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The Learned Societies' Group on STEM Education

Ms Shirley-Anne Somerville MSP
Cabinet Secretary for Education and Skills
The Scottish Parliament
Edinburgh
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Dear Cabinet Secretary

Learned Societies' Group on Scottish STEM Education

I write to you as interim Chair of the Learned Societies' Group on Scottish STEM (Science, Technology, Engineering, and Mathematics) Education (the LSG). The LSG welcomed the publication of the OECD's report on its review of Curriculum for Excellence (CfE) in June 2021. Building our national STEM capacity is of critical importance if Scotland is to realise its social, economic, and environmental aspirations. While the Scottish education system is commendable in many respects, we were very supportive that a comprehensive review of CfE be undertaken, and we are keen to contribute as constructively as we can to the implementation of the OECD recommendations.

The LSG is considering in detail the recommendations of the OECD report and the accompanying commitments made by Scottish Government. In principle, we are supportive of several of the measures that have been proposed by Government. Fundamentally, we would like the implementation process to be mindful of the unique qualities of education in the STEM subjects such as an emphasis on practical work and the need for coherent progression. This will ensure that any proposed solutions do not inadvertently neglect nor exacerbate existing issues while also facilitating high-quality teaching and learning in the STEM subjects. Our key responses to the OECD report are summarised below and we intend to submit our more detailed reflections in due course.

- Although we understand the desire to react swiftly to the OECD report, many of their proposals will require the collection and application of concrete evidence, serious reflection, and widespread consultation. Such consultation should necessarily involve a diverse range of

stakeholders including the teaching community, parents, learners, employers, tertiary education institutions, and representative and subject bodies. In order to change the system in such a way that it really does lead to Scottish education once again ranking amongst the best in the world, this evidence-gathering and engagement should not be rushed. The OECD called for a long-term approach to implementation. We are concerned, therefore, that publishing an ‘implementation plan’ (OECD recommendation 4.1) in September may be unrealistic, especially when some key stakeholder groups, including the refreshed Scottish Education Council and the new Children and Young People’s Education Council, have still to be established. It may be appropriate to publish a timetable indicating when important targets in the review and reform process should be achieved, and who will be responsible for them.

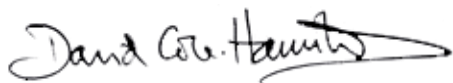
- Coupled with the above comments, there is a risk that the structural reforms to which Scottish Government have committed (i.e. relating to Education Scotland and the SQA; in response to OECD recommendation 3.2) will take precedence over the need for Scottish society to consider what kind of education system we require, including the balance between knowledge and skills, and on the nature of curriculum content and assessment. It is important that there is sufficient time and space afforded to discussing these fundamental issues ahead of structural reform.
- There are many places in the commitments where the Scottish Government discuss engagement with practitioners, teachers, academics, and other stakeholders. We strongly endorse the need for widespread engagement and are able to offer multiple routes to reaching many of these stakeholder groups through our individual societies’ networks. Not only do we represent academics and teachers, we also advocate for the best interests of our subjects and so are able to offer subject-specific perspectives that may not otherwise be captured through more general consultation exercises. Stakeholders consulted should also include members of the public and young people, and the LSG is in a strong position to facilitate such interaction in the STEM areas.
- For the STEM subjects in particular, building a secure knowledge base through a coherent progression throughout Broad General Education (BGE) and into the senior years is essential. Whilst maintaining breadth is very important, the STEM subjects require ongoing depth to enable students to progress in their understanding. A move to a more interdisciplinary approach is desirable in many ways but it is challenging to do this in a way that ensures a coherent and gradual building up of skills and knowledge in the STEM subjects. (OECD recommendation 1.2)
- The plans for the adaptation of the senior phase are not yet clear. We view this aspect (OECD recommendation 1.3) as potentially the most critical of all the commitments, and will reflect on the recently published report on options for Scotland’s future approach to assessment and qualifications. We believe there is both an appetite and a need within the education system for a significant shift. Substantial and wide-ranging public and stakeholder engagement will be required to consider the potential options and to help determine the approach that would meet Scotland’s needs. The LSG has expertise to provide evidence for how such a change could benefit the STEM subjects and, as above, would be keen to facilitate public and STEM education interaction. We also believe that, if the senior phase is to align more closely with the ethos of the rest of the CfE, the design and implications of its assessment should be given careful consideration alongside the design of the curriculum.
- The commitments are demanding of teachers in terms of developing and delivering appropriate curricula throughout BGE and the senior phase (OECD recommendation 1.4). We welcome these but believe that in order to achieve these, teachers need access to ongoing, well-designed support, including subject-specific support. For example, delivering the fundamentals of the

STEM subjects in primary schools requires deeper STEM subject expertise in primary teachers than is currently common, and keeping up with subject developments to ensure up-to-date curricula is particularly challenging in the STEM subjects, which are fast-moving, and requires access to sustained career-long professional learning.

- The issue of teacher recruitment and retention is crucial. We strongly welcome the commitment to additional hours for teachers outside the classroom for professional and curriculum development (OECD recommendation 3.1), but this is only achievable through recruiting additional teachers. This will be very challenging in many of the STEM subjects, where we are already experiencing severe teacher shortages. Without additional teachers there is a risk that existing teaching resources will be spread even more thinly. There needs to be more research into how to resolve these challenges, building on existing research on addressing the shortage of Computing Science teachers in Scotland ([Judy Robertson, 2019](#)) and a commitment to implementing the recommendations of such research.

We have arranged to meet with Professor Kenneth Muir to discuss how we can input into to his review of the reform of Education Scotland and SQA. However, we recognise this is just one aspect of the reform agenda and so we wish to offer our support and expertise more generally to ensure that the STEM subjects are adequately represented in this process. For example, our collective convening power means we are well-placed to facilitate cross-disciplinary discussions to help inform any implementation plans, including having access to networks of practising teachers in the STEM subjects. We also possess and collect a range of data that can shed light on the nature and extent of issues such as multi-course teaching and gender disparities in the STEM subjects. If you would find it useful, the LSG would be pleased to meet with you to discuss our positions in more detail and the part we can play in fulfilling the recommendations of the OECD report. To this end, we would be grateful if you could follow up with the LSG's secretary, Daria Tuhtar, at dtuhtar@therse.org.uk.

Yours sincerely,



Professor David Cole-Hamilton FRSE
Interim Chair of the Learned Societies' Group

CC Mr Jamie Hepburn, Minister for Higher Education and Further Education, Youth Employment and Training

