OFFICIAL REPORT
AITHISG OIFIGEIL

Education and Skills Committee

Wednesday 5 June 2019

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Wednesday 5 June 2019

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EDUCATION AND SKILLS COMMITTEE
19th Meeting 2019, Session 5

CONVENER

*Clare Adamson (Motherwell and Wishaw) (SNP)

DEPUTY CONVENER

*Johann Lamont (Glasgow) (Lab)

COMMITTEE MEMBERS

*Dr Alasdair Allan (Na h-Eileanan an Iar) (SNP)
*Jenny Gilruth (Mid Fife and Glenrothes) (SNP)
*Iain Gray (East Lothian) (Lab)
*Ross Greer (West Scotland) (Green)
*Gordon MacDonald (Edinburgh Pentlands) (SNP)
*Rona Mackay (Strathkelvin and Bearsden) (SNP)
*Oliver Mundell (Dumfriesshire) (Con)
*Tavish Scott (Shetland Islands) (LD)
*Liz Smith (Mid Scotland and Fife) (Con)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Susan Boyd
Andrew Bruce (Scottish Government)
Elisabeth Kelly
Ian Menzies (Education Scotland)
Dr Emma Woodham (Glasgow Science Centre)

CLERK TO THE COMMITTEE

Roz Thomson

LOCATION

The Robert Burns Room (CR1)

Scottish Parliament

Education and Skills Committee

Wednesday 5 June 2019

[The Convener opened the meeting at 10:00]

Decision on Taking Business in Private

The Convener (Clare Adamson): Welcome to the 19th meeting of the Education and Skills Committee in 2019. I remind everyone to turn their mobile phones and other devices to silent for the duration of the meeting.

I refer members to my entry in the register of members' interests. I am the vice-chair of the Scottish Schools Education Resource Centre and a member of the British Computer Society.

Agenda item 1 is a decision on taking in private a discussion of the evidence that we will hear today. Are members content to take that business in private?

Members *indicated agreement.*

The Convener: Can we also agree to take future consideration of evidence for the inquiry in private?

Members *indicated agreement.*

Science, Technology, Engineering and Mathematics Inquiry

10:01

The Convener: Agenda item 2 is the committee's inquiry into STEM in early years. I welcome to the committee Susan Boyd, a primary school teacher; Elisabeth Kelly, a principal teacher; Andrew Bruce, the deputy director of the learning directorate of the Scottish Government; Ian Menzies, a senior education officer in sciences learning at Education Scotland; and Dr Emma Woodham of Glasgow Science Centre. I extend a warm welcome to you all.

I ask you all to give a brief outline of your experience in the area. It would be great to get a good example of STEM innovation.

Elisabeth Kelly: My name is Elisabeth Kelly. I am a principal teacher for early years in Midlothian Council, and my role is primarily to support, challenge and help to improve all of our early learning and childcare centres—both state-run and funded providers. I have an interest in STEM because I am interested in all early years learning, and we have a very holistic approach to the curriculum in early years. I am studying for a masters in learning for sustainability at the University of Edinburgh.

There is a massive opportunity to engage children in STEM when they are young, because they are already totally interested in their world—how it works, why things work and all that kind of thing. It is about helping our staff to capture and understand that, so that they can scaffold and progress the learning in early years.

Susan Boyd: I am currently a primary teacher at Breadalbane academy, in Aberfeldy, but I have over 40 years of experience of working with children and was formerly a principal teacher of early years in Highland. I studied science at the University of St Andrews, and I got into primary teaching specifically to promote science through providing greater and quality experiences of it in early years and primary education.

I am really pleased to report that I have seen a lot of wonderful practice, particularly in early years. When I was in Highland, I had the opportunity to support a small cluster of nurseries and 33 principal teachers in a new programme that Highland rolled out and ran for five years until, sadly, budgetary cuts changed that perspective. In those five years, we gave absolutely essential support to early years practitioners who were not qualified teachers and who had very varied experiences in science, technology, engineering

and maths. I had the good fortune to work with a range of practitioners to develop the Highland science programme, which is now available on glow and is a really big tool in providing support from early years through to secondary level.

My work with Breadalbane academy over the past four years has involved trying to develop a STEM hub within our community school. That has been particularly successful—last year, we were finalists in the Education Scotland STEM awards—and we are promoting the development of STEM through STEM ambassadors in secondary schools, through STEM prefects in primary schools and through developing practitioner knowledge from early years right through primary and into secondary education by having STEM drop-ins.

Dr Emma Woodham (Glasgow Science Centre): I am the STEM learning manager at Glasgow Science Centre, and my role involves managing our multifaceted learning team. At Glasgow Science Centre, we are passionate that learning is for all, and we want to inspire and challenge everybody to discover the world around them and the relevance of science in their lives. Previously, I was a research scientist.

Today, I would like to highlight our experience at Glasgow Science Centre in providing training for teachers in our inspire and challenge philosophy, which encourages teachers to become facilitators, to develop the natural curiosity in their pupils and to build pupils as scientists rather than vessels of knowledge.

At Glasgow Science Centre, we are also passionate about equity of access. I will highlight a number of initiatives that we have been taking to ensure that we reach far and wide throughout Scotland—everywhere from Orkney down to Dumfries and Galloway—and that we reach those who are most in need, including people in our local areas that are experiencing the highest levels of deprivation.

Ian Menzies (Education Scotland): Good morning. I am a senior education officer at Education Scotland. I lead on the sciences curriculum and on learning for sustainability, and I am responsible for the implementation of the STEM strategy. I was on the Scottish Government working group that developed the STEM strategy, and I oversee the new STEM team at Education Scotland.

One of the biggest pieces of work that we have done over recent years is the raising aspirations in science education programme, for which we have run a three-year pilot with the Wood Foundation, the Scottish Government and participating local authorities. We have worked with eight local authorities up to now, and we have extended the programme to a further four. We received a final evaluation last week, which was extremely positive and showed that the programme has increased teachers' conference, with 71 per cent of the teachers reporting an increase in their confidence in the pedagogy around STEM and 76 per cent reporting an increase in their confidence in delivering the content of science. As a result of that positive evaluation, the programme is now to be offered to all local authorities in Scotland on a rolling basis.

Another big piece of work that we have been involved in is the improving gender balance and equalities programme, which I also oversee. That pilot programme was started three years ago, with the Institute of Physics and Skills Development Scotland, to tackle the ingrained gender imbalance in STEM subjects at school. Again, that programme has been really positively evaluated, and we are extending it to schools and clusters around Scotland with the support of a new team.

Andrew Bruce (Scottish Government): Good morning. I am a civil servant in the learning directorate at the Scottish Government. The division that I lead was responsible for developing the original strategy and is now responsible for overseeing its delivery. It is great to hear from colleagues around the table about practice and what is happening in schools and early learning centres just now.

I suppose that the things that I will focus on from the Government's point of view are the arrangements that we put in place to support the strategy at a national level. Along with the Government's various arrangements to oversee the delivery, the key thing that I would identify is the introduction of the new STEM bursaries to support career change in the teaching profession in those subjects in which there are shortages. We had 107 of those bursaries last year, and the scheme will shortly reopen for the forthcoming year.

The Convener: Thank you. We have quite a big panel this morning. When you want to respond to a question from the committee, please indicate that to me or the clerks and we will try to ensure that everybody gets an opportunity.

Our first question will be from Liz Smith.

Liz Smith (Mid Scotland and Fife) (Con): Mr Menzies, I wonder if I could ask you about Education Scotland's overall strategy on the STEM subjects. You have pinpointed some examples of what you consider to be good work that is being undertaken. Will you say a little bit more about what you see as the key points in the strategy to address some of the concerns that we have been presented with through our evidence?

Ian Menzies: Sure. One of the big features in the STEM strategy is teacher confidence. We have heard that from some of the other panellists already. Education Scotland is playing a leading role in professional learning and in building teacher confidence in the system.

Last week, we published the results of the practitioner survey and provider survey that we undertook to look at the provision of STEM professional learning in Scotland. The results show that 43 per cent of the respondents from early learning and childcare agree or strongly agree that they are confident in delivering STEM. That compares with 63 per cent of respondents from primary education.

We know that we have a big piece of work to do if we are to build on those confidence levels. I mentioned that the RAiSE programme has been a big part of our work in that area over the past three years. We are really excited to be extending that programme to local authorities around Scotland in partnership with the Wood Foundation. We are grateful to the Wood Foundation for the financial support it has given to that programme, which is more than £1 million to date.

Another big piece of work that we have been doing is the grants programme that we launched in October, through which we have issued £187,000 to 24 organisations around Scotland. The focus of that programme was to extend provision to practitioners around Scotland to ensure equity of access, to develop new models and approaches and to find ways of scaling up existing provision that has proved to be successful. Last week was a big week for Education Scotland, because we launched a second round of that grants programme. We now have a budget of £1.3 million, which is really exciting. Our new STEM team is busy working with local authorities around Scotland and with school clusters to encourage them to bid for that money.

That money is for the STEM strategy, but it is also for making maths count, because we realised that mathematics and numeracy are a core part of STEM. We are really keen to have a focus on maths and numeracy. We know that we have work to do on building confidence in technologies and engineering, and we have identified those as priority areas for the grants this year. In addition to the £1.3 million that we announced last week, we are starting to distribute a further £500,000 of funding to those organisations that bid for the funding last year. The idea is that, year on year, we will see growth in the provision of professional learning within the STEM strategy. For instance, most of the 24 organisations that received funding last year will continue to extend and develop that support into this year. The £500,000 is to support that work.

