



Science and Technology Committee

Corrected oral evidence: Physics teachers

Tuesday 13 January 2026

11.30 am

[Watch the meeting](#)

Members present: Lord Mair (The Chair); Lord Berkeley; Lord Drayson; Lord Lucas; Baroness Neuberger; Baroness Neville-Jones; Baroness Northover; Lord Ranger of Northwood; Viscount Stansgate; Baroness Walmsley; Baroness Willis of Summertown; Baroness Young of Old Scone.

Evidence Session No. 1

Heard in Public

Questions 1 - 14

Witnesses

Jenni French, Head of STEM in Schools, Gatsby Charitable Foundation; Hari Rentala, Associate Director of Education and Workforce, Institute of Physics.

USE OF THE TRANSCRIPT

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

Examination of witnesses

Jenni French and Hari Rentala.

Q1 The Chair: Welcome to the second session this morning. We are undertaking a short inquiry on physics teaching. We are pleased to have as our witnesses Jenni French, head of STEM in schools at the Gatsby Charitable Foundation, and Hari Rentala, associate director of education and workforce at the Institute of Physics. We are very grateful to both of you for being here. As I think you understand, this session is exploring the shortage of specialist physics teachers. We want to understand whether there are any policy mechanisms that could address this. Perhaps each of you could start, when you introduce yourselves, by setting out for us why you feel it is so important that STEM subjects such as physics need specialist teachers—I think we are pretty clear about that, but obviously we would like to hear your views. What evidence exists for the impact that this problem is having on physics education?

Jenni French: I am from the Gatsby Foundation. I think you will all be aware that physics is a foundational subject at the heart of the UK's industrial strategy. Crucially, it is a key feeder into engineering. A-level physics remains one of the strongest predictors for the progression to engineering degrees and into the engineering workforce, which underpins much of our industrial capacity. But it does not just have an impact on the workforce who go through HE: being taught physics well, even to GCSE, supports analytical, technical and problem-solving skills, and it supports a wide range of occupations. The UK faces significant shortages of technicians, so high-quality physics education is an important contributor to these pathways.

It is structurally different to other subjects. It is a relatively small subject taught within a large department, so it has thin staffing margins. So one shortage—losing one teacher—can have a huge impact on the capacity to teach physics well. Around a quarter of secondary schools have no physics specialist teacher at all, and a further third have only one, which can make it really hard to deliver physics effectively.

Schools' access to specialists enables them to offer triple science. About a third of pupils nationally take triple science at GCSE, but there are much lower rates in disadvantaged schools. This inhibits the ability to deliver high-quality practical physics. So, where physics is taught mainly by non-specialists—which is around half of physics lessons nationally—fewer pupils continue with the subject post 16. As a consequence, fewer pupils progress into A-level physics, degrees and other technical routes, particularly those from disadvantaged backgrounds. So the shortage of specialist physics teachers is not just an education issue but a constraint on the supply of the physicists, engineers and technicians needed to deliver the UK's industrial ambitions.

The Chair: That is a helpful introduction.

Hari Rentala: Thank you very much for having me here. I am associate director of education and workforce, and part of my remit includes the Institute of Physics' work towards ensuring that every young person has equitable access to a high-quality physics education.

I am entirely supportive of everything that Jenni said, but I will bring a little bit of a flavour of my own to some of the key points. There are individual impacts and there are economic and societal impacts. At the individual level, I think it is generally recognised, including by the DfE, that high-quality specialist teaching is one of the most important in-school factors affecting progression in a given subject, and that is a link that has been documented on a number of different occasions. We looked at this again with a small sample in our recently published work, which confirmed that link. We found that students in schools without any specialist physics teachers were half as likely to go on to study A-level physics as those in schools with enough specialists.

The other dimension of the individual impact is that this is not equal or equitable. Students from the poorest backgrounds are three times less likely to take A-level physics than those from the wealthiest groups. It has been fairly stable for quite a long time that around 70% of A-level physics students come from 30% of schools, and they are most likely to be schools in well-off areas. There is quite a lot of overlap between areas of deprivation and areas that are less likely to have a full complement of specialist physics teachers.

That is the individual level. Jenni spoke very articulately about some of the economic and societal considerations, which are obviously very important as well. I am sure that this committee, given its remit, is very well versed in those, but I will pick out a few. Physics is foundational: it underpins productive industries in every part of England and the UK more broadly. Physics-based industries—industries that have a strong physics dimension—employ, at our last count, more than 2.3 million roles across England alone and contribute in excess of £190 billion in England every year.

Physics underpins at least four of the Government's five missions: economic growth, the green economy, the NHS and access to educational opportunities. It is also foundational to industrial development and of course contributes to a number of the IS-8 sectors. I am sure this is very close to this committee's heart. There are a number of sectors that the UK is trying to establish itself at the forefront of, and physics absolutely underpins those. Quantum is a really good example of that: there is a huge amount of investment going into quantum, and we need the skills pipeline to unlock that.

Having said all that, the last time we surveyed physics-based businesses, two-thirds said that they had previously stopped or slowed R&D due to skills shortages. So the logic model there is: fewer specialist teachers, fewer physics A-levels and fewer of the other pathways that Jenni

referred to, and in turn, that pipeline is being held back, affecting our economy and our society.

The Chair: You paint a very interesting, somewhat gloomy, picture. Thank you both very much.

Q2 Baroness Willis of Summertown: My question is about the current state of physics teaching in the UK. In 2022, we wrote to the Government and, in that letter, we noted that there is a severe long-standing shortage of specialist science teachers, especially in high-demand subjects such as physics and computing. I have read your Gatsby report and the IOP report, which do not paint a very pretty picture. What I was most surprised about is that physics shortages were worse than maths, and that people are shifting from physics teaching to maths teaching. That seems even more strange or alarming than I originally thought. Going back to the 2022 baseline, have things improved since then or have they gotten worse?

