The Royal Society's submission to the APPG on Schools, Learning and Assessment: inquiry into assessment reform.

March 2023

1. Executive summary

1.1. The Royal Society welcomes the APPG's inquiry on assessment reform and its intention to provide advice to policymakers on how to improve education and assessment for all students.

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 and policy programme to ensure that the UK maintains its status as a world-leading scientific nation, to encourage science, maths and computing education to 18, and to generate evidence and analysis to support a range of public policy decisions.

1.4. Reform to the assessment system should contribute to helping students keep options open so that they do not close down future progression prematurely.

1.5. The Royal Society believes that we cannot have reform to the breadth of study without a fundamental change in the methods, nature and significantly the purpose of assessment, and that none of these things can take place without addressing the problems of the wider secondary education system. A national high-level government review is needed to identify these issues more fully.

1.6. Any review of the current assessment systems within the UK must look at alternative methods of assessment beyond the traditional high stakes summative exams that the system currently relies on. Discussions across the education sector and beyond have recently explored the possibility of baccalaureate style education, which usually features a range of assessment methods.

1.7. On-screen assessment has the potential to be fairer, greener, and more inclusive than traditional paper-based exams. However, any inclusion of technology in assessment needs to take into account the availability of resources, the technical infrastructure available in schools and the training needs for pupils and teachers.

2. Introduction

2.1. The Royal Society has long advocated for educational reform, calling for a long-term review of the secondary education system to include meaningful methods of assessing and measuring progress for young people among other areas. A reformed education system which prioritises interdisciplinary knowledge and skills, and assesses students using a range of methods, would help to develop the crucial real-world skills necessary to flourish in society.

2.2. New GCSE and A level qualifications were introduced in England, Wales, and Northern Ireland in 2015. Assessment in England changed from a mixture of synoptic examinations, teacher assessed coursework, and controlled assessments throughout the duration of the course, to assessment mainly by exam at the end of the course. Other changes saw the decoupling of AS and A levels, the inclusion of new and more demanding content within GCSEs, and the GCSE grading scale change from A*–G to 9–1.

2.3. Polling by the National Education Union (NEU) in 2019 uncovered concerns held by educators about the reformed GCSEs and A levels in England, with reported adverse impacts on student mental health and motivation, and views that ability is being less accurately recorded than before. Moreover, research commissioned by the Royal Society in 2021 indicated that far fewer students were taking an AS level as a consequence of their decoupling from A levels.

2.4. Good GCSE qualifications in English and Mathematics are typically required for progression to further and higher education courses and for many areas of employment. However, more than a third of students do not achieve a standard pass (grade 4/C) in GCSE Mathematics at the first attempt. Under the condition of funding, introduced in England from 2014, these students must continue to study mathematics during their post-16 education and are required to resit the GCSE examinations until they achieve a grade 4 or above or else study for a Functional Skills qualification in the subject.

2.5. Regrettably, the percentage of GCSE resit students attaining a grade 4 or above has decreased since the condition of funding was introduced, with fewer than a quarter achieving this benchmark by age 18. For the many thousands of young people who leave education without a grade 4 in GCSE Mathematics, their future employment and life opportunities are seriously diminished, with negative knock-on impacts on society and the economy. Furthermore, the 80% increase in the numbers of resit students observed since the introduction of the condition of funding has created considerable added strain on the education system, particularly for educational providers and teachers[1].

2.6. Assessment reform should not just take place across the traditional 'academic' qualifications, and any future review must consider the extensive suite of technical and vocational assessment and qualifications available across the secondary and further education sectors. There is already precedence for alternative assessment styles within the chartered and professional registration for engineers, for example. Government and awarding bodies should seek to use imaginative and innovative assessment, making use of education technology, to assess progress in technical and vocational education.

---

[1] https://royalsociety.org/topics-policy/education-skills/mathematics-education/gcse-mathematics-resits/

3. Qualifications and narrowed choices

3.1. Although students in England study a relatively wide range of subjects during their secondary school careers, it is commonly recognised that England offers one of the narrowest post-16 education systems in the developed world.

3.2. The specialised focus of A level study forces students to choose just a handful of subjects from a smaller group of subject areas. Research commissioned by the Royal Society and published by the Education Policy Institute in 2021 showed that the proportion of students with A levels and AS levels or equivalent qualifications covering at least three of the main subject groups (such as sciences, humanities, languages and maths) has halved since 2010[2].

3.3. This decline is thought to have been driven by reforms to AS and A levels, particularly the decoupling of AS and A levels which took place in 2018. The average number of qualifications taken by students has fallen 43% between 2016 and 2019, from five to three. Further to this, research carried out by Education Datalab in 2017 indicated that the average number of A level qualifications taken per pupil was closer to 2.7[3].

3.4. This is significant because research has shown that students who take A levels from a broader range of subject areas actually have an increased salary by the time they are in their mid-to-late 20s compared to their counterparts who had studied a narrow range of subjects.

3.5. It is the Society's view that students in England currently have an illusion of choice. In theory they are able to choose their own subjects for GCSE and A levels, but in reality, their choices are restricted. Limits on subjects, Ebacc and Progress 8 requirements, teacher shortages, geographical factors and entry requirements into higher education conspire to narrow options for many too early. Students are often making these choices without knowledge of the subjects and importance in future study, training and career opportunities.