Liz Smith: I am sure that all of that work is immensely encouraging.

I want to draw your attention to some of the comments that have been made to us by STEM professionals. Elisabeth Kelly, Juliet Robertson and Dr Kirsty Ross have made the point that quite a lot of practitioners have a poor understanding of certain concepts. Dr Kirsty Ross feels that, sometimes, those who have that poor understanding are not aware of it. What conversations are you having with the General Teaching Council for Scotland and the university training schools? It seems to me that some of the issues are about teacher training.

Ian Menzies: Obviously, there is an opportunity to promote that competence within teacher training. For us, it is about the whole journey of a professional from the moment that they qualify as a teacher, and RAiSE officers have been providing effective probationer support within local authorities. It is about building the confidence of early-career teachers from the word go. We also recognise that some people who have been teaching for a number of years still need that type of support.

RAiSE officers have been embedded in local authorities, working through all those different processes and opportunities and providing that support. Sometimes, that support is delivered through separate training sessions; sometimes, because we know that there can be challenges around teachers being released from the classroom, RAiSE officers have gone into classrooms and provided team teaching.

Liz Smith: On that theme, are specific issues being raised by teacher training colleges and the GTCS? Is there a problem with the knowledge that is being taught on STEM courses, or is it more about teachers not having the confidence and teaching skills? What is being flagged up as the main area of concern?

Ian Menzies: The issue is really just people going into teacher training without a background in, or experience of, science. There is a big job to be done. There is an opportunity to address that in the initial teacher education, but there is limited time with those students. A big part of the challenge is to develop experience.

I will give you an example from the grants programme. One of last year's grantees, in the first round of funds, was New College Lanarkshire. The college realised that the early learning and childcare practitioners that it was training lacked confidence in STEM, so it used the funding that it received from Education Scotland to develop a new STEM module, which is being provided to those early learning and childcare practitioners as part of their training programme, to build their

confidence. The college realised that it has a big engineering provision, and it is trying to join that up with its early years provision much more effectively. Through the course of this year, those early years practitioners will take their STEM learning into the establishments where they are doing their placements.

That is just one of the things that we are doing with the grants programme to provide early-career support and build people's confidence so that they can take it into the system.

10:15

Liz Smith: I have one final question—

The Convener: I think that Ms Kelly wants to come in on that point, before we move on.

Liz Smith: Apologies.

Elisabeth Kelly: Most of the practitioners that we work with in early learning and childcare do not go through the initial teacher education programme; they come from many other avenues, because they are not teachers. Few authorities still have teachers in early learning and childcare. There are some, but, even in those authorities, a majority of the staff in early learning and childcare settings are early learning practitioners. They may have higher national certificates, higher national diplomas or a bachelor of arts degree in childhood practice, if they are at graduate level. Some have level 3 Scottish vocational qualifications. A wide range of courses are presented within that structure but, from the research that I have done—which has been largely anecdotal, from asking people—there is very limited STEM input to those courses.

Liz Smith: Thank you. My last question is for Susan Boyd. A couple of years ago—and more recently—the Royal Society of Chemistry commented that it would like to see a dedicated science professional in every primary school. Would you care to comment on that view?

Susan Boyd: That would be lovely, and I would totally welcome it.

I will deviate slightly from the question that you asked, but I hope that this relates to it. I am happy to hear about all the development work, particularly for early years practitioners, who often come into the job with no qualification and do SVQs on the hop. My experience in Highland was that those people were supported by principal teachers who had a depth and breadth of knowledge of the curriculum and of approaches to learning and teaching right through early years and into primary. That is the only way forward, from my perspective—it worked and it was successful.

I am fortunate to work in a community school, where I have access to secondary science, technology, engineering and maths specialists, which is invaluable. Small primary schools should also have access to a STEM practitioner who has the relevant qualifications and experience, to support practice. That was the hugely valuable thing that I was involved with in Highland. We could deliver STEM training—centrally in Inverness, or in Skye for Skye and Lochaber—but the most important factor was that we were able to go into early years centres and schools and back that up with resources and team teaching to support practitioners who were either teachers or, more often, early years practitioners.

Liz Smith: Thank you.

Ross Greer (West Scotland) (Green): Ian Menzies mentioned some of the survey results on the confidence of practitioners. Roughly 43 per cent of early years practitioners and 63 per cent of primary teachers have some level of confidence in STEM subjects. Some of the written submissions that we received on that were interesting. They made the point that STEM is a broad area. We would hope and expect that a substantial majority of primary teachers would have a level of confidence in their ability to teach maths and numeracy, but it would be different for something like engineering. Does Education Scotland, or perhaps the Government, have any stats that break those results down beyond STEM into individual subjects at primary teaching level?

Ian Menzies: We do. That is one of the reasons why we took forward the work on the annual STEM practitioner survey and the provider survey. We published those results last week on the national improvement hub. Early learning and childcare practitioners told us that one of their top priorities continues to be mathematics and numeracy: 33.8 per cent said that that was one of their priority areas. That compares with 20 per cent who said that science was a priority for the coming year and 20 per cent who said that technologies were a priority.

The figures for primary practitioners were slightly different: 34 per cent said that their priority was mathematics and numeracy; they were a bit more confident in science, with 23 or 24 per cent saying that it was a priority area; and technologies were a priority for 28 per cent.

Our experience, from both the survey results and inspections, shows very clearly that the technology side needs more support, especially engineering, but that we also still have work to do in terms of mathematics and numeracy. That is why the second round of the grants programme, which we launched last week, continues to have an extremely strong focus on mathematics and numeracy.

Ross Greer: I am interested in the balance between initial teacher education and continuous development. I accept that we have just been talking about early years practitioners who take a different route in, but let us consider primary teachers. In a range of inquiries that the committee has done, we have come across a range of areas that people feel strongly there should be more coverage of in initial teacher education. It would be a very good idea for there to be more coverage of everything in initial teacher education, but that is just not possible. What is so essential and core to STEM teaching in primary school that it has be covered in ITE, and what can wait until continuing professional development—although that is probably the wrong phrase here—given that, realistically, it cannot all be covered if a person is not a subject specialist?

Ian Menzies: The value of the data that is coming from the STEM surveys is really important. Teachers have told us that their top priority across all sectors by a long shot is STEM pedagogy. That was quite a significant front runner.

The second priority was skills progression. We know that there is an important focus on skills for STEM careers and pathways, and teachers tell us quite clearly that they want a strong focus on them.

Another big issue is general knowledge of what is available and resources. In initial teacher education, there is quite limited time to provide that support and learning to teachers who are coming into the system. Connecting them to the fabulous support from the science centres, festivals and other STEM partners is an important part of the support that they can be given. We have a really rich landscape in Scotland in that respect. Ensuring that newly qualified teachers or trainee teachers are connected to that wider landscape and infrastructure is key so that they can continue to progress and develop once they have qualified.

Ross Greer: I would be interested in Susan Boyd's perspective on the balance. Have you seen any change over the past few decades in the balance between what is covered in ITE and what has to be covered later in someone's career? Is the right balance being struck?

Susan Boyd: My experience is that a lot of IT work is going on in the early years centres. In our survey in the school that I am currently in, we identified things that we would like to be improved, but we are using IT really well. Access to professional skills and knowledge and training in a rural area can sometimes be a problem. I love using IT, but it is very difficult for me to go on training courses. If you do not use it, you lose it.

Ross Greer: I have a final question on early years practitioners for Elisabeth Kelly. I am thinking about balance again. How much emphasis should we put on equipping early years practitioners with those skills as opposed to ensuring that there are subject specialists—whether teachers or industry professionals—involved in the early years setting alongside those practitioners?

Elisabeth Kelly: It is probably a matter of a mixture of both, but the early years practitioners are the people on the ground every day with the children, and they are the ones who are skilled in observing what is happening with them and what learning is taking place, and building on that. Specialists and people such as me can go in, help, train, model, coach and teach, but when we walk away, we need to have left them with those skills in some way.

Whether the skills come through initial training or we build on them in the setting, there would have to be a bit of both. From my experience of teacher training, a person can learn everything in the world, but unless they continually refresh and improve on the job, they will have forgotten a bit five years down the line.

Priorities change—that is what is difficult in teaching. There is currently a huge focus on literacy and numeracy, so everything else shifts away a wee bit in people's heads.

Does that answer your question?

Ross Greer: Yes—absolutely. Thank you.

Johann Lamont (Glasgow) (Lab): My question, which is probably mainly for Education Scotland and the Scottish Government, is specifically about how realistically we can deliver the theoretical model on the ground and what is happening in our communities in relation to resources.

You might be aware that, in response to concerns that were raised about the level of resources for science in school, the learned societies group investigated the funding of science practical equipment. Its study found that more than half the respondents thought that they did not have sufficient equipment and consumables to deliver practical science work. Others noted a lack training in the use of science equipment and consumables, and most respondents—98 per cent of them—reported having to draw on additional funding for practical activities, with parental sources being the most common for extra-curricular activity.

I suspect that the situation is even more serious in early years than it is in secondary schools, where there is at least some infrastructure. Do you have any analysis of the availability of resources

and support staff in early years? Have you done any research on the extent to which that is being funded through external resources, such as parents? That must, in itself, create, or amplify, disadvantage.

Ian Menzies: On resources, the point to make about early learning and childcare is that it is very much about teaching STEM in the everyday—for example, by observing STEM in nature by walking in the local park or the setting's grounds, by observing biodiversity and the changing of the seasons, and by enjoying and understanding your senses.