Hari Rentala: I agree with the committee's assessment. The phrasing you used—"severe long-standing shortage"—is absolutely appropriate and right. We think that there is a shortfall of around 3,500 out of an optimal number of around 10,000; if I am honest, that is relatively stable at the moment and has been for a while. Is it improving? There may be some green shoots starting to come through; I will unpack that for you a little, because I realise that that is not necessarily helpful in and of itself.

The most important messages I would like to give the committee today are twofold. First, the green shoots represent an opportunity; it is really important that the Government do as much as they can to make the most of those opportunities. The second important message is that we cannot cherry-pick individual levers and hope to solve this problem sustainably. The reason why we produced what I concede was a weighty tome on this subject is because we felt that you have to look at this issue carefully in the round, across a range of policy levers, in order to achieve a sustainable solution to the problem.

Specifically, to unpack the green shoots, I will pick out a few messages that I want to share with the committee. The first green shoot is that the Government appear to be committed to investing in retraining existing teachers; they expressed that commitment in the recent curriculum review government response. That is something to build on, but there will need to be some changes around incentives—I can talk to you about those more in the course of this session, if that would be helpful—to make the most of that and to build what is currently a CPD provision into something that helps teachers gain a genuine additional specialism.

In terms of the other green shoot I want to flag up, there are some caveats to what I am about to say; I am sure that we will explore them in today's session. Obviously, there has been a huge uptick in international recruits. As far as recruitment numbers go, if—I underline that word—the Government can make this work better for trainees and teacher training providers in schools, that could be promising. Our sense at the moment,

which we will return to later, is that it is not working as well as it could be.

That said, I do not have such a “sunny uplands”, optimistic story to talk about in that I do not see as much around the issue of retention. That is going to be key if we are to move the dial sustainably. I am sure that we will explore some of what I have said in further questions, but I hope that that gives an initial flavour of things.

Baroness Willis of Summertown: Jenni, what about you? Have you seen a difference since we wrote the letter in 2022?

Jenni French: Hari is absolutely right. Broadly speaking, there are still severe and long-standing shortages of physics teachers. This morning, we published some work with the NFER modelling the likely number of physics teachers looking forward. It shows that, under current policy, there is unlikely to be much change and more action will need to be taken. Hari mentioned international teachers, but they are not transformational. We have not fundamentally shifted the attractiveness of the career, in terms of becoming a physics teacher and staying in the profession.

Baroness Willis of Summertown: Let me move on to the second part of this question. We are going to discuss things such as international teaching and recruitment further down the line, as well as pay. However, on the major factors behind the shortages, which we will not be covering later on—at least, I hope my colleagues do not think so—why do other countries not seem to have this problem of physics teacher shortages? Why are we unable to bring them here? What are we doing wrong? What major factors in the UK are creating this shortage?

Jenni French: Other countries do have the same problem that we have, by and large. We are not unique. What is special about physics, as I am sure Hari will agree, is that there are not that many graduates. So the pool from which you are trying to recruit physics teachers is relatively small. Every time we do not recruit sufficiently, the target goes up; it continually goes up but the pool is not getting any bigger. You have a relatively stable pool of physics graduates, and physics teachers leave more quickly than other teachers. You have a continuing problem where the deficit does not really change and you are never tackling it.

Baroness Willis of Summertown: If we are able to get a large number people applying internationally, does that not suggest that the pool internationally is bigger than the pool we have here?

Hari Rentala: In theory, yes. We will explore this in much more detail in the relevant question. At the moment, we do not have systematic evidence on this at the IOP, but we have reservations about how many of those internationally recruited teacher trainees are able to convert into employment in the state sector.

Baroness Willis of Summertown: I do not want to jump into that

question. I am asking more about the shortages we have here and whether we can learn something about those.

Hari Rentala: May I comment on that? I will do a system-level bit then a physics-specific bit.

I start by echoing what Jenni said. There absolutely are challenges with the attractiveness of teaching as a profession. Part of the underlying reason for this ongoing, long-standing issue is our retention problem. There, we are an outlier. We are one of the worst in the OECD in terms of the average experience of a teacher, and this is not specific to physics. In England, average experience is 13 years; in the OECD, it is 17. That is an issue.

The physics-specific bit is a little harder to pin down. There are probably multiple factors at play. One of them is to do with having to teach outside the sciences. You mentioned physics teachers being more attracted to maths; that plays into this point. There may also be something in there around employability outside the teaching profession.

However, the issue here is ultimately one of retention. The important message to take away is that we naturally tend to think about the issues affecting recruitment and retention, but, in reality, there is significant overlap between the factors that drive attrition and those that would enhance the attractiveness of teaching as a profession for new graduates and other pathways.

Baroness Willis of Summertown: Do you want to add anything to that, Jenni?

Jenni French: No; that is right.

Baroness Willis of Summertown: The final part of this question is: are there significant differences between state and private schools? Are you seeing that coming through in terms of teacher retention and people being prepared to teach physics?

Jenni French: Hari previously mentioned the figures on disadvantage and the differences. Absolutely, we see those differences. The unevenness of the distribution is part of the big problem. The unevenness of specialist teacher provision and the unevenness of progression post 16 are real concerns.

Baroness Willis of Summertown: Is there a reason underlying that, in terms of state versus private? Is it behaviour?

Jenni French: We did some analysis looking at job vacancies. We see that schools in challenging circumstances, however you want to define that, are much less likely to advertise for a specialist teacher. We do not understand why that is, but we suspect that it is because of a history of not being able to recruit them. They have started not to ask for specialist teachers and instead say, "We have a science teacher vacancy. We'd like

a science teacher to come and fill that". Of course, these physics specialists are scarce and can get the type of job they want, so they are less likely to apply to those schools. We are in a bit of a circle. We need to break that cycle somehow, so that specialists end up in the schools where they are most needed.

