THE ROYAL SOCIETY

Royal Society response to the Advanced British Standard (ABS) consultation

March 2024

1. Executive summary

1.1. The Royal Society welcomes the opportunity to provide comment on the Department for Education's consultation on the proposed Advanced British Standard.

1.2. The Royal Society is a Fellowship of many of the world's most eminent scientists and is the oldest scientific academy in the world. The Society's fundamental purpose is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity.

1.3. Our strategic priorities are to promote excellence in science; to support international collaboration; and to demonstrate the importance of science to everyone. It is for these reasons that the Society has a long-established schools education engagement and policy programme to ensure that the UK maintains its status as a world-leading scientific nation, to encourage science, mathematics and computing education-to-18, and to generate evidence and analysis to support a range of public policy decisions.

1.4. The Royal Society has long advocated for change, most notably through the publication (in 2014) of its 'Vision for science and mathematics education' report. The Society stated then how the narrow A level-dominated system forced young people to reduce significantly their options for study at the age of 16. Ten years on, little has changed, with an average of only 2.7 subjects studied at A level.

1.5. As education systems continue to recover from the effects of the Covid-19 pandemic, we can see the fragilities in our system that were exposed during prolonged periods of school closures and exam cancellations – an inequality of access to technology; an overreliance on high-stakes terminal assessment; and a continuing struggle to recruit and retain enough teachers in shortage subjects. In addition, policymakers and employers are keen to ensure the education system is providing the right skills and knowledge necessary to help achieve economic recovery and future growth.

1.6. Any reform to the education system should contribute to addressing some of the fundamental challenges facing the system, such as meeting future economic and social need, ensuring greater equity across the system, increasing real choice for young people, recognising teachers' professionalism through promoting greater professional agency, and achieving genuine parity between all educational routes.

1.7. Reforms on this scale should be carried out following a full, independent review of the school education system, reflecting the interdependency of the different phases and seeking to avoid unintended consequences of reforming a single part of a complex system.

2. **Recommendations**

2.1. The Royal Society recommends that the Government should commit to a fundamental review of the education system, starting with questions which focus on the nature of our education system in the mid-21st century, including:

- What is education for?
- What do young people need to know and to do?
- What is the future role for teachers and how can the status of teaching be improved?
- How to nurture the skills essential to thrive in the face of a complex and uncertain world?
- What should schools be measuring, for what purpose and for whose benefit?

2.2. In recognition of the Prime Minister's commitment to mathematics, data and numeracy, the Society recommends that the Government should consider the work of the Royal Society Advisory Committee on Mathematics (RS ACME) Mathematical Futures Programme, within its planning for the ABS.

2.3. The proposed reforms would place significant demands on the teaching workforce. The Society therefore strongly recommends that while it develops the reformed curriculum structure and content, the Government should pay significant attention to the contribution of teachers as partners in the process. Through focusing on the positive educational benefits and partnership, the Government should set out how it values teachers' contribution to the creation of new structures, qualifications and content.

3. Introduction

3.1. The Royal Society believes that educational reform is crucial now for several reasons. The current education system does not serve the needs of all learners, and if the UK is to achieve greater economic productivity, remain world leading in sectors such as science, and provide an education which allows all young people to succeed, then significant changes to the teaching profession, assessment, and the way the education system is structured are needed. Education is a powerful way for governments to help improve society by providing future skills for the economy, preparing young people for fulfilling lives and strengthening engagement with wider society as citizens.

3.2. The Royal Society's longstanding vision for a broader education is now even more urgent, as this would better prepare students with the versatile sets of skills and knowledge that are essential for understanding the complexities of an increasingly technologically driven and cross-disciplinary world. England especially has one of the narrowest systems in the developed world, which means its students are missing out on opportunities afforded to their OECD counterparts, including access to wider knowledge and skills essential for future work and study.

3.3. Under the current system, young people have an illusion of choice - in theory they can choose their own subjects for GCSE and A levels, but in practice these choices are often limited by such factors as teacher shortages, regional disparity, higher education requirements, subject/course provision and assessment.