In the early learning and childcare profession, including in lower primary, there is not a big need for expensive resources to support STEM. The raising aspirations in science education—RAiSE—team has been really successful in working with and visiting schools and early learning and childcare settings and looking at the resources that they already have. Many settings have big kit boxes for STEM that people might have forgotten about. Our RAiSE officers take those boxes and look at what consumables might be needed for them, get them back into shape and provide training on them, to make sure that primary schools have the support that they need. For example, our RAiSE officer in Moray made sure that every primary school in the area had basic kit for teaching STEM.

The RAiSE team has found different organisations across Scotland and the United Kingdom that provide funding for resources. RAiSE officers have been providing training to practitioners in different settings to point them in the direction of, and enable them to access, the funding resources that are available.

Johann Lamont: Do you accept that even to do that job of accessing those resources requires resource in an early learning or primary school setting? I repeat that the LSG research has established issues to do with science practical equipment, training and the use of that equipment; it also found that that area was being resourced largely by parents. Do you think that there is an equality issue?

Ian Menzies: Again, our RAiSE officers are providing that support locally. They are embedded in local authorities and target different communities that are perhaps more in need of support. That is part of the work that they do locally; they also provide training for those settings, to enable practitioners to access the available funding.

Johann Lamont: The learned societies group says that the training is not there. It says that there is an issue with training and equipment and that external resource is required. I have concerns about that, as that external resource comes disproportionately from parents, which means that disadvantage will be amplified. Is Education Scotland or the Government looking at those issues?

Ian Menzies: Resourcing for science in schools and other establishments is the responsibility of local authorities.

Johann Lamont: If you were doing an inspection, would you have a view on what resource there should be?

Ian Menzies: During an inspection process, if there was an issue about resourcing, I suppose that that would be brought up in dialogue with those establishments, and—

Johann Lamont: Do you accept that the survey is flagging up an issue? Is it the responsibility of Education Scotland or somebody else to respond to the survey?

Ian Menzies: Local authorities have lead responsibility for resourcing the curriculum and for resourcing their schools and settings.

Johann Lamont: Does the Government have a responsibility, in dialogue with local authorities?

Andrew Bruce: We have a responsibility to respond to various pieces of research and reports that come forward. I do not have additional insight to give you on how we have taken forward those particular issues, other than to pick up the points that Ian Menzies has mentioned to do with our significant investment in additional support for practitioners, in terms of training. I certainly agree that, as we progress the strategy, we want to be alive to anything that has the potential to get in the way of its successful implementation.

Johann Lamont: Do you think that a strategy without underpinning resources is not really a strategy at all?

Andrew Bruce: I think that significant resource has gone into supporting the strategy. Ian Menzies alluded to the additional support for—

Johann Lamont: I am sorry to interrupt, but does that mean that you do not accept the findings of the learned societies group on that issue?

Andrew Bruce: I am not saying that I do not accept the findings, although I must admit that I have not studied them in detail. I am certainly prepared to look in more detail at the findings and the infrastructure that is needed to support the implementation of the strategy. However, I do not accept that additional resource has not been provided to support the strategy, because resource has gone into professional support and STEM bursaries.

10:30

Johann Lamont: The question is whether sufficient resource has been provided. It would be very useful if you could get back to us after you have looked at the findings.

Iain Gray (East Lothian) (Lab): Surely the question is about support for technicians and for buying equipment. The additional resources that Andrew Bruce has referred to are about supporting teachers and training, but the learned societies group's concern, which Ms Lamont raised, is about the lack of technicians and equipment in order to carry out empirical science. Have additional resources been provided to support that work? The examples that you have given do not support that; they support something else.

Andrew Bruce: The supply of technicians is a matter for local authorities, which can choose how to deploy their resource in education. I was making the point that the resource for career-long professional learning is available to the full range of practitioners. We have spoken about teaching professionals and early years practitioners, but the resource is also available to technicians, who can access the support through SSERC and through some of the other work that Education Scotland has outlined.

Ian Menzies: The Scottish Government is providing significant funding—more than £800,000 this year—to SSERC. As part of the training, SSERC provides kit and resources as an embedded part of professional learning. People can physically go to SSERC to get training and support, but SSERC also runs very good online cookalong sessions in which professional learning is delivered virtually, through glow and other formats. Kit boxes and resources are sent to establishments ahead of people receiving the training through the virtual cookalong sessions. Through the Scottish Government's support for SSERC, we are providing that resource to the system.

The training that I talked about was not necessarily training in being confident in science. Just last week, we provided training to RAiSE officer teams from 12 local authorities on accessing funding from all the different sources that are available, so that they can provide support in their local authority settings.

Our focus is very much on providing professional learning for practitioners and technicians. In local authorities, it is very much about the apparatus.

Johann Lamont: You are providing funding for people to learn how to access funding, and you are relying on SSERC to deliver training, instead of that being the core business of the education system. We are looking at how you can be systematic in your approaches, rather than being at the mercy of individuals within establishments who already happen to have an interest in STEM. How can you make things consistent if you accept that it is all about getting access to this or looking to that group and so on? How do you provide consistency, given that some schools and early learning centres will be under more pressure than others?

Susan Boyd: My experience, from working in three local authorities, is that it is down to headteachers to identify the budget for STEM resources. As we all know, budgets are under pressure, but I have not found that to be the major factor in the inconsistent delivery of STEM; I have found that the issue is more about a deficit in expertise.

The Convener: Articles in the *Times Education Supplement Scotland* have mentioned the importance of technicians, not least because they usually provide the health and safety back-up for any science experiments that take place. Would that issue be identified only during an inspection? At what point would Education Scotland intervene if there were not enough resources to support the curriculum?

Ian Menzies: Technicians are based mainly in secondary settings, and we are talking about early learning and primary education today. I am really pleased that the STEM strategy has a strong focus on not just early learning and primary practitioners, but school-based technical support staff. For example, our grants programme provided funding to SSERC and the Scottish technicians advisory group, so that they could provide technicians with opportunities for professional learning and development. That funding and support will continue into the second phase, this year.

In a highly effective cluster model, where the early learning settings, the primary settings and the secondary settings all work strongly together, collegiately and collaboratively, one of the things to explore is how the technicians can provide support and resources for the whole cluster, including early learning and primary settings.

Resources are already being shared in some clusters. For example, if a primary school does not have access to resources, a secondary school will provide that support through its technicians.

We want to develop such things through the cluster approach that we have a strong focus on in the grants programme.

Dr Alasdair Allan (Na h-Eileanan an Iar) (SNP): I was interested in what Dr Woodham said about the importance of overcoming the challenges that geography and other limiting factors place on young people's access to

science. I am curious to hear what you feel those obstacles are. Do they correspond with everything that has been listed as a potential obstacle in the way of young people accessing STEM?

Dr Woodham: I am happy to comment on that. It is an exciting time at the Glasgow Science Centre because, due to a £4.1 million investment from the Wellcome Trust, we are embarking on what we call the connect project. It is a large-scale organisational change for us to support and attract a more diverse audience. As part of that, we have been looking in depth at what the barriers are for those who wish to access us. At issue is whether those who partially see us as relevant to their lives are financially able to visit us and how we can make what we do relevant to them. Further, we are located in Govan, which means that we are surrounded by people who are experiencing the highest levels of deprivation. In those cases, entrance costs and transport barriers are huge issues. There is a range of reasons why people do not access us, not all of them financial. Over the next three years, during the period of that funding, we will look to address those issues. The organisational change will take place over the next 10 years.

We can overcome barriers to access using a great blend of options. For example, over the past academic year, we have been allocating our transport grants to schools in the 40 per cent most deprived areas according to the Scottish index of multiple deprivation, as well as those that are in classes 5 and 6 on the urban/rural classification. Further, all additional support schools are eligible for transport grants, and they get three per school.

It is also extremely important for us to make and invest in partnerships with local education authorities, to ensure that the pupils who experience the highest levels of deprivation in those areas are able to access us. On that front, we have fruitful long-term partnerships with Glasgow City Council and West Dunbartonshire Council. We see the benefits of those partnerships, in that 43 per cent of Glasgow schools and 28 per cent of West Dunbartonshire schools visit us at least once a year.

It is worth pointing out that half of our non-visitors are above the 40 per cent SIMD level, which highlights the fact that the barriers to people coming to visit us are not only financial.

For remote and rural areas, we can offer an on-tour visit. That can be a great option for people who are not able to visit us. People are, frankly, astonished at the lengths that Glasgow Science Centre is willing to go to to visit schools. We have received funding from the Edina Trust and over the next three years we will visit every island-based remote primary school in Scotland. Over the past year, we visited Orkney and Skye. We will continue that approach over the next two years, and we are planning a Shetland tour. Our on-tour team has just seen their millionth visitor and we are very proud of that.

When we are designing exhibitions, programmes and experiences, we always keep in mind ways in which we can take them on the road so that we can ensure that those experiences are getting to people who are not able to access us. As someone who went to school in Inverness, I feel passionately that we should get up there and inspire children in those schools to take part and, perhaps, like me, work in the Glasgow Science Centre one day.

We are very proud of our on-tour funding and we have worked really hard to leverage third-party funding to make it happen. We received £2.25 million from GlaxoSmithKline and funding from the Scottish Government energy and climate change directorate and OPITO to build those exhibits. That is how we go about reaching the people who cannot visit us.

Dr Allan: You mention those who cannot visit you, but presumably you make efforts to get people to the science centre. A lot of experiences can be had through outreach to schools, but some can be had only by visiting the centre. What efforts are made to ensure that there is some co-ordination when schools or sections of schools come to visit you? You will appreciate that a school from Uist or Shetland cannot visit Glasgow or Edinburgh every time that something is on. There has to be some level of co-ordination so that they can do a number of things in three or four days. Otherwise, frankly, it is not an option. Is co-ordination going on with other cultural and educational organisations to make sure that those kinds of trips are possible?