Hari Rentala: I absolutely echo all of that. It boils down to the fact that teaching is a difficult but rewarding profession, and few people are going to volunteer to make their lives even harder than they already are.

I want to comment on how you define schools in challenging circumstances. I want to make a link there to our calls around retraining, because it may be particularly difficult to get physics specialists—either new or experienced ones—into those schools. It is arguably far easier, and certainly more cost-effective, to support established teachers in that school who are already committed to it to retrain and gain an additional specialism. That would be our response to that set of challenges, rather than trying to pull people into the system afresh.

Baroness Willis of Summertown: I admit that an old friend of mine leads a science department in a large state school and has done so for 30 years. I am hearing all the things you are saying, but she said that the problem is Teach First. In that school, it is Teach First then, "Do something else". The system does not work and has broken down.

Jenni French: That is right.

Q3 ***Baroness Walmsley:*** I would like to ask you about the targets for the recruitment of students into initial teacher training. Before I do so, I apologise for the fact that I will have to leave the committee after you have answered my question.

There has been a long-standing failure to meet targets. You are telling us that, currently there is a 3,000 shortfall against a target of 10,000, but there have been policy responses. Can you tell us why they have not worked to reach the targets and how you think the policy responses should be changed or improved to reach the targets that we need to reach?

Jenni French: The way you phrase the question is exactly right, because what you are talking about is the number of physics teachers we need to deliver physics effectively, which is 10,000, and the shortage is 3,000. For too long, government targets have focused on how many teachers we need to recruit. Of course, that is not the real problem. We do recruit teachers; last year, we recruited over 1,000 potential trainee teachers. The problem is how we ensure that those teachers go into the classroom and stay there. It is about switching the focus from solely recruitment targets to making sure that we think about the teacher supply target.

Hari Rentala: I would echo that. It is a small point, but there was a very deliberate reason why we referred to "the 3Rs: Retention, Recruitment and Retraining" in the title of our report. It was because we felt that that

was where the emphasis was missing. I echo everything that Jenni said, but I would just add one further set of points.

We surveyed physics graduates who chose not to go into teaching to find out what their reasons were—this was self-reported, obviously. There were multiple factors, as you would expect: concerns about managing classroom behaviour, the perceived status of teaching both within government and by society, having to teach out of specialism, lack of autonomy, lack of flexibility, and pay and progression. That gives you a sense of the spread of factors at play. If you think about it, it will also not surprise you if I say that those factors which switch some graduates off from teaching overlap very heavily with the factors affecting retention as well. That just reinforces Jenni's point.

Baroness Walmsley: I am not going to dig into retention, because I know that Baroness Young will ask you questions about that later.

Q4 Viscount Stansgate: Welcome. We have heard that closures of maths departments in post-1992 universities due to financial pressures on those universities have threatened the supply of mathematics teachers. Does the same apply in physics?

Hari Rentala: The IOP undertook separate work looking at the financial sustainability of physics in HE—I am sure this was brought to the attention of this committee—published in September last year. The headline finding, which I fear is rather gloomy, was that, at the time of that survey, over a quarter of university physics departments said they expected to face possible closure within two years. That is a very challenging statistic, clearly. Our call in that area was for a plan to stabilise, strengthen and sustain university physics. That is the context.

Relating this to teacher training—I think Jenni has already said something on this—physics graduates are absolutely an important feeder for physics teacher training alongside subjects such as maths, engineering and so on. Roughly 5% to 6% of physics graduates, about 4,000 UK-domiciled in a given year, go into teaching. That is broadly similar to the other sciences, but far less than some other subjects such as humanities. The domestic physics teacher training intake is roughly half physics graduates. The natural consequence of that is that, if there were to be significant closures and there was a knock-on reduction in physics graduate numbers, we would expect to see that play out in reduced recruitment. But I do not have any data on whether that is specifically linked to particular subsets of the university or HE landscape. I do not think we see particularly strong patterns in that regard.

Jenni French: I agree with everything that Hari says. If the post-1992 universities close down, you might find that, as a higher proportion of teachers come from those universities because universities such as Imperial, Oxford and Cambridge are more likely to send a higher proportion of their graduates directly into industry or academia, it could have a disproportionate knock-on effect, similar to the maths situation.

Viscount Stansgate: How would you summarise the current state of physics degrees and teacher training courses, given the huge financial pressures that universities are now facing?

Hari Rentala: That is a good and valid question, but I am afraid we have not undertaken a systematic review of teacher training in HE at this point in time. We started with physics departments in HE as the initial priority. The link I would draw here and the thing that is probably worrying me—and, I suspect, Jenni, to a lesser or greater extent—is the impact on teacher training providers of that significant uptick in international recruitment. It is a vast number of applications that they are having to deal with, orders of magnitude bigger. Real people are having to review these, interview and everything else. I worry how long some tutors will be able to keep up and cope with that.

Jenni French: I agree. I am sure we will come on to that.

Q5 **Lord Lucas:** Are there any schemes that allow physics graduates to retrain as teachers as a career change, particularly later in their career? Do we offer a syllabus and practice in physics which would be attractive to such a person, or is it still too cramped, old-fashioned and really hard to vary? If we are looking at taking existing teachers in other subjects, what is the first thing the Government should be doing to make it easier for them to requalify as a physics teacher?

Jenni French: Career changer routes are an important but underused source of physics teachers. I am sure you will all be aware that Now Teach, the scheme to support career changers into teaching, has recently had government funding cuts. But its results show that, although physics teachers are quite a small proportion of its cohort, they have better retention than other teachers. It finds that 68% of its teachers are still in teaching, as opposed to 40% to 50% of other teachers, five years down the line. As we said before, these career changers can bring valuable experience from industry into the classroom, which is always very helpful.

