encourage young people into STEM?

Professor Dame Athene Donald: We are clearly not, to some extent. The Institute of Physics has lots of evidence about the ethos in schools and how much difference that makes, particularly for girls. If we think about engineering, a lot of teachers do not know what engineering is and cannot talk about it. Careers advice is also a major problem in schools. We need to ensure people understand what you can do with a STEM education, broadly defined. There are lots of things that could improve the situation in our schools.

The Chair: Thank you very much indeed. We are now coming to the close of this session. I would like to thank our witnesses very much for the extremely helpful evidence that Professor Donald and Mr West have given us. If there are any further points you would like to add—we may have missed something you feel it is important for us to know about—please do not hesitate to write in. We can incorporate any further comments in our evidence.

Having said that, I would like to remind you that the transcript will be sent to you shortly, and you are able to make minor corrections at that stage, if you wish to. Thank you, once again, for coming to join us. Thank you, Professor Donald, for finally solving and conquering the technology problems.

Professor Dame Athene Donald: I am so embarrassed about that. I am really sorry to have missed the first 15 minutes.

The Chair: It happens to all of us. Thank you very much indeed.