Dr Woodham: That is a really good question. My understanding is that we are not part of that. It is a really interesting point and it would be great to look at that. We do not look further afield, to be honest, when we are engaging with schools in Orkney, for example, because only one has ever come to visit us. Our priority for those areas is the on-tour service, so we have not looked at what else schools do when they come to visit us. I am not sure whether any of my colleagues can advise.

Susan Boyd: I can comment on that, because I have experienced the Bodyworks show twice, in two different settings, and it really is hands on. It is like visiting the science centre. Those are invaluable initiatives for supplementing the STEM experiences that we are trying to develop in early years and primary.

Can I clarify whether you were asking what the challenges are in delivering quality STEM in early

years and primary? Was that part of your question?

Dr Allan: I was going to come on to schools and early years, but the issue about the science centre was raised. I am happy to move on to schools and early years centres, as you have prompted me in that direction. On that subject, we have already talked about parental inequalities, if you like, or the differences in opportunities that existed for parents, and how that still presents in inequalities among children. Is any work being done, either in early years centres or primary school, directly with parents to include them in the process?

Andrew Bruce: One of the actions in the strategy is to improve the level of resources available to parents, through the parentzone website. Ian Menzies can say a bit about that. Equally, there is the work to support the expansion of early learning and childcare—I reiterate Elisabeth Kelly's point that actively expanding that provision represents a great opportunity to support practitioners. That work covers things such as gender neutral play and so forth, which we hope will spread back to the home environment through interactions with parents. An online module has been developed, I think by the University of the West of Scotland, to support early learning practitioners, particularly around their STEM practice and tackling gender stereotypes. We hope that that will spread through the engagement that early learning practitioners have with parents. To answer your question, the additional resources that are going to parents would be the main action.

Ian Menzies: Parents are crucial. The STEM strategy was very influenced by the ASPIRES research, which showed the importance of building science and STEM capital within families and communities around Scotland. We take that very seriously. Engaging parents is part of the work that we have been doing through the RAiSE programme.

One of the strengths of the STEM strategy is the big focus on community learning and development. We have a real strength in Education Scotland and we are working very closely with our community learning and development specialists. Over the past few months, for instance, we have been doing a series of events around Scotland, bringing together community learning and development specialists with early learning specialists and primary and secondary school staff to look at the connections and how we can take STEM into the wider community and families. Our RAiSE team has been running a lot of parental engagement events: for example, we had the Angus STEM festival just last week and more than 400 people attended; we had the Leith family fun event, attended by more than 700 people over three days; and we also had a family stargazing event in Fife.

Engaging with parents, and finding new ways to do that, is really important. At a simple level, within early learning and childcare establishments, one of the things that we have been doing with our RAiSE officers is sending STEM bags home: interactive STEM challenges that young people can take home and do with their families. One of our keynote speakers at the Scottish learning festival last year was Professor Louise Archer, who was responsible for the ASPIRES research. We wanted to put the importance of engaging families up front as part of our big STEM live event at the Scottish learning festival, because it is a huge part of what we are doing.

10:45

On the parentzone website, we already have the "I am a mathematician" and "I am a scientist" resources up for parents, who can download and use those activities at home, and we are finalising a new resource called "I am an engineer". They are all available in Gaelic as well.

Dr Allan: Very good. I also want to ask how you measure performance on all those fronts. We have heard about the performance indicators for the science centres, but are there or should there be performance indicators more widely to measure what progress we are making on equity of access to STEM?

Andrew Bruce: You are absolutely right. The key performance indicators that we produced relate to some of the science centre activity. There is also an equity indicator in relation to performance in national qualifications around Scottish credit and qualifications framework level 6, which mirrors the wider attainment indicator in the national improvement framework.

We published a set of key performance indicators in—I think—December 2017, and the annual report that was published earlier this year provided a report against them. We are reviewing the indicators, not with a view to introducing a new set, but to see whether there are better ways of producing milestones on the way to them. A number of the indicators are about developments by 2022, for example, which is the end of the strategy period, but with our colleagues we are looking at whether we can produce some additional milestones within that. If, as part of that work, there are suggestions about other measurements that should come in, we will be happy to consider them.

Oliver Mundell (Dumfriesshire) (Con): I am particularly interested in the challenges that rural areas face, from a constituency point of view. Some are pretty obvious. In one and two-teacher

schools, in sheer percentage terms, it is less likely that there will be someone within the staff base who is proactively interested in science than in a larger primary school. In rural areas, there will be fewer STEM businesses in the vicinity and fewer academic institutions operating, and science centres will be further away. Schools in rural areas have smaller budgets, and in some cases no access to pupil equity funding.

I was interested in what Susan Boyd said about science visits and other things supplementing the work that is done in schools. I am concerned that we sometimes focus too much on one-off visits, and that people sometimes think that they are covering STEM because they manage a trip out once a year, or someone comes to visit the school.

What do we need to do to reverse that imbalance?

Susan Boyd: In rural areas, we are developing our own ways of delivering STEM, and that is being supported by a lot of people who are passionate about science, technology and the other aspects. One-off visits are great, but they are only part of what we are doing. I am in Aberfeldy at the moment, and we have some great professional partnerships with Marine Scotland. Over the past few years, we have also been working with Academy9 and Jacobs, which is developing the A9 dualling project. What we are doing there is fabulous. Academy9 and Jacobs are not working in the early years, but in the middle to upper primary. Marine Scotland is available to everybody in the school. The real scientists and engineers who come in are great role models, and the gender issue is very well supported, particularly by the Academy9 scientists and engineers who have been coming in.

We are working on three fronts. Emma Woodham's work is fabulous and it has a part to play. The second front is the actual practitioners. When I was in Aberdeenshire, I was the only teacher in the school, but I had access to the schools within the cluster so I could meet them regularly, and, through our tapestry learning initiative and projects, we were able to team teach and visit other schools. There was quite a rich and diverse range of opportunities. I come back to the biggest challenge being to have STEM practitioners able to give support in the early years. We have not mentioned additional needs yet. Workload and additional needs are my biggest challenges in delivering STEM.

Elisabeth Kelly: What Oliver Mundell said is crucial. STEM should not be and cannot be one teacher's passion. It must be everybody's. Every teacher must be able to deliver it at a really high quality, all the time, not just on one-off science visits. They are great as provocations, or as part of STEM, but some people in our profession do say, "Right. I've been to Dynamic Earth. Tick. I have done that bit of the curriculum." It cannot be like that.

There are issues in rural schools around not having technology or whatever, but we just need to look at it in more interesting ways. Rural schools have the countryside, which is an amazing way to experience all sorts of STEM activities. We have farming communities. We have all sorts of industries. It is just about being a bit more creative about getting them involved in rural schools.

Again, we go back to the cluster approach and calling on other people, like neighbours, and getting together. What Oliver Mundell said highlighted one of the problems: responsibility for all that learning in the whole school cannot be down to just one person's passion.

Oliver Mundell: I guess that you support having more concrete indicators to make sure that we are achieving that kind of model. Do we need more data and a review to make sure that that is happening consistently across the country?

Elisabeth Kelly: We must be careful about what we mean by concrete indicators and data. The minute that we start putting in structured next steps or data collection, it can backfire. We have seen it happen in some of our other curriculum areas. That is a teacher's opinion. However, we definitely need more information about what is really going on in schools.

Susan Boyd: It is a hugely complex issue. As was mentioned in some of the submissions, there are a number of initiatives. As I have said, and as I keep saying, I am passionate about STEM but I see that there are a lot of other areas of need. STEM will be supported if we address some of the challenges that we are facing in early years and primary years education as a whole.

We would like to have indicators so that we can gauge how we are doing, but there is a high turnover in early years staff. We might train people and give them resources, but we need to retain them. We need to have those professionals who can deliver the broad general education that we are all hoping for, including STEM. That means that the people who are vital to pupils' wellbeing and the development of their learning are not just teachers. They are the support staff that we are desperate to retain.

We need resources for STEM. To deliver science in any way in the primary or early years, we need to create the resources. We need to set them up, and then we need to teach them. We do not have enough bodies on the ground to do that effectively. We might be doing it, but we are not doing it effectively and a lot of it is being done

through the good will of early years practitioners and teachers.

Let us have a framework that will deliver support for STEM and support for teachers.

Ian Menzies: We are aware of the needs of rural areas and we have been working on them for a number of years. When we set up the RAiSE programme and were looking to engage with authorities around Scotland, we deliberately chose authorities that faced challenges around rurality, including Highland, Dumfries and Galloway, and Moray.

We also recognised the big challenges of geography, and we ensured that authorities such as Highlands, Dumfries and Galloway and Fife had additional resource. For example, Highland got two RAiSE officers and Dumfries and Galloway got two or three. We are really conscious of that issue.

Through our partnership working with the RAiSE officers, we realise that it is sometimes a challenge to connect schools in rural areas with local employers. We have therefore been working in partnership with the STEM ambassador hubs in the west of Scotland and, in the past 12 months, we have increased the number of STEM ambassadors that are active in Dumfries and Galloway from 36 to 115.

We talked about the science centre model and accessing those centres. In Highland, the science skills academy is in the process of launching five Newton rooms across the area. Two have already been opened, in Thurso and Lochaber. The aim is to give those rural areas that science centre experience. The University of the Highlands and Islands has an active STEM hub that does a lot of outreach across the area, as does Aberdeen Science Centre.