However, the main concern for these career changers is not that there is not an interest or that they cannot make good teachers, but that the conversion rate from application to going into the classroom is quite poor. More work could be done in supporting those career changers through that process—if it is not through Now Teach, which has had its funding cut, then some way to support those teachers in other ways.

I will let Hari pick up on the conversion courses, because I know that they have a lot more detail, but one thing I want to say about conversion courses and retraining of teachers is that there is no way of counting them in the school workforce census at the moment. The only way we count specialist teachers in schools is when you become one as you enter the system; either you have a physics degree or you do a physics QTS and you get QTS through becoming a teacher. You cannot ever become a specialist in the data because you have done an enormous amount of professional development or training. That is a bit of a blocker on

incentivising the individuals, the schools and the system to put more money into this retraining process.

Hari Rentala: I would echo that. We are a relative outlier in that QTS is a stand-alone thing without a subject attached to it. I made a point earlier around the retraining provision and the commitment to funding from government being welcome but needing to look at incentives. This is an example of the sort of incentives that are really important, to shift it from being a high-quality, intensive CPD course into something that is genuinely recognised by senior leaders in schools and the education system as a whole as an additional specialism.

The other thing I might flag in this space is that they pick up people at different points in their careers. It would be remiss of me not to mention subject knowledge enhancement briefly. Typically, whereas retraining is in-service for established teachers, subject knowledge enhancement is typically pre-teacher training for those who do not have sufficient physics subject knowledge but want to pursue, for example, a PGCE with physics. That has to all intents and purposes withered over the last decade-plus. I think in 2012 the long-form 24-week course, which is a good-quality course to equip people with the subject knowledge they need, had around 200 people per annum going through it. In the last few years, that has been lowered to fewer than 10. So that is one dimension.

It is not quite the same as later career changers, but certain engineering disciplines are potentially fertile ground for physics teacher trainees. Obviously, a very small proportion of those currently actually go into physics teaching. There have been some nascent attempts to try to recruit more effectively into physics teaching even a tiny fraction more of that pool of over tens of thousands of engineering graduates, because the returns on that could be quite significant. Those are slightly different takes on the career changer point, but I thought they might be relevant.

Lord Lucas: Who should be taking responsibility for doing the sort of things that you are suggesting should be done?

Jenni French: A lot of the responsibility lies with the Department for Education, particularly in terms of those statistics, understanding how the school workforce census works and how we collect what a specialist looks like. There is obviously a role for the professional bodies, like the Institute of Physics, to define what that means and to say what the bar is to have sufficient specialist subject knowledge and pedagogy, but it primarily lies with the Department for Education.

Hari Rentala: I would echo that. Ultimately, it is not just funding levers—although funding is obviously a part of it—but about the policy framework within which schools are expected to operate. Exactly as Jenni says, we as the Institute of Physics are open to conversations about some form of assurance or certification process where we look at that retraining provision and say that this actually equips someone to be a

specialist teacher, and we can stand behind that as the Institute of Physics. That is a conversation we are absolutely open to.

Q6 Baroness Young of Old Scone: You very much put emphasis on the retention thing rather than the recruitment thing. All of this reminds me of what the debate used to be—and still is, to some extent—in nursing, where it is like a bath where you are pouring the water in the top but the plughole is not blocked. Do we know where the folk who are running out the plughole go? Why do they go? Is there enough systematic work to establish from people who are going through that experience what it would take for them to stay?

Jenni French: Essentially, physics teachers will leave for the same reasons as other teachers: workload, behaviour and accountability pressures. But they leave at higher rates, because they have stronger outside options outside of teaching. We have some recent evidence that is soon to be published with UCL, which looks at the motivations for going into and staying in teaching. It suggests that STEM graduates are slightly more motivated by pay than other graduates, who tend to be slightly more motivated by workload, but it is marginal.

Really, it is about all these issues together. But it helps to explain why physics teachers can be particularly responsive to pay. We know that early career retention payments are starting to work, and we have seen some evidence that the number of physics teachers leaving after their first year is dropping slightly, which is a good way of taking things forward. But none of the issues being used is adequate to address the scale of the problem at the moment.

Hari Rentala: I am not going to disagree with anything that Jenni said but I might spotlight a few things within that. Front and centre would be workload and well-being issues, which remain stubbornly problematic. OECD data suggests that at the time this data was gathered, teachers in England work an average of 47 hours per week. That is eight hours more than the OECD average of 39. That may have come down a little bit, but the difference is still there. That is sizeable.

The other thing I will draw out is that I am afraid that teachers also frequently cite issues with senior leadership as a key factor. One study we looked at actually ranked senior leadership as the leading factor. For early career teachers, that might manifest as an oppressive surveillance culture. Issues might manifest for more experienced teachers as a lack of agency or autonomy, where they are expected to teach to a given set of constraints that diminishes their sense of agency and professionalism. So, workload and well-being are absolutely issues.

I echo the point about early career teachers. Early career teachers tell us they want more subject-specific support. Our sense from the work we have done delivering the teacher training scholarships for physics, which is a little bit more anecdotal, is that having access to that subject-specific support seems to make a difference. If so, why is it that only the 170-odd scholars who received the scholarship get access to that, when it is not,

in the schemes of what we spend in this area, a vast amount of money? I support the points around the value of financial incentives in retention as well.

Q7 **Baroness Neville-Jones:** You mentioned CPD just a moment ago in the context of teacher training. More generally, could this area be helpful in the quest for greater retention? If that is the case, we also have the impression that that is one of the areas where the Government will take a swipe at the funding if money is short. So, one gets into consistency of policy. But what do you feel about the role of CPD, particularly for physics, which is the sort of subject which is certainly transferable to industry? It would be interesting to get your view on whether it could really be very helpful in a subject of this kind.