3.4. The Advanced British Standard should offer the opportunity for a major rethink of the way the secondary education system in England functions, what young people moving through the system need to know by the time they leave, and how we can ensure that teaching, learning, and assessment are accessible and appropriate for learners at all levels of their education. However, under the current proposals, the ABS appears to be a framework intended to fit around the existing education system; making tweaks to the way A levels and T Levels are delivered but fundamentally changing relatively little about how the system operates. The Government should instead give more consideration to ideas that take us beyond a simple reorganisation of existing subjects and adjustments to assessment whilst assuming a similar structure as is currently in place.

3.5. The Royal Society welcomes the focus on how the education system needs to change to address the needs of young people now and in the future and wholeheartedly agrees that there need to be significant changes made to the secondary education system in England to ensure all young people can succeed and are able to progress to their chosen career. However, the Society believes that the ABS could reach further in its aims and its ambition to fully transform the education system. The Government has set out a ten-year timeframe for the ABS to be fully implemented, and this would allow time for a proper review of the system followed by a series of reforms which would tackle some of the biggest issues within education today.

3.6. For example, the ABS proposal focuses on the greater breadth of subjects studied post-16 without using the opportunity to explore how to improve recruitment and retention of teachers to teach the proposed expanded offering. While it does compare guided learning hours in addressing an international context, there are few other

references to what works in other jurisdictions. The potential introduction of the ABS offers an opportunity to consider fundamental questions about the purpose and nature of education and assessment, and the potential that technology offers to teaching, learning and assessment.

3.7. Though we welcome the inclusion of technical qualifications within the proposal for the ABS, we are concerned about the development of an additional secondary track, the ABS 'occupational' route, for those pursuing technical routes. In addition, the inclusion of both technical and academic qualifications within the same framework should consider how to serve those who would want to keep options open for either of these routes in future, such as allowing learners to choose a mix of qualifications. The key question remains how to ensure equal esteem for technical routes (discussed further below in 4.13-14).

4. The Advanced British Standard: proposal and suggested design

4.1. The ABS focuses on a narrow but high-stakes educational phase for those in compulsory education. It is the Society's view that the 16-18 stage cannot easily be reformed in isolation from what precedes it, or indeed, what follows. Positioning a new qualification structure without more detailed consideration of its potential effects on a system that has evolved organically over a long time will likely produce negative unintended effects. Which is why the Royal Society recommends a holistic review of the secondary system, before attempting to design a new approach to one particular stage.

4.2. As mentioned elsewhere in this response, one of the key issues with the current system is the lack of choice learners can make about their own education. The ABS seeks to address this through providing the opportunity for learners to take three majors alongside two minors, but the Society is concerned that this proposal could be just as restrictive as the current system is for most learners.

4.3. The structure based around major and minor choices resembles A levels and two AS levels but does not necessarily offer the same breadth that a free choice of those five qualifications would have. Under AS and A levels, young people were in theory free to choose a mix of subjects and disciplines according to their own interests, desired progression, and their school offer.

4.4. Under the ABS proposal, many young people would still in effect be restricted in their options, with mathematics and English taking up two of the five available 'slots' across majors and minors. Given this restriction, it is likely that many students would simply add an additional subject that supports their intended progression path unless they have a special interest in another subject that would provide more genuine breadth. Hence, there is a real concern that the introduction of the ABS looks to be a post-16 version of the EBacc, and as such could lead to further rigid accountability measures which would place institutions under greater pressure, resulting in unhelpful practices and consequences.

4.5. The decoupling of AS levels from A levels has been cited as one reason for a marked decline in the number of qualifications taken per student – a fall of 43% between 2016 and 2019[1]. AS levels were seen to have significant educational benefit from many across the education sector, allowing students to understand their progress and to refine their progression options, such as applying to universities with different entry requirements according to their AS level results[2]. If it constrains itself to focusing solely on 16-18 education, the Government should consider how the 'minors' aspect of the ABS could be used to recreate some of these benefits, rather than simply being used as a way for most students to access additional mathematics and English qualifications.