Through our grants programme, we have provided funding to support Highland Council, which has big challenges with rurality and remoteness, to deliver professional learning virtually to early learning and childcare and primary staff. We hear strongly from our practitioner surveys, which give us important data, that practitioners absolutely want more support online, and that goes for practitioners in rural areas as well as those in other areas. Through the grants programme, we are trying to enhance that offer of online professional learning support.

To pick up on the point about drawing on what is available locally, this year in the grants programme, we have introduced a new funding stream called the leadership and collegiate professional learning fund. Practitioners have told us strongly that the opportunity to work with other practitioners in their schools and their clusters is really valuable and has a high impact on professional learning. For instance, 70 per cent of early learning and childcare practitioners said that working collegiately within their cluster has a high or very high impact and 81 per cent said that working collegiately within their setting has a high or very high impact. The new funding stream aims to give teachers the space and time locally to draw on their collective expertise and resources, to learn together and collaborate and to co-develop new approaches.

The rurality aspect is important. We will continue to track the issue through our surveys. Last week, we published the STEM provider survey, through which we invite all the providers across Scotland, such as the science centres, festivals and universities, to share information with us so that we can see the service or offer that has been provided to local authorities and, where we can, plug the gaps.

Susan Boyd: I am happy to hear of all those developments, and they are starting to have an effect, which is great. However, I would like to highlight my union's concerns, which were raised by its members. I want to be absolutely clear that you can have a passion for science and all the training in the world, but you need the staff to deliver STEM education. If you have a class of 25 children, a large percentage of whom have additional needs, and you do not have any support in the classroom, you may be creative and bring in STEM professional volunteers or parents to deliver STEM education, but you need to have the staffing to deliver it consistently.

Oliver Mundell: How much money is made available through the collegiate fund, and is it available for classroom cover?

Ian Menzies: The enhancing professional learning fund has two funding streams. One is for regional and national partners, which includes science centres, festivals, universities, colleges, professional associations, third sector organisations and learning societies. The leadership and collegiate professional learning fund is for practitioner-led professional learning, and the totality of that—

Oliver Mundell: I am interested in the second stream. How much money is available?

Ian Menzies: There is £1.3 million available in this financial year for the whole of the enhancing professional learning grants programme, which has two funding streams.

Oliver Mundell: Is there a breakdown of the two?

Ian Menzies: There is not a breakdown, at the moment. We will look at demand from the system and at the bids that come in to see where we can make the money work hardest.

Oliver Mundell: Will that money be available for classroom cover to allow teachers out of the classroom?

Ian Menzies: Part of the money might be for classroom cover. We know that some clusters have practitioners—such as Susan Boyd—who have a background in, and a passion for, STEM subjects. They have a lot to share through building the confidence of other practitioners in primary schools within a cluster, or by working with early learning and childcare practitioners. Where we can make use in other settings of the resource, capacity or expertise of practitioners such as Susan Boyd, the money can be used to release them to provide face-to-face support.

11:00

Iain Gray: Many of the lines of questioning come down to the same thing, even if they approach the issue from different sides. They are about how we mainstream delivery of STEM education in the early years. A couple of questions ago, Susan Boyd was asked about that and she said that it is complicated. However, in some ways, it is not complicated; it is really simple. If we were to ask staff in any primary school or early years setting what they do on literacy, none of them would say, "We went to the library last year," but if we asked what they do by way of STEM education, they might say, "We did a visit to the science centre." That is the problem.

The system does not recognise STEM education as being core, as it recognises—rightly—literacy and numeracy, and speech and language development. What can be done to change that mindset so that all schools and all early years settings understand that STEM education is not an option but something that they must deliver?

Elisabeth Kelly: The profile of STEM education being raised in the policy and documentation that we have would help. In documents such as the new national standard that is coming out on expansion of early learning and childcare, and "How good is our early learning and childcare?", the curriculum is referred to and literacy and numeracy and health and wellbeing are mentioned a lot. Words such as "curiosity", "imagination" and "creativity" are used, but we need to help our practitioners to link those words to STEM—

Iain Gray: I will stop you there. That is the fault of Education Scotland and the Government. You are actually not asking the system to deliver STEM in the same way as it delivers literacy and numeracy, so it does not do so. Why would it?

Andrew Bruce: I want to make two points. Your initial point was that STEM is not part of the core curriculum. It is part of the core curriculum. Three of the eight—

Iain Gray: It does not sound as though it is. Elisabeth Kelly has just said—

Andrew Bruce: As far as the systems and the policy framework are concerned, three out of the eight curricular areas are STEM related—mathematics, the sciences and technology are covered as part of the framework.

I certainly accept that, in the priorities that the Government has set in the national improvement framework, there is a focus on literacy and numeracy, raising attainment, health and wellbeing and developing the young workforce, but I counter the suggestion that STEM is not part of the core framework: it is.

I accept what you said about the challenge to do with the extent to which time is dedicated to delivering STEM and people's confidence in their ability to do that. The actions in the STEM strategy are designed to respond to that and to ensure that STEM is properly addressed as part of the expansion of early learning and childcare. Earlier, I alluded to the package of support that is being provided to support the workforce on that, but I do not dispute what Elisabeth Kelly and others have said about the need to provide further support—

Iain Gray: You are, kind of, disputing what Elisabeth Kelly said. She said that STEM is not prioritised in the documents against which practitioners in the system believe they are being held to account, whereas you are saying that it is. You cannot both be right.

Andrew Bruce: I am saying that STEM features in the support that we are putting in place and in what we are doing in areas such as outdoor learning.

There is an interesting question about prioritisation. There is danger that, if everything is a priority, nothing will be a priority. Clearly, the Government—

Iain Gray: So, you are saying that STEM is not a priority.

Andrew Bruce: It is clear that STEM is not one of the priorities that are set out in the national improvement framework.

Iain Gray: Thank you. That is helpful.

Andrew Bruce: That said, that does not mean that there is no action on STEM. All sorts of stuff is happening; examples are the STEM strategy and the fact that STEM features so heavily in the broad general education.

Iain Gray: You say that, but when the committee—

The Convener: I think that Elisabeth Kelly still has some points to make on that issue, Mr Gray. Perhaps we could let her finish.

Iain Gray: Sure. I am sorry.

Elisabeth Kelly: I suppose that it is about the priority. Even if those things are coming down from the Government, in the heads of the teachers it is about literacy and numeracy, and health and wellbeing. Education Scotland's inspections often have that focus—they certainly have in recent times.

The problem is that subject disciplines have been put back in silos, but STEM enhances literacy and numeracy, and vice versa. Subjects should not be treated differently, especially in the early years, where we use a very interdisciplinary pedagogy, in which play is the main source of learning. In a den-building exercise, for example, a child can experience literacy, numeracy, engineering, technology and science—the whole shebang. Different elements will come out of that experience, depending on the child's interests and how the practitioner is helping them.

It is about bringing us back to how I feel curriculum for excellence was meant to be—that is, working together meaningfully with an interdisciplinary focus. For some reason—I am not blaming anyone—we seem to have become very literacy and numeracy focused, although each is dealt with separately. Of course those subjects are important—they are the foundations of everything—but we have lost sight of the rest, a wee bit.

Susan Boyd: I agree with a lot of what Elisabeth Kelly has said. STEM is being delivered through interdisciplinary learning; in fact, that is happening to the extent that scientists are almost a little bit concerned that progression in science knowledge and skills is not being attended to as well as it should be, although that might be more of an issue for middle and upper primary years, to which I am moving. In the early years up to middle primary, we deliver a lot of STEM education through interdisciplinary learning projects, including outdoor learning, forest schools and lots of other marvellous initiatives.

Iain Gray: You said earlier—you have used the example a couple of times—that you were part of a team who went into early years settings in Ireland and worked alongside practitioners to raise the quality of delivery in what you have just described. However, you also said that that team was the first thing to go when cuts came. Is that right?

Susan Boyd: That is correct; that team has gone. Now the model that is being used is much more along the lines of the model that Elisabeth Kelly works in, in which she supports many more centres. Early years practitioners, who are not teachers, are being asked to teach children to the same level as teachers would. On top of that, they have all the care standards to meet. They have a lot on their plates. How do we support that? I feel strongly that we need to do so with more teachers like Elisabeth on the ground, reinforcing good practice across all disciplines. STEM would benefit from that.

Iain Gray: My question is, I suppose, a version of the question that Andrew Bruce dealt with. How much priority are we really giving to STEM education? You seem to be saying that, in resource terms, we are not giving it as much priority as we sometimes purport to be giving it.

Susan Boyd: I cannot answer that question fully because my authority is not in the RAiSE programme, although I hope that it will join it. The additional funding would allow groups, such as the STEM working group—

Iain Gray: Is that not the point? If STEM education was core business, it would not be a matter of who is and who is not in the RAiSE programme. I know that that support is available everywhere—you have made that point—but the programme is not taken up everywhere, because there are other priorities.

Ian Menzies: In the past four months Education Scotland has recruited a new team of STEM officers. We have seven or eight in post, who are embedded in the new regional teams that we have set up: every region now has a dedicated STEM education officer. When we are up to full complement, we will also have a dedicated improving gender balance equality officer in each of the regional teams. We have some really exciting opportunities in the new regional infrastructure—our new STEM education officers and improving gender balance equality officers will be working in harmony with the mathematics, numeracy and literacy officers and the attainment advisers in the teams. We have an opportunity to join up those areas, and we are really excited about that.