Jenni French: You are right. Government funding for subject-specific CPD has been cut significantly recently, and for shortage subjects such as physics, that is likely to be counterproductive in the long run. We know that high-quality professional development is associated with retention. It supports confidence, professional identity and career satisfaction. We have evidence from working with Teacher Tapp and the Teacher Development Trust which shows that teachers value this subject-specific CPD, as Hari just said, and they value it more highly than generic training, particularly in STEM subjects.

The Teacher Development Trust's most recent report, *The CPD landscape in 2025*, shows that 40% of teachers and school leaders think the CPD they undertake has no impact on their practice, that it is too generic and compliance driven and there is no follow-through to help embed it. Two-thirds of respondents who said they were going to leave in the next three years thought that more personalised CPD would help them to stay. So, it suggests quite clearly that the professional development we are providing is not responding to the needs of the actual teacher.

The recent government funding has largely focused on these universal frameworks: the early career frameworks and NPQs. That has brought greater consistency across the system, which is welcome, but evidence suggests that they are much more effective if they are delivered in a subject-specific, well-contextualised way. If it feels generic or disconnected, it is not going to support them but will add workload. So, rebalancing some of this investment could be a relatively low-cost way to improve retention and reduce the need for repeated recruitment.

Baroness Neville-Jones: How does it need altering if it is not serving the purpose that it could?

Jenni French: As Hari mentioned, the great thing about the scholarships that physics teacher trainees get is that it is a much more subject-specific support. The early career framework is great—it gives people some generic skills—but thinking about that in a more subject-specific way could be really helpful, particularly to those physics teachers who might not have another specialist in their school. If they are the only physics specialist in their school, they are going to be even more isolated than a

maths teacher. Even though there are shortages of maths teachers, you are unlikely to be the only maths teacher in the school, so you do not have that support from within the school.

Hari Rentala: To echo everything Jenni has said, very articulately indeed, as a summative point, the emphasis of the early career framework has perhaps shifted too much away from retention through to that focus on a uniform programme of preparation. There are benefits in that, but we know that teacher trainees would value more subject-specific support. It is a policy choice as to how much of that is actually funded.

Q8 **Lord Drayson:** My questions are really probing issues around bursaries, pay and retention payments. In my work building science-based enterprises, I am very aware of how competitive and difficult it is to recruit physics graduates into businesses. So, in probing this in a bit of detail—if we could just take bursaries, then retention payments and then pay—we have had schemes to provide teachers with quite generous bursaries to encourage them to do teacher training. Have these worked? Should we keep doing them?

Jenni French: The short answer is yes. Evidence shows they are effective at recruitment, and we have done some evaluation of bursary policy, which showed that the trainees who received a bursary are just as likely to progress into teaching as those who did not receive a bursary. They are genuinely helping people enter the classroom; it is not just paying people to do their teacher training. So, particularly where recruitment is challenging, they definitely help. But, of course, they are not the same as paying people more. As you said, they are a one-off tool, so they cannot be seen in isolation.

Lord Drayson: So they are not a replacement for the pay issue.

Jenni French: Absolutely.

Lord Drayson: But in terms of the incentive to encourage people to train, have we got the balance right between the investments being made in those bursaries and other measures to encourage people to train?

Hari Rentala: The evidence suggests that if you increase the bursary a bit, you will increase the pipeline a bit, and the same in the inverse. I would zoom us out to the fact that at the moment, with the current levels of retention, recruitment cannot keep up. Therefore, I would argue, it would not be a sensible course of action to tinker with the bursary, which may further diminish recruitment, when actually, to speak to your comment earlier, we are trying to hold on to water in leaky hands. I would take the view of urging a bit of caution against looking at this as a zero-sum game. I know that government finances are so, ultimately, but we need to take a systemic approach to looking at this. Robbing Peter to pay Paul is probably not going to serve us in the short or medium term.

Jenni French: There is an argument that you could increase the bursary slightly; it is not an ever-increasing pool, but you could probably increase it slightly and pull in a few more physics teachers.

Lord Drayson: That is helpful. What we are hearing, I think, is that these work so we should keep doing them and, if anything, make them a bit more generous.

Jenni French: Absolutely.

Lord Drayson: Do retention payments work? Are they at the right level? Should we keep doing them?

Jenni French: Again, retention payments work; there is evidence for this. At the moment, we are seeing in the evidence coming through a slight decrease in the number of teachers leaving after their first year, which is great. The modelling I mentioned, which we published this morning, looks at what might happen if you increase those retention payments. There is an argument there for giving retention payments to teachers not just in some schools but in all schools in the first five years of their teaching, possibly even extending that to their first 10 years of teaching. That would be a relatively cost-effective way of increasing the pool of physics teachers.

Lord Drayson: Hari, you are nodding.

Hari Rentala: Yes.

Lord Drayson: I turn to the big one: pay. This committee has previously commented on the clear need to provide a differential to physics teachers. It is interesting that the current starting salary for a physics teacher is evidenced as being 27% below the average starting salary of physics graduates; that contrasts strongly with the experience of English and PE teachers, who are better paid as teachers than in other professions. Can you give us your views on what you think should be done about pay? We are particularly interested in the capacity—or otherwise—of state schools to be flexible on pay in order to ensure that they can recruit and retain suitably qualified physics teachers.

Jenni French: Differential pay sounds very attractive in principle but, in practice, it is quite difficult to implement; that is why these early career retention payments can do the same job effectively without introducing some of these issues. Of course, it is all a trade-off. Pay across the system is a great attractor, but it is incredibly expensive. Targeting that money through either differential pay or retention payments, as you suggest, makes a lot more sense in a fiscally constrained environment.