4.6. As stated by the Department for Education (DfE) in communications regarding the ABS, one of the four key principles for the introduction of the ABS is to bring our education system more in line with international counterparts in a variety of ways. This

[1] https://epi.org.uk/wp-content/uploads/2021/09/EPI-Royal_Society-16-19-report.pdf

[2] https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/letter_to_schools_and_colleges_wales.pdf

is a valid goal, but there are several areas where the proposals within the ABS do not necessarily accord with this aim. For example, many international counterparts, including other OECD countries, employ mixed methods of assessment throughout the education system as part of baccalaureate or diploma style study, as well as for several other qualifications.

4.7. It has been well documented that in any given year, approximately a third of students will fail to reach a standard pass in their English and mathematics GCSE exams[3], and following reforms to GCSEs introduced from 2014, the new exams were found to have a more negative impact on disadvantaged students than on their more advantaged classmates[4].

4.8. In addition, there is a stark contrast between those students in state-maintained schools sitting GCSEs, many of whom are assessed entirely by exams, and students in the independent sector who benefit from being able to sit alternative qualifications, including the IGCSE, where in some subjects up to half of the assessment is via coursework[5].

4.9. Moreover, young people across the UK are still recovering from the disruption caused by school closures and exam cancellations during the Covid-19 pandemic. This has had a negative impact on attainment across all young people, and has particularly affected those from disadvantaged backgrounds, causing in some cases the attainment gap between disadvantaged students and their peers to increase[6].

4.10. In 2021, the Education Policy Institute published research commissioned by the Royal Society which indicated that individuals who had studied a broader range of subjects in A level had higher earnings on average by their mid-twenties than individuals who had studied a narrow range of subjects[7]. The Society was pleased to see this research cited by the Department in the October 2023 publication *A world class education system,* although the Government's proposals fall short of what is needed to ensure all individuals have this same opportunity.

4.11. The Royal Society strongly believes that a reformed education system should seek to close the attainment gap between disadvantaged students and their peers, and recommends the Government reconsider its focus on high stakes exams as the primary assessment method for the majority of subjects and qualifications.

4.12. At a Royal Society roundtable in 2023[8], attendees discussed potential future assessment reform. In particular, the roundtable focused on the need to define what

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[3] For example https://www.ascl.org.uk/Our-view/Campaigns/The-Forgotten-Third;

[4] https://www.forbes.com/sites/nickmorrison/2019/12/04/tougher-exams-are-bad-news-for-disadvantaged-students/

[5] https://www.theguardian.com/education/2023/jun/08/state-school-pupils-at-a-disadvantage-from-tougher-exams

[6] https://d2tic4wvo1iusb.cloudfront.net/documents/guidance-for-teachers/covid-19/Impact_of_Covid_on_Learning.pdf?v=1652815530

[7] https://epi.org.uk/wp-content/uploads/2021/09/EPI-Royal_Society-16-19-report.pdf

[8] [8] The roundtable took place in February 2023 under the Chatham House Rule, and included attendees from Higher Education, awarding organisations, education researchers and other stakeholders.

the purpose of assessment is, and that at its core, education must seek to help young people, and must not disadvantage groups of learners from any background. In addition, attendees agreed that current assessment methods are not necessarily always suitable for the needs of employers as they measure a narrow range of capability. Employers are increasingly looking to test attitudes and aptitudes rather than relying on assessment grades, which they report lower confidence in over recent years.

4.13. The Society would also recommend the Government consider whether, within a new and reformed education system, high-stakes assessment points are needed at both age 16 and 18. A whole-system review which looks at progression and the potential impact of incorporating more formative assessment methods may find that this is unnecessary. The Society is concerned that the proposal for two routes within the ABS, the ABS and the ABS (occupational) does little to dispel the suggestion that technical or vocational qualifications and pathways are secondary to academic ones.

4.14. As stated in the ABS proposal 'A world class education system', released in October 2023, a key aim of the ABS is to 'end the artificial separation between technical and academic routes, delivering genuine parity[9]'. It is our belief that the kind of genuine parity intended here, and needed across the education system, is not possible with the separation of routes proposed in the consultation document. More careful consideration needs to be given to how the proposed ABS 'occupational' route would allow for genuine parity, and how this would fit with pre-16 and post-18 options for technical routes.