We feel strongly—this is a big part of our work through the RAiSE programme—that all the learning that is related to sciences, technologies, mathematics and numeracy is brought to life through the STEM context. STEM should not be seen as additional, but as something that provides an engaging, motivating and exciting context for learners that enables them to connect learning in the classroom and outdoor settings with real life. Our new STEM teams are empowered by system change, by equity of provision and by mainstreaming.

Susan Boyd: I just noticed that the papers mention the regional improvement collaboratives.

Is that a new initiative that will be rolled out, involving the officers that you mentioned?

Ian Menzies: Absolutely. The local authorities are coming together in new regional improvement collaboratives. In the past few months, Education Scotland has been refocusing our work in order to support them.

I am really excited by the conversations that our STEM officer team and improving gender balance equality officer team have been having in the past month with their counterparts in the RICs and local authorities. There is a real energy about what is happening.

There is a big focus on STEM. From the word go, the west partnership, which is one of the biggest collaboratives, identified learning for sustainability in STEM as an area on which to focus. We are working in partnership with it and with Keep Scotland Beautiful on the upstream battle campaign along the River Clyde, which is about marine plastic pollution. That is a really exciting context for learning for young people in schools. So, one of the big regional collaboratives is already saying that it wants close partnership working on learning for sustainability in STEM. We are happy to support that work.

Iain Gray: Susan Boyd and Elisabeth Kelly said that that will not happen everywhere unless there are enough resources—specifically, enough staff—in every setting to make that play through. What is your response to that? They are saying that there can be good practice and support, but if the teachers, technicians and support staff are not in classrooms, it will not happen.

Andrew Bruce: I guess that the starting point would be the areas in which there are teacher shortages. We acknowledge those. The target for intake into ITE courses has been increased, and the numbers are going up. That is supported by the STEM bursary scheme. There are attempts to address the situation, but I do not pretend that it is anything other—

Iain Gray: That is about secondary teachers. We are talking about primary and early years education.

Andrew Bruce: I do not have the figures for primary school teachers to hand; I am happy to provide them later. The point that I am trying to make is that we are looking carefully at supply into the system.

Ian Menzies's point is that the support that Education Scotland is providing to the regions is a consistent picture. Education Scotland has adopted its new structure, which is based on the regional structures. Those regional structures are coterminous with the regional improvement collaboratives. There has been a change in the infrastructure in order to make sure that the support that Education Scotland provides and—as Ian Menzies mentioned—STEM expertise are aligned with the new regional improvement collaboratives and are provided consistently.

The Convener: Mr Scott, do you have a supplementary question on this area or do you want to move on to a new area?

Tavish Scott (Shetland Islands) (LD): I have some supplementary questions to ask in this area.

The Convener: I will bring Rona Mackay in first, because gender was just mentioned, and I know she has some interest in that.

Rona Mackay (Strathkelvin and Bearsden) (SNP): I want to go back to the point on equity of access and gender. I am interested in parental involvement, because we know that a lot of gender stereotyping starts in the home. Do the modules that Andrew Bruce talked about relate to early years or secondary education?

Andrew Bruce: The module that I mentioned is about support for the workforce in early years provision. Ian Menzies will keep me right on this. The University of the West of Scotland resource covers a number of things, some of which promote STEM in early learning settings, and include tackling gender stereotypes.

Alongside that, the Care Inspectorate has been working with Zero Tolerance to produce a series of resources to promote gender-neutral play. In addition—Ian Menzies will be able to speak at length about this—there has been expansion of the pilot that took place in schools on improving gender balance, and the focus of that will now go beyond schools into other settings.

Rona Mackay: What form does parents' involvement take, in the module? What is the uptake among parents?

Andrew Bruce: The module is for early learning practitioners. The theory is partly that practitioners will engage with parents and will have the chance to spread the learning approach in that way.

Rona Mackay: Has that started?

Andrew Bruce: I am not sure.

Ian Menzies: That is currently in development and is due to be finalised at the end of this year.

Rona Mackay: How will you monitor uptake and success? Do you have a plan for that?

11:15

Ian Menzies: Work will start in the coming months as the new online module takes shape. It is to support the expansion of early years learning. There will be a focus on STEM and gender

balance. I will chair that work, in partnership with our Scottish Government colleagues. That gives us a real chance to ensure that it is fully connected to our ambitions in the STEM strategy, which is really important. I am sure that monitoring the statistics, use, uptake and engagement will all be embedded in the resources that are developed.

Rona Mackay: In her opening remarks, Elisabeth Kelly mentioned that there is a massive opportunity for STEM in the early years, and that that is good. I agree. However, "Tapping all our Talents 2018", which is a report on women in STEM subjects, says:

> "Where progress has been made, this is frequently due to the personal interest in the issue of one or several individuals within a school, and their drive to create change."

That is very important, but how much is it a factor? Teachers might know about the issue, but might not focus on it. Is there any way of addressing that?

Elisabeth Kelly: As I said in my submission, that is hugely influential. The early years landscape is very varied; it depends on what people are interested in. In one setting, there might be a woman or a man early years practitioner who is really interested in STEM and will create that environment; it will probably be a woman, because that is the situation that we are in, although the early years community is trying massively to change the gender balance in our workforce. We have talked about that. We cannot have just one person creating change; that needs to be everywhere, all the time.

Our practitioners are working hard to conquer their unconscious bias when it comes to gender, and we are mainly succeeding. However, we are certainly not yet able to start to influence parents, because a lot of practitioners are probably not yet strong enough in their understanding to help with that.

What is lovely about most early learning and childcare settings is that children play anywhere all the time, so there will be girls in the block corner and boys in the house corner. That has developed over the years—we have got rid of a lot of princess outfits and all that kind of stuff.

I think that I went away from your original question. I am sorry.

Rona Mackay: Will that be part of the training for the new early years practitioners in the recruitment drive?

Elisabeth Kelly: Do you mean addressing the gender imbalance?

Rona Mackay: Yes.

Elisabeth Kelly: In my experience, it depends on who delivers the training. In Midlothian, for example, modern apprentices come into our local authority, and we deliver that training through the team that I work with. I have no doubt that it will address that. In other local authorities, people will maybe go through Edinburgh College. People might have an SVQ 3, and people are beginning to do national 5s in high school. The input into those courses is very mixed, so I could not guarantee that the issue is being addressed.

Rona Mackay: Do you find in your work that, at the early years level, parents are receptive to their daughters being involved in STEM stuff? Is there any resistance to that?

Elisabeth Kelly: It varies massively from community to community and from parent to parent. On the whole, our practitioners do a very good job of helping parents to understand that we encourage every child to do everything in our setting. When we had the princess outfits, for example, if a little boy dressed up in a princess outfit and there was a picture of that in his learning profile, there would sometimes have to be a conversation with his parents about that being absolutely acceptable and fine, and there being nothing for them to be worried about. That approach is on-going; parent dialogue is sometimes needed.

It is really interesting to look at the STEM capital in families. Again, the area is quite complex. To some parents in some of our areas—potentially more in the deprived areas—just the words are frightening. They think, "Whoa! What's that all about? That's not for us."

Rona Mackay: So it is important to communicate well.

Elisabeth Kelly: Yes. I go back to community projects, such as community gardening. A person can garden alongside somebody and talk about something that is science, and they can learn in a more natural and relaxed way, as opposed to people saying, "This is STEM and you're going to need to teach that to your child at home."

Rona Mackay: Can you ensure that such learning is carried on through the primary years, when things become more intense and teachers are working to the curriculum? How does the basis in early years transfer to primary?

Elisabeth Kelly: You have hit upon a huge can of worms in relation to how teaching in early years is transferred to primary in Scotland. Personally, I cannot ensure that that happens, but we try to influence the transition into primary 1. A lot of local authorities are trying to make the early level work as an early level, by having a flow between nursery and primary 1 and through communication with primary 1 teachers. However, in my

experience—Susan Boyd will probably know more about this—the issue can look like a very different animal in a primary school from how it looks in an early learning and childcare centre.

Ian Menzies: Improving gender balance and equality is a complex issue. We have looked at our data on the uptake of STEM highers in Scottish secondary schools over the past 35 years, and we have made very little impact over that time in increasing the participation of girls in subjects such as physics, computing and other technology-based subjects. Boys are also still underrepresented in biology. There is a lot of complex work to do, which will involve changing the whole system and shifting the mindset in the whole of society. That is why Education Scotland has in place a new gender balance team, which will be embedded within the new regional teams.

The work is not new; it has been under way for three years. Over the past three years, we have learned a lot through our pilot programme and drawn heavily on research. We have provided more than 2,500 hours of professional learning to teachers in the system, more than 5,000 hours of engagement with pupils and more than 3,000 hours of engagement with different stakeholders and organisations in the system. We are drawing on all that experience from the past three years in taking the work forward. Our big target is to reach every school cluster in Scotland in the next four years, which is challenging and ambitious. One of the key aspects of the work is the need to take a very strong cluster-based approach, because primary schools and early learning establishments cannot do the work on their own; we all need to do it, as a whole community and society.

We have talked about the new model that has been developed as part of the expansion in early years provision. To pick up some of the earlier points about how policy reflects STEM and having a gender balance, I note that the new induction resource for the expansion of early years provision talks about gender and encouraging gender-neutral practice. We will refresh the "Building the Ambition" document on early learning and childcare, which will give us the opportunity to include issues relating to STEM and gender balance.

A big piece of work is under way. We are excited by the sheer demand for time and engagement with our new team, and we are looking forward to that work and those discussions continuing.

Susan Boyd: We have touched on two issues. A lot of work is being done to make the transition from early years to primary more seamless, and the value of play right through primary school is now a much more acceptable idea in our learning and teaching environments in primary schools.