What could be better is that the early career retention payments could be better publicised so that teachers know that they exist and that they could be part of the package they are expecting. Because policy changes regularly, it may not be clear to someone entering teaching that they might get this pay. More could certainly be done to make sure that

potential physics teachers are aware of the retention payments they could receive.

Hari Rentala: I would echo that; indeed, I would probably build it out slightly. What we have found is that awareness of teaching as a career, of bursary offers and so on is quite good, but awareness of some of the other offers—including our scholarships—is a lot lower. More could be done with that to make the most of it.

I would also echo the points around cost-effectiveness. We have looked at this through the lens of the most cost-effective route to achieving what we are trying to achieve; that would appear to be through targeted financial incentives at both the bursary and retention stages.

Lord Drayson: I can understand your argument in terms of being in a fiscally constrained environment but, looking at the bigger picture, one of the things that is holding back economic growth is the lack of physics teachers teaching people physics to enable them to contribute in careers that deliver economic growth. You say that it is difficult to have differential pay for physics teachers in the state sector. Can you explain why it is difficult in the state sector?

Jenni French: There are a lot of concerns around fairness and workforce cohesion in the classroom. Paying financial incentives centrally rather than through the school seems to moderate some of those issues and make things less difficult for schools.

The Chair: Are you saying that squaring different teachers and different disciplines is iniquitous?

Jenni French: Yes. It is certainly felt by both unions and schools that having differential pay is not desirable and that doing so could open the door to differential pay for lots of different subjects. However, these targeted retention payments essentially do the same thing.

Lord Drayson: That is interesting. So teachers' unions are against differential pay for subjects.

Jenni French: Many schools are as well.

Lord Drayson: When you say schools, do you mean head teachers?

Jenni French: Yes, that is right.

Lord Drayson: So it is the head teachers of schools. Can you make the reason for that clear to us?

Jenni French: It is about having a feeling of fairness and workforce cohesion within their schools.

Lord Drayson: Do you have the data to tell us, on average, what a physics teacher in the private sector is paid and what they would be paid in the state sector?

Jenni French: I do not have that data now but physics and maths are, I think, the only graduates for whom the average graduate salary is higher outside teaching than it is for teaching. Starting salaries for teachers are, in general, quite good.

Lord Drayson: Could you write to us with the latest data on the average pay for a physics teacher in the independent sector and a physics teacher in the state sector so that we have clear data?

Jenni French: Absolutely.

Lord Drayson: If pay is not the answer, are there any other interventions that you think would be more successful?

Hari Rentala: May I come in on that point? I understand that the focus of this set of questions has been to probe bursaries and pay. That is a really important line of inquiry but I want to bring us back to some of the comments that we made earlier around the attractiveness of the profession. I reeled off a list of reasons, including pay, that sit behind that; I would also include progression, which this committee has raised previously. There is a long list of other factors, too.

It may be that you can draw a slightly higher proportion in through better pay offers—I am sure that the evidence suggests that that is the case—but, ultimately, both of us want to make sure that a sufficient spotlight is put on wider attractiveness, which overlaps heavily with retention and which would contribute to a thriving and healthy teaching workforce.

Jenni French: That is absolutely right. It is not that pay does not matter—it absolutely does matter; there is no question about that because we have the evidence—but you can deliver that pay through retention payments rather than through core pay. There are also other ways of delivering it.

The Chair: I think that the question Lord Berkeley was going to ask has already been covered.

Q9

Lord Berkeley: I have one other question. What you are saying is very interesting but I think that many of your comments probably apply to other technical subjects, including chemistry, engineering and maths, which we talked about earlier. Is there a feeling that some of the career advice students get from schools is too much in favour of arts and crafts and media and not enough in favour of these technical things? Does that influence schools' policies, including how hard they try to recruit more teachers with the right qualifications? Have I made things completely unclear?

Hari Rentala: There are a few different parts to that question; let me try to disentangle them.

I do not think that we have looked specifically at how the quality of careers advice affects or has affected people's propensity to pursue teaching, if that is part of what your question was getting at. I go back to

what I said earlier: generally speaking, we find that awareness of teaching as a career, as well as of some of the basic incentives around bursaries and so on, is pretty high.

I do not necessarily want to take the committee on a tangent around some of the other factors that affect graduates' career choices and those sorts of things. The attitudes of teachers in schools will be one of those factors, as will the attitudes of parents, carers, other peer groups, social media and so on, but that is probably straying outwith the scope of what we want to talk about today. This is not something that, to date, we at the IOP have bubbled up as being a major thing that we feel we want to spotlight, but I understand where the question is coming from.

Jenni French: It is a good question because, first, we know through the Gatsby benchmarks that careers advice in schools is improving and that all schools are starting to think about careers in a much more structured way; that is a great thing.

Of course, there is the issue that, if there are fewer specialist teachers in a subject, the non-specialist teacher may be less able to inspire a young person in the whole field of that subject. If you are taught physics by a biology teacher, naturally they do not have the breadth of knowledge that might inspire some young people to go and study the subject further. It will have an impact in a roundabout way, even if it is not explicitly recognised by the school that specialist teachers will inspire progression.

Hari Rentala: That is a good point; I absolutely support that.

Q10 **Lord Ranger of Northwood:** Do physics teachers have to be physics graduates?

Jenni French: No, they do not have to be physics graduates, but they have to be graduates because teaching is a graduate profession. Engineering is a very good match for a physics PGCE.

Lord Ranger of Northwood: On your point about inspiring, is there a process of bringing part-time teaching in from industry? If there are more physics-capable people out there, can they do some part-time training or teaching? Has that been looked at?