4.15. The Royal Society supports the continued inclusion of employability, enrichment and pastoral activities within the ABS framework. However, we believe that more consideration needs to be given to how some of these components, specifically the provision of work placements, would be made available to all students.

4.16. We think that the Government should consider what can be learned from the current provision of placements through the T Level qualifications, which has been cited as a potential barrier to increased uptake of these qualifications[10]. If the ABS were to encourage more students to take up industry placements, a more thorough plan would need to be put in place to encourage more employers to offer work experience to learners, and for the Government to ensure that the number and type of placements available are spread across the country, with students in areas of disadvantage or in rural areas still able to access the placements of most relevance and interest to them. It is also worth reflecting on the feedback from industry on the implementation of the Apprenticeship Levy, with many employers highlighting the inflexibility and high administration burden.

[9] https://assets.publishing.service.gov.uk/media/651d3c116a6955000d78b292/A_world-class_education_system_-_The_Advanced_British_Standard__print_ready_.pdf pg 22

[10] https://schoolsweek.co.uk/students-misled-and-teachers-struggling-ofsteds-verdict-on-t-levels/

5. Mathematics education up to 18

5.1. The Royal Society strongly supports the ambition to increase the number of young people who study a form of mathematics to the age of 18, and we are pleased to see the focus on the importance of mathematics within the ABS proposals. However, the proposals do not contain enough detail about the nature of the type of mathematical education to 18 that will be offered under the ABS, nor the steps which would be required to recruit new, and train existing, teachers to match the increased demand the ABS would create. The Society believes these are significant issues which need to be considered before making changes to mathematics education in this way.

5.2. The proposal for the ABS suggests learners will be required to study mathematics (as well as English) to the age of 18, as either a major or minor subject choice, bringing England in line with most international counterparts. In particular, the ABS consultation document specifies that the content of the extended mathematics offer should be 'stretching and rigorous' to encourage young people to take up the 'highest level of maths... they can access.'

5.3. The Society agrees that all young people need to learn how to confidently engage with mathematics, data and statistics through the course of their education. As part of the Society's extensive Mathematical Futures Programme, which was launched in 2020 and will be publishing a final report in summer 2024, the Society will make the case for a new approach to mathematical education for everyone, providing the mathematical skills and knowledge necessary for all from the everyday needs of all citizens to the brilliant academic mathematicians of the future.

5.4. To achieve this, the Society recommends change across the whole education system, including:

- a new curriculum for mathematics from early years through to school-leaving age;
- reform of pathways and qualifications from the age of 14;
- assessments that provide accurate information about what pupils know and can do; and
- better use of digital technologies.

5.5. We anticipate these changes would take 10-15 years to fully implement – roughly the same timescale as the proposed ABS – and would need investment and careful planning. We would welcome the opportunity to discuss our work on mathematical and data education in more detail with the Department.

5.6. The Mathematical Futures Programme sets out a new approach, which the Society refers to as mathematical and data education, which we believe would help to equip future citizens with the capabilities, skills, adaptability and resilience they need to lead fulfilled lives in a fast-changing, data-rich world where mathematics and data play increasingly important roles in everyone's lives.

5.7. The Society remains in favour of increasing Core Maths provision across the UK, enabling more young people to have the opportunity to take mathematics qualifications beyond the age of 16. In 2022, the Royal Society and British Academy published a joint statement explaining the value of Core Maths qualifications, suggesting that in addition to increased Government funding for provision, universities

could incentivise prospective students by including Core Maths in entry requirements, and employers could consider offering Core Maths as a professional development opportunity for employees[11].

[11] https://royalsociety.org/-/media/policy/publications/2022/2022-01-26-core-maths-joint-statement.pdf

6. **Teaching profession**

6.1. Government data for England show teachers are leaving the profession in record numbers and that too few new recruits[12] are joining it. In many secondary subjects, there is an increasing reliance on non-subject-specialist teachers[13] to take lessons. Anecdotally, some secondary school mathematics, computing and science departments now have no recognised subject specialists[14].