The second issue is about gender equality. In the setting that I am in, we have a perfect scenario in which we very much promote young women and girls moving into roles of responsibility within STEM subjects from early years right up to the end of secondary. In fact, more of our primary STEM prefects are girls than boys this year.

Rona Mackay: How are you promoting that gender balance?

Susan Boyd: Even if some early years and primary practitioners are not confident in STEM subjects, we are all aware of their importance. In our planning for play and learning, we ensure that we give opportunities to both males and females and that we positively promote girls having those experiences. My colleagues in secondary schools are doing a marvellous job, and we have great role models because three out of the four principal teachers in our secondary school are women, who visit the nursery and the primary school. We are working with parents in our workshops to share the STEM learning that we are providing in a way that demystifies the subjects so that they are not a worry for parents or children.

Jenny Gilruth (Mid Fife and Glenrothes) (SNP): I would like to pick up on what Elisabeth Kelly said in her answer to Rona Mackay, which was that it needs to be everywhere, all the time.

Do you accept that there might be a challenge in that regard for our primary teachers, who are trained to be generalists? I am thinking about one of my friends, who got a politics degree and then went on to do a postgrad qualification in primary teaching. She might not naturally have an inclination to deliver STEM in the way that others might who have a specialism in it; she will have an opportunity and an obligation to deliver it through the BGE, as we have heard from Andrew Bruce, but her interests might lie elsewhere. Is there a challenge there in relation to potentially disempowering the profession if teachers are being instructed in that way? Do you have any suggestions about what the answer might be?

We heard from the RSC in a previous evidence session about the level of qualifications for primary teachers entering training. I think that the RSC was advancing the idea that they should have a maths higher, for example, which is not currently required—I think that the requirement is for is a level 5 maths qualification. What is your answer to that challenge regarding primary teachers being generalists?

Elisabeth Kelly: It is a huge question, isn't it? As a primary school teacher, one is expected to be brilliant at teaching music, physical education, art and everything else these days. You are right—we all come from very different backgrounds. My first degree was in history, so I love doing a social

science project on the Vikings—that is my thing—but I also love STEM. Primary school teachers have to accept that generalist approach when they come into the profession. That is the profession that we are in. If we wanted to be specialist subject teachers, we would become secondary school teachers. There has to be an awareness that primary school teachers have to be passionate about learning and teaching, so they are passionate about all their subjects.

There may be a bit more expertise in one area than in another because of the teacher's previous life, but that should not control the curriculum that they present in the classroom. I strongly believe that. I should not just teach history all the time because that is what I was previously interested in. Likewise, when I say that STEM should be all the time, every day, I mean that it should not be about just doing a week of science or going on a visit to Dynamic Earth.

I am not currently in a primary school, but if you look at a primary school timetable or go into a primary 3 classroom, for example, there is a big literacy block and there is numeracy and then there might be a wee bit of a topic. There tends to be a big literacy focus. When I speak about interdisciplinary learning, I mean that we need to start looking at literacy through being outside, through a gardening project or through an engineering project—we could be learning literacy while we are designing a new Mars or lunar landing. Then we move away from the idea of needing to spend blocks of time just on literacy, or the idea that I need to spend an hour teaching literacy before I can look at STEM.

Dr Woodham: I will highlight a little bit about our approach to teacher training because, in some ways, it can answer the question about an individual who might not come from a STEM background and how we can empower them to see STEM as relevant and make sure that they feel that they can facilitate STEM learning. I think that our inspire and challenge approach does that.

I come at this from the angle of somebody who went through our school system and went directly into a PhD in an excellent research institute and was faced with having to have the confidence to be an active research scientist. That is not about knowledge—it is about skills; it is about having confidence in yourself to investigate and to use observational skills to categorise and analyse. Those are things that all of us will have done in the few hours before we even came into this room today.

Our inspire and challenge approach tries to highlight to anybody, whether they are a primary, secondary or early years teacher or practitioner, that they do not need to have the answers; they do not need to have an in-depth knowledge of any of those topics. I have a PhD and there is lots about even my PhD subject that I will never know. It is about encouraging them to invest in their pupils and in developing their pupils' skills. I totally agree with Elisabeth Kelly that that can happen in any type of lesson—you can categorise in any lesson; you can observe in any lesson; and you can try to use those skills in any lesson.

It is about recognising the importance of building those skills in a lesson; it is not about being a scientist, but about using those skills every day—whether pupils end up working in STEM industries or not, the skills are important. I think that our approach helps to build and give teachers and practitioners confidence. Over the past three years, we have trained 240 teachers in the inspire and challenge approach, primarily in the West Dunbartonshire region. Prior to training, teachers rate their confidence in teaching STEM at 2.6 out of 5; after training, they rate it at 3.4 out of 5.

Having been on the ground and done the training, and having spoken to teachers and seen them through the journey to increasing their confidence in STEM, I know that it is about their recognising that they do not have to know the answers but that they need to support their pupils to have time for free investigation, which is hugely beneficial to their learning experience.

11:30

Jenny Gilruth: We heard evidence from Lorna Hay, who is a primary teacher in Pitteuchar East primary school in my constituency and who told the committee about evidence that suggests that, if children are not exposed to STEM subjects by the age of 10, which is primary 6, they will not choose them later in their school career. This question is really for the practitioners. Do you think that, by the time that children get to secondary school, any interventions that are aimed at challenging the gender divide are too late?

Susan Boyd: That is a difficult question to answer. In my experience, a lot of rich STEM things go on in the early years, and that is mentioned in the papers. It happens without early years practitioners or anybody else, including parents, knowing that it is STEM, because, as we know, everything is maths.

The worry is whether we have the know-how in the STEM subjects in primary. We have talked about interdisciplinary learning. When we were putting together the Highland science programme, our concern was that science is not taught cohesively and progressively in primary schools because it is all taught through interdisciplinary learning, and that gives us a problem when we get to the 10-plus bracket. We want children to be interested in chemistry, physics and biology, so

they have to be taught those. They have to have the knowledge and they must be taught the skills, and I am not sure that that is happening consistently.

Jenny Gilruth: Would you advise that the subjects be taught discretely? One challenge for science-based subjects is that, when pupils enter secondary 1, science is usually delivered as a general subject until the end of S3, and it might not be obvious to pupils that they are studying physics, chemistry or biology. Is that a challenge in primary as well?

Susan Boyd: It is a complex issue. Actually, it can be great for children not to be aware that they are doing chemistry. When they are out doing the Coca-Cola and Mentos challenge, little do they know that they are exploring a science concept that high-level scientists are still arguing about. We need to be clear that, once children get into primary, they need interdisciplinary learning, which is rich, diverse and important, but we also need to teach discrete science skills and lessons, and teachers need the skills and training to do that.

Jenny Gilruth: My final question is for Ian Menzies. I should say that, in a previous life, I used to work with Ian in Education Scotland.

I am interested in Education Scotland's role in supporting work in the area. I have not worked in Education Scotland for five years now—

Ian Menzies: You would be welcomed back. [*Laughter*.]

Jenny Gilruth: Perhaps you could explain what your role looks like. How do SEOs work with Her Majesty's Inspectorate of Education to ensure consistent delivery on equalities? We have heard previously from Professor Ian Wall that, in

"the last five inspection reports of primary schools in a year, equalities was dealt with in one case in two sentences, and in the others in one sentence."—[*Official Report, Education and Skills Committee,* 27 March 2019; c 13.]

I realise that you are not a member of HMIE, but how do SEOs work with it? Do you have development officers around you centrally? You have spoken about the RICs, but are you supported by a team in Education Scotland centrally, and if so, what does that support look like?

Ian Menzies: That is one of the fabulous strengths of Education Scotland. When I came into post a number of years ago, one of the first things that was presented to me was the three to 18 curriculum impact report on sciences, which had been done by the inspectors and which looked at the strengths of the system on sciences and aspects for development. That became my work plan.

Over the years, it has been nice to have day-to-day contact with our HMIE colleagues. Occasionally, they will say that there is fabulous practice in a school and that it would be wonderful for me to go and find out how we can share it more effectively. For instance, a couple of years ago, we did that with Moffat academy, which has a strong cluster approach. Following an inspection, we organised an open day and invited people from around Scotland to see the practice there. Similarly, our inspectors might give us intelligence on an area where support is needed with STEM, and we can then mobilise resources in our curriculum teams to provide that.

Some of the feedback that we are getting in the inspections shows that positive progress is being made in STEM, and we are seeing examples of highly effective practice, although the situation is still variable. Practice is strongest where the settings make good use of partnerships with local employers and so on and develop their learners' skill sets, and we are also seeing practitioners challenging traditional stereotypes. All of that intelligence from the inspections has been really useful for our work.

As for the resources that we have, I have been managing the new team of STEM officers in Education Scotland for the past four months now, and I also have oversight of the improving gender balance and equalities team. The RAiSE programme, for instance, is led by Gayle Duffus, a national education officer, who, although based in Education Scotland, is actually employed by the Wood Foundation. I have oversight of and try to shape and co-ordinate all that work on a day-to-day basis.

We are moving into a new space in Education Scotland, with all the staff, including me, embedded in the new regional teams, and it is an approach that gives us wonderful new opportunities. The new staff will be embedded in the regions and will work with literacy and numeracy officers and attainment advisers. I will still have oversight and play a role in that work, and we will have regular opportunities to come together, look at the STEM strategy, feedback from practitioners and data from our STEM survey and try to develop the vision and the actions that will allow us to have the impact that we want.

Tavish Scott: I wonder whether our teachers can tell us whether the rising class sizes in primary schools are helping or hindering the teaching of STEM subjects.