Hari Rentala: The issue and the barrier there is ultimately that teaching is a specialist profession and, rightly, it is a significant undertaking to become sufficiently qualified to do it well. Then there is a curve in building up experience. So the barriers to doing that as a part-time endeavour are fairly significant.

Jenni French: It would be interesting to explore that. It happens more in FE: people come from industry and work in FE. It would be great to explore that. There would have to be some consideration of how it would work with the school and the employers, but it is definitely interesting.

Lord Ranger of Northwood: Mr Rentala, you mentioned that there has been some way of managing government recruitment numbers through

international recruitment, but there are some challenges there about unsuitability. How has that manifested itself? Do we have the right balance between domestic recruitment and international recruitment? What can the Government do to make sure that we get the right kind of teachers if we are recruiting internationally?

Hari Rentala: It is absolutely correct that the conversion rate of international applicants into trainees is low. It is much lower than it is for domestic applicants. It is really important that we recognise that teacher training providers tell us that, after that sifting process has taken place, those they accept on to their training programme tend to be very high-quality candidates who are highly qualified, passionate and capable—with the right support to acclimatise to the different system and cultural context. That is an important point to acknowledge first.

As things stand, about 60% of this year's physics intake is international, which is a huge increase on previous years. Within that time, the UK-domiciled recruitment figures have, depending on how generous you want to be, either stagnated or actually slightly declined. So, on a basic level, that is not a very healthy place to be, but I will take a step back: if we could solve, or at least meaningfully improve, the issues with retention, the sorts of numbers we are currently achieving, even domestically, would go a long way to maintaining a healthy workforce. It is because attrition is so high that we are trying to top it up from somewhere else.

Jenni French: That is right. As Hari said, 682 international trainees started this year, so it is materially helping. I hope some of you have seen our *Filling the Gap* study that we published with the ASE, which looks specifically at the international trainees. As Hari said, the volume of applicants is incredibly high and providers are really burdened by that. But, once you can get through that sifting, there are some really great teachers in there. International teachers absolutely can help fill some of that gap until we can fix the retention problem, and that is how we should see it. This should not be a long-term solution. Ultimately, we want it to be a complementary solution, but for the moment we are having to use it to fill this gap.

We do not have any comprehensive data about whether these international teachers who start their training and complete their training go into schools. That is missing, which is a big miss from Government. But the best guess from surveying providers is that about half of those who started their training in 2024 went into schools in 2025, and the rest cannot find a job. So, just to be clear, 682 are starting their training this year, and my best guess is that less than half of those will get a job because the number of schools able to sponsor a visa will not be sufficient. That is an enormous number of trainees we are training who will not go into teaching.

Hari Rentala: It is a waste of talent and investment.

Jenni French: It is a waste of money and of these poor individuals' time when they have been promised the opportunity to teach.

The Chair: Is there a trend in the data? Is any particular country providing the majority of those 680 people?

Jenni French: It tends to be Commonwealth countries, but I do not have the exact breakdown.

Lord Ranger of Northwood: My next point follows on from that. It is about government policies and how they work to either support or not help this recruitment avenue. The Government are obviously pursuing various policies to reduce overall immigration: targeting international students and increasing the salary threshold for skilled workers. Are those groups of policies and measures having a substantial impact on the ability to rely on the recruitment of teachers or trainee teachers from overseas?

Jenni French: One of the big issues is that the graduate visa, which is an option if you cannot find a school to sponsor your visa, has reduced from two years to 18 months. But of course, the induction period for a teacher is two years, so it sits totally at odds with whether you can get into school. The process for schools is incredibly unwieldy, and they find they just cannot sponsor visas—or perhaps they go a long way down the line and withdraw a job at the last minute because it is just too much work to sponsor the visa. So all of the policy is at odds. If the Government want to use this great pool of potential teachers to fill this gap in our classrooms, they have to sort out this policy from beginning to end and have a coherent system.

Hari Rentala: We did some estimates and found that only around 10% of schools were actually sponsoring visas. That tells you the scale of the challenge that these new recruits face. There is a range of complexities and issues in this area but, even within the constraints of the visa regime and the policy challenges that Jenni outlined, the IOP's view is that there still has to be a way to make it work better for teacher trainees, IT providers and schools. At the moment, it feels like not enough effort has been put into helping the system, as it stands, work better for those three groups.

Q11 **Baroness Young of Old Scone:** This is a long shot, but most universities are now churning through visa support in a fairly systematic way. Is there a case for some sort of service to be provided to schools? Universities are being asked to outreach into their communities, but this would be one way of helping, quite frankly. That figure of half of all trained teachers not getting a job is just bonkers.

Baroness Neuberger: I will come in on that because my question is in that area. Is there any way when the schools are part of a group? For example, my son is a head teacher in the Ark group. Is there a way that the groups could take on the visa sponsorship? For local authority-maintained schools, could the local authority take this on? It is absolutely

ridiculous and a complete waste.

Jenni French: You are right; the system needs to be better. Multi-academy trusts do a better job than individual schools, but there could definitely be more support to schools to help them through that process.

Viscount Stansgate: You said that 10% of schools are sponsoring visas. Do you know anything about the difference between the state sector and the independent sector in that very small number of 10%? Is it mainly those in the better-off private sector, for example?

Hari Rentala: I have not got any analysis on that, I am afraid, but one point I should probably clarify is that I think that data was based on state schools. As an emphasis, we tend to focus more on the state sector than the independent sector in our analysis, so I think that figure relates to the state sector.

Jenni French: That is right.

Q12 **Baroness Northover:** This is obviously a very important area. I will backtrack to the initial numbers and ask you about the Erasmus scheme. Do you think that this will have a positive impact on the international recruitment of teachers?

Hari Rentala: To be honest, we have not looked at that in particular detail. The contextual bit of information I would flag here is: as things stand, EEA-domiciled recruits make up a pretty small proportion of the overall numbers. What we have at the moment, for the time being, is not a shortage of people interested in applying. That is not where the bottleneck actually exists; it is the conversion rate into employment and teaching that is the issue.