6.2. Any major system reform, including the reforms which are suggested within the proposals for the ABS, will need to reverse this situation. A compelling vision is required that, with teachers' buy-in, resets the teaching profession. This vision needs to recognise teachers' value and agency by restoring to them the professional autonomy and responsibility they appear to have lost. This may include:

- considerations such as greater trust in how teachers teach and assess students;
- new accountability measures that value developing the analytical, problem-solving, critical thinking and creative capabilities employers increasingly need alongside knowledge acquisition;
- embracing AI and other digital technologies so that, for instance, teachers can potentially provide for the specific learning needs of individual students, or work more flexibly, and so that students know how to use these tools properly and about their limitations;
- reinstating subject-specific knowledge as an essential focus within initial teacher education and throughout teachers' professional careers; and
- a commitment to a model of sustainable funding for provision of high-quality professional development on the understanding that this may require absence from the classroom.

6.3. In this new system, teachers would be enabled to become what Andreas Schleicher has called[15] 'active agents of their own professional growth', free to teach innovatively, and trusted as the principal reformers of education in schools and colleges. Teachers would be more responsible for interpreting the curriculum and for driving their own professional development, an essential requirement for a teaching career.

6.4. In addition, the Society believes that the need for expert teachers across mathematics, physics and computing, in particular, is increasingly vital. Education reform on such a large scale will be at risk unless it is properly resourced with the right expert teachers to make the new system a success. Future changes to the education system will require teachers who are sufficiently experienced and who have agency and positivity to work in partnership with the Government to deliver the reforms, and the Government should work with teachers to ensure consent of and support for these changes ahead of them being implemented.

6.5. The current shortage of suitably qualified specialist science teachers reduces the UK's capacity to offer high quality STEM education. According to Ofsted, 26.6% of teaching hours in physics in 2019 were taught by teachers with no relevant post-A level

[12] https://www.nfer.ac.uk/publications/teacher-labour-market-in-england-annual-report-2023/

[13] https://schoolsweek.co.uk/extent-of-classes-taught-by-non-specialist-teachers-revealed/

[14] https://www.schoolbus.co.uk/news/featured-article/number-of-teachers-leaving-the-profession-hits-record-high/9649

[15] https://www.oecd.org/site/eduistp2012/49850576.pdf

qualifications. At primary level, just 5% of teachers are estimated to hold specialised science degrees and teaching qualifications. At secondary level, a failure to meet teacher recruitment targets in key subjects such as chemistry, computing, mathematics and physics remains a persistent problem. Physics also suffers from a higher graduate attrition rate than other areas of teaching[16].

6.6. Teachers, particularly those within these shortage subjects, should also have access to subject specific continuing professional development in order to tackle high rates of attrition. As the DfE highlights international comparisons as a key driver behind the move to the ABS, it is worthwhile noting that teachers across the UK have access to less CPD than teachers in other high performing PISA countries. In the 2018 Teaching and Learning International Survey (TALIS), fewer than 50% of teachers in England had experienced subject related CPD in the 12 months prior to the survey, compared to almost 90% in Shanghai and 80% in Singapore[17].

6.7. The NFER Teacher Labour Market in England report for 2024 showed that the Government only recruited 63% of its target for new mathematics trainee teachers in 2023/24[18].Under the current system this falls significantly short of the number of teachers needed, which will only be exacerbated by the increased need for mathematics teaching under the ABS proposals. Teachers must have access to good quality subject specific professional development opportunities to ensure they are fully informed of recent developments and research in their field, and to stay abreast of rapid technological advancements, particularly if we expect to need more teachers of mathematics in the coming years.

[16] https://royalsociety.org/-/media/policy/Publications/2022/2022-01-31-sci-uplift-DfE.pdf

[17] https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf

[18] https://www.bbc.co.uk/news/education-68602435; https://www.nfer.ac.uk/publications/teacher-labour-market-in-england-annual-report-2024/