Susan Boyd: I am in the fortunate position of teaching in a rural school. I have taught in a city school in Inverness, in a class with the maximum number of children, but the school itself was quite well supported and resourced, and at the time—which is a few years ago—what you have

highlighted was not an issue. Where I am at the moment, we have good class sizes, so I cannot really comment on that particular issue. What I can say, though, is that this is the first year in 15 years that I have had no classroom support and, if 80 per cent of your children have additional support needs, it makes not only developing STEM but delivering the core curriculum a very tough ask.

Tavish Scott: Indeed.

Elisabeth Kelly: In early learning and childcare, we have to adhere to certain ratios. For example, if you have 80 children in a building—which we try not to have—you will have a ratio of one to 10 or one to eight that you have to meet. Given that, I suppose that what you have asked about does not affect us, but my personal experience suggests that the more qualified and great staff that you have to work with a certain number of children, the better the learning experience.

Tavish Scott: According the Government's own figures, class sizes in primary schools are rising significantly in most parts of Scotland, so the general pressures are clear and, I assume, affect all aspects of teaching.

Elisabeth Kelly: Yes. I do not really know where the figure for class sizes came from in the first place, but they are big.

Susan Boyd: My experience of having 33 children in a class is that it is not an issue, as long as you are well supported. At the moment, I am teaching 20 children, but the school does not have the resources to offer support to some of the learners in my class. They are supported by me, parents and volunteers, and in many creative ways that our school is developing, but obviously we would be much happier if we had core support staff to meet those learners' needs.

Tavish Scott: Ian Menzies, is there one school inspection report that demonstrates that this is an issue in Scottish education?

Ian Menzies: As far as staffing is concerned, I am not from the inspection side of things, but I have some information about what is happening with STEM and I can talk about the gender balance and equalities aspects.

Tavish Scott: As far as you are aware, the teaching of STEM has never been flagged up in an inspection report as being affected by the pressure that Susan Boyd and thousands of teachers across Scotland have been reporting.

Ian Menzies: We are seeing positive progress—

Tavish Scott: That is not what I asked. Can you answer the question?

Ian Menzies: As I have said, I am not an inspector, but, if you want that information, I can send it later.

Tavish Scott: But you have just explained to Jenny Gilruth that you are in charge of STEM for Education Scotland. Are you telling us that you are not aware of this issue being flagged up?

Ian Menzies: We can send that information at a later date—

Tavish Scott: But you are not aware of it.

Ian Menzies: What I am saying is that we are seeing progress with STEM.

Tavish Scott: That is not what asked. I wonder whether Andrew Bruce can give us some context to this issue.

Andrew Bruce: On Susan Boyd's point about additional support for learning, the cabinet secretary is committed to a review of additional support for learning.

Tavish Scott: That is welcome.

Andrew Bruce: I am also aware of the increases in teacher numbers in previous years. In particular, there are more primary school teachers than there have been since around 1980. There are rises in those numbers.

Tavish Scott: That is not the point that Susan Boyd was making. She was talking about support for teachers in primary classes.

Andrew Bruce: I appreciate that, and I have made a comment about ministers being committed to examining the support element.

Tavish Scott: I want to go back to the point that Susan Boyd made about her union's submission on initiatives. It helpfully sets out five initiatives—I can think of six, if we include languages in schools—that primary school teachers are being asked to implement, if that is the right expression.

Do you have a sense of what is the most important initiative? I do not envy you at all. It looks impossible to me. All the initiatives are valuable—I get that—but I wonder how you know which is the most important. Are you given guidance on that?

Susan Boyd: In my staff survey, one of the feedback comments—it was anonymous, but I know the handwriting of members of staff, so I know who wrote this—concerned the question of balance. Even though I am passionate about STEM, I agree that there has to be balance. That is what we all want for our children. The National Association of Schoolmasters Union of Women Teachers and other unions are highlighting that literacy and numeracy are hugely important, as is health and wellbeing. To be frank, because of the

needs that pupils in my current class have, I have probably spent five months teaching literacy, numeracy and health and wellbeing almost exclusively. That is what that specific class needed, and I was able to do that because of the support that I had in the school. Now, in the final weeks and months of the term, I have more opportunities to enrich the curriculum with a variety of other subjects.

We are aware of all of those initiatives, and we are all trying to balance them.

Tavish Scott: Thank you. That is very fair.

Elisabeth Kelly: We are all trying to achieve balance with regard to initiatives, but individual local authorities have their own priorities. We have the national improvement framework, and each local authority makes its own quality improvement plan, and there are clusters that make plans and then each headteacher makes a plan. At that point, the staff on the ground input into their own quality improvement processes, certainly with regard to early learning and childcare, and that involves a consideration of what the Government is saying, what practitioners are saying and then—in early learning and childcare—what that cohort of children needs at that time. As professionals, we try to balance all the things that are coming at us.

Tavish Scott: In your submission, you made a good point about taking children outside the school and into the wider world. I come from a farming background, and when I was farming—long before I was in politics—we used to get primary classes coming to the farm around lambing time. The children would come and pick up lumps of silage and learn about how putting fertiliser on a field helps the grass grow—all that kind of stuff. We do not get those visits now. The point that you make in your submission is that teachers—and I suppose that you are suggesting that local authorities are the same—tend to make a consideration that is solely about the risk that is involved rather than about children learning about our world. I so agree with that point. Could you add to that?

Elisabeth Kelly: I come at this from a learning sustainability angle. A couple of years ago, the Care Inspectorate published its "My World Outdoors" early learning resource. That is all about getting kids outdoors. For a long time, that has been the priority because, for some reason, we had previously taken an approach that very much involved staying inside our schools, in the playgrounds and the classrooms. There has been a big push to get everyone outside again, which is fantastic. However, with that push came a big slant on risky play. The Care Inspectorate understood that there was a perception that it was against risk, which is probably why it had to push this big "We love risk! Be risky—it's great!" statement. However, because of that, a lot of the staff in early learning and primary schools think that going to a forest and experiencing risky play is the most important thing. I think that we need a shift back to people understanding that those activities are about learning about our world through our world—through real contextual experiences.

It is all well and good going to a forest—I think that forests are wonderful—but if you live in Mayfield in Dalkeith, for example, that is not your daily reality of your community. For me, going out into a local green space is better—or even some other place, because, if you do not have a green space around you, there is nothing worse than being made to feel that that is detrimental to your health or your wellbeing. We need to help these people love the communities that they are in and experience the world around them.

11:45

Tavish Scott: Are there some practical things that you would like to be done that would help that to happen? You mentioned the Care Inspectorate. Does it have to do a bit more in that regard? Could other agencies do something?

Elisabeth Kelly: The Care Inspectorate recently published a document called "Out to Play", which is a step further on from "My World Outdoors". It gives more practical guidance about getting children out of the school grounds. I was pleased to see that it contains references to sustainability and to embracing the idea of learning about the little things when you are outside. Hopefully, that approach is slowly coming in.

In my experience, teachers are afraid to take children outdoors. They are afraid to leave the classroom. They are even afraid to go into the playground. That relates to some of the points that Susan Boyd made. If you do not have that support with you and you have a class of 30 children, some of whom might present distress behaviours, you are probably not going to go to a farm. You need a lot of support to do that, because you cannot otherwise guarantee everybody's safety.

Ian Menzies: Education Scotland's view is that learning for sustainability and STEM should not be viewed as initiatives. Learning for sustainability is an entitlement in the curriculum. As we have just heard from Elisabeth Kelly, we know that young people are passionate about getting outdoors, exploring and getting to know the world. We have seen that recently in young people's passion about climate change and reducing the use of plastic in our schools.

Similarly, STEM is a context for learning that gives learners a chance to apply their learning in a

meaningful and engaging context. I am privileged in that I am able to visit schools around Scotland, and I see that there is not a sense that STEM is a burden; rather, there is an energy and enthusiasm around it. That comes through in the information that you have heard today. STEM is an engaging, exciting, meaningful context for young people—

Tavish Scott: What is Education Scotland doing to break down the barriers that exist in terms of risk?

Ian Menzies: In partnership with the Scottish Government, we have produced the "Going Out There" online resource, which we developed in partnership with the Scottish Advisory Panel for Outdoor Education. That gives teachers support around managing risks, conducting risk assessments and so on. That is a practical way in which we are breaking down those barriers.

Tavish Scott: So, you have given teachers guidance.

Ian Menzies: We have given them guidance, support, and information on how to manage risk assessments and how to visit places such as farms, forests and so on—

Tavish Scott: But that does not involve giving Susan Boyd the support that she needs, which involves extra assistance in her class to get those kids out of school.

Ian Menzies: One of the things that we are doing with the new RAiSE officer team—we are going to be doing it with our STEM team, too—is provide them with training in outdoor learning and how to take the education experience outdoors, so that they can provide that support locally to schools, clusters and practitioners, and within the regions.

Susan Boyd: I would like to pick up on some points that have come up. Risk is an important issue, and risk assessments are part of the growing workload that holds us back in terms of delivering all the areas of the curriculum. STEM is included in that because a lot of our STEM experiences are outdoors, so that involves spending time going online to complete risk assessments and so on. One of my big challenges is workload. Although there have been working groups on reducing teachers' workload that have come up with wonderful recommendations, local authorities are not necessarily implementing them. That creates a huge pressure in relation to our ability to deliver any valuable learning and teaching, and particularly STEM.

The Convener: I thank the panel members for attending this morning. Our deliberations will continue next week.

11:48

Meeting continued in private until 12:00.

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