Baroness Northover: Prior to Brexit, was there a different pattern in people coming in?

Jenni French: There was a different pattern of trained teachers coming in. Physics teachers who were trained in the EEA might come and work in the UK, for example. There has been more of an issue with language teachers, and languages struggle from this more than physics does.

Hari Rentala: I am sure that the committee is aware of this but the big change that we have seen, with regard to the huge uptick in non-EEA international recruits, relates to a policy change around bursary eligibility. Flipping that switch is what has resulted in these changes. It was, what, a few years ago now?

Jenni French: Yes. In 2022, an international relocation payment was given to physics and languages trainee teachers in order to enable them to pay their up-front visa costs. That has since been withdrawn—it was up to £10,000 but it does not exist now—but the bursary that can be claimed for physics is £29,000. However, that bursary has to pay for international university fees, visa charges and the health surcharge. So it is not substantial, but it does enable some people to come and train.

Hari Rentala: In 2022-23, the number of non-EEA internationals was 40; in 2023-24, it jumped to 192, and we are now at 607. That gives you a sense of how quickly that number has increased.

Q13 **Baroness Northover:** The second part of what I was going to ask about, which you have covered, concerns the disincentives that exist in terms of visa costs and the crazy situation of schools regarding those. Do you want to add anything to what you have said previously, because this is a very important issue for us to be aware of?

Jenni French: The only thing I would reiterate is that it is potentially a great source of teachers. We need teachers—there is definitely the demand—but, at the moment, the system is not fair for the providers, which have to do an enormous amount of work. That needs to be fixed. It is also not fair for the trainees, who often face quite a lot of financial and personal hardship to train in England and then have to go home without getting a job; nor is it fair for schools and pupils, who cannot get the teachers they desperately need. We are almost there—we just need to fix those little bits to make the whole system work.

Baroness Northover: Are they able to bring in their dependants? Suppose you have a male physics teacher with a wife and a couple of children, or a female one in a similar situation. Can they bring their dependants in?

Hari Rentala: The short answer is that I am not sure.

Jenni French: I do not know.

Lord Drayson: I just want to make sure that I understand this crazy situation accurately. What you are saying is that the Department for Education is paying £29,000 to incentivise international students to come to this country in order to train as a teacher, but the Home Office then stops them getting a job.

Jenni French: In summary, that is about right.

Hari Rentala: That is technically accurate but it is probably worth being clear that it is paying anyone £29,000 to go into teacher training. The shift was that it opened up eligibility to international applicants. It is not a special—

Lord Drayson: But the growth has been in international students?

Hari Rentala: Absolutely.

Jenni French: Yes.

Baroness Northover: Would you be able to find out whether they can bring in their dependants? I know that this applies in other areas; for example, where people are doing master's degrees, they cannot bring in their dependants, but they can do so if are doing a PhD. That could be having an influence because I would imagine that these people often

have, say, young children.

Jenni French: You could well be right but, as Hari said, the demand is not the problem; the real bottleneck is in the jobs.

The Chair: We have almost reached the end of this session. You have both been terrific—thank you. Baroness Neuberger will now ask the final question.

Q14 **Baroness Neuberger:** What recommendations would you make to the Government? You have told us quite a lot of them, I think; things are pretty clear, including the fact that we have a completely bizarre system in which we are bringing people over here to train and work in our system but our schools cannot sponsor the visas. It is crazy, obviously.

You, Ms French, said, “We’re almost there”. If you were to write to the Government and ask, “Can you sort it?”—as we will do—what would you tell them they absolutely must do speedily?

Jenni French: I would group my recommendations into four themes. First, physics has been missing its targets for a long time. This is a long-term problem so we need a long-term strategy; a series of quick fixes will not the problem.

Secondly—this has come up quite a lot—we need to prioritise retention over recruitment. Recruitment on its own is not going to solve the problems.

Thirdly, financial incentives work. We need to make them targeted and look at all of these different levers together.

Finally, I turn to international recruitment. It should be a complement, not a substitute, but we need to make sure that the system is coherent from visa policy right through to training, induction and employment.

I would also add that physics teachers are part of this wider skill system; that is why this issue is so important. The decisions that we take today will shape whether we have the capacity to deliver on our industrial ambitions in 10 or 15 years.

Hari Rentala: May I offer some comments? Again, I absolutely do not disagree with Jenni, but I would emphasise a few key areas.

This is a long-standing, wicked issue, but it does not have to be intractable. I echo Jenni’s point that it needs a long-term, coherent solution—not one that cherry-picks individual levers that are, for whatever reason, easier to address. Also, retention needs to be improved substantially for realistic levels of recruitment to maintain a thriving, healthy physics-teaching workforce.

In the meantime, if we can make international recruitment work better for trainees, teaching training providers and schools, that will help, as will—I emphasise this from my own perspective—proper investment in

teacher retraining and the right incentives to recognise that as an additional specialism.

The bit I have not said, which brings all of this together, is that we have done a lot of thinking on this matter; it is in our 3Rs report. We think that all of this could come together in a 10-year plan that would cost something in the order of magnitude of £120 million over those 10 years. The crucial point is that, as that plan is being implemented and our reliance on recruitment decreases because retention is improving, the plan starts to pay for itself; by the end of the plan, in fact, we would be delivering £8 million of annual savings from a healthier, thriving workforce. Over time, if we can commit for that long, it washes its face as well.

The Chair: I thank you both very much for coming. You have answered lots of our questions; we are very grateful to you for appearing before us. Speaking as an engineer, I do not underestimate the importance of physics; you have both been excellent at emphasising that as well. That concludes today's public session.