3.6. Reform to the assessment system should contribute to helping students keep options open so that they do not close down future progression prematurely.

4. Parental perspectives on education

4.1. Royal Society research on parents' perspectives on the current education system in England, indicates how parents of secondary and post-16 students find it difficult to separate 'education' from 'assessment', with parents characterising secondary education as a 'trajectory' with exams as a series of 'stepping stones' necessary to get to the next phase[4]. Assessment is now so central to education that it can seem as though ultimately the only point of education is

---

[2] Diversity in A level subjects taken by students has fallen significantly over last decade, impeding career opportunities - https://royalsociety.org/news/2021/09/diversity-a-level-subjects/

[3] Post-16 Qualification and Subject Mix- a Report for The Royal Society - https://royalsociety.org/~/media/policy/topics/education-skills/Broadening%20the%20curriculum/education-datalab-report-post-16-qualifcations-and-subject-mix-05-09-2017.pdf

[4] https://royalsociety.org/topics-policy/publications/2019/parents-views-on-broadening-school-education/

examinations. Even outside of the years where high stakes assessment takes place, students and teachers are focused on the next round of exams, or on choosing subjects for the next stage of qualifications.

4.2. During the research, a key concern emerging from parents was that a broader education would lead to more exams. Though supportive of a broader system, parents express concern that in this could result in further increased workload with even greater pressure on their children.

4.3. However, parents could see the potential benefits of a broader education, especially when they are able to associate this with greater flexibility both in choosing post-18 options and later in life, and when thinking about how studying a broader range of knowledge and skills could open up more employment opportunities.

4.4. The Royal Society believes that we cannot have reform to the breadth of study without a fundamental change in the methods, nature and significantly the purpose of assessment, and that none of these things can take place without addressing the problems of the wider secondary education system. A national high-level government review is needed to identify these issues more fully.

5. **Alternative methods of assessment**

5.1. Any review of the current assessment systems within the UK must look at alternative methods of assessment beyond the traditional high stakes summative exams that the system currently relies on. Discussions across the education sector and beyond have recently explored the possibility of baccalaureate style education, which usually features a range of assessment methods:

   5.1.1. Baccalaureate-style systems allow students to take a wider range of subjects, as well as a wider range of qualifications. Practical learning, project-based learning, Extended Project Qualifications, performance-based assessment, oral assessment and more can feature as part of baccalaureate-style education.

5.2. Extended Project Qualifications (EPQs) and Higher Project Qualifications (HPQs) are alternative methods of assessing a wider range of skills including time management, problem-solving and creativity. While these qualifications may prove a credible alternative to the current exam system, it is important to consider the additional funding and resources they require, and to carefully navigate some of the challenges of implementation. This includes how to authenticate the work is the individual's own, while making use of technology to identify individual contributions to jointly produced project work.

5.3. Flexible approaches to assessment are also growing in popularity. A 'stage not age' approach to qualifications where appropriate could help to improve pass rates for certain subjects – rejecting the idea that all young people should be ready to take an exam at the same time, and instead focusing on their own knowledge, skills and development. Such an approach has been suggested with reference to digital literacy by Professor Dame Muffy Calder FREng and

Professor Simon Peyton Jones FRS[5] in a paper published on the British Computing Society website.

6. Education technology, sustainability and accessibility

6.1. It is imperative that any future changes to assessment must reflect the changing nature of the world we live in, and the changing nature of the technology that students interact with every day and also seek to take advantage of new digital technologies that have potential for usage in assessment.

6.2. Technology is a driver of change throughout every sector, and will be crucial in changing how we demonstrate educational progress and achievement. There are many potential uses for education technology within assessment and qualifications, and it could be argued that simply just deploying this to streamline the administrative side of the current high-stakes system would be remiss: the real potential for education technology lies in personalising the educational pathway of individual students, allowing teachers and learners to identify and address specific areas for development and progress.

6.3. Adaptive assessment has been implemented in Wales to provide teachers with valuable data on student outcomes. The adjustment of difficulty based on performance has the potential to help teachers tailor their teaching methods and improve overall learning outcomes.

6.4. Similarly, the Welsh regulator Qualifications Wales has committed to exploring the use of digital technologies in assessing learners including in science practical exams[6]. The potential for using digital technologies to assess scientific knowledge and problem-solving skills is something the Royal Society believes merits exploration.

6.5. **On-screen assessment has the potential to be fairer, greener, and more inclusive than traditional paper-based exams. However, any inclusion of technology in assessment needs to take into account the availability of resources, the technical infrastructure available in schools and the training needs for pupils and teachers.**

6.6. Before assessment becomes entirely digital, it is important to address the unequal distribution of technology and resources. Ensuring all young people are provided with a laptop and ensuring that all schools have access to high-speed internet is one potential first step.

---

[5] https://www.bcs.org/media/10255/digital-literacy-for-all-discussion-paper.pdf

[6] https://haveyoursay.qualifications.wales/gcse-the-sciences-dbl