ASE, IOP, RSB and RSC submission to Education Committee inquiry

The future of post-16 qualifications

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https://committees.parliament.uk/work/1637/the-future-of-post16-qualifications

The Association for Science Education, Institute of Physics, Royal Society of Biology and Royal Society of Chemistry responded jointly to the Education Committee inquiry examining how effectively post-16 level 3 education and qualifications (such as A Levels, T Levels, BTECs and apprenticeships) prepare young people for the world of work.

The Committee will consider the Government's current work and proposals in this area and look at whether an alternative model, which enables a greater blend of academic and vocational pathways, should be explored.

The joint response submitted by ASE, IOP, RSB and RSC draws on a joint briefing previously submitted to the Department for Education on Level 3 Qualifications in Applied Sciences and Engineering and established positions shared by our organisations. Our organisations have since continued discussions with the department regarding development and implementation of T Levels.

The Committee invited written submissions on any or all the following points:

- The experience to date of those taking or delivering T Levels, and any changes to T Levels that may be needed to ensure they are accessible to all students.
- The strengths and weaknesses of the current system of post-16 qualifications, with reference to A Levels, T Levels, BTECs and apprenticeships, in preparing young people for work or further and higher education.
- The benefits and challenges the Government's proposed changes to Level 3 qualifications would bring, with reference to any implications for BTECs and routes into apprenticeships.
- The extent to which the Government's review of Level 3 qualifications will impact disadvantaged groups, students from minority ethnic backgrounds, students known to the care system, and students with special educational needs or disabilities, and what measures might be put in place to mitigate any negative impacts
- The benefits and disadvantages of introducing a baccalaureate system in post-16 education that allows students to take a variety of subjects, including both academic and vocational options.
- The benefits and disadvantages of a post-qualifications admission system.
- International good practice examples of systems for post-16 education and qualifications.

The future of post-16 qualifications

The Association for Science Education, Institute of Physics, Royal Society of Biology and Royal Society of Chemistry have jointly and individually held discussions with the Department for Education on the removal of funding for Level 3 qualifications in applied science and engineering and on T Level development and progression. In March 2021 we shared a joint briefing, alongside the Royal Society and Royal Academy of Engineering, asking the department to reconsider the removal of funding from applied science and engineering qualifications at Level 3[i]. Our organisations work together closely on matters concerning education policy in the sciences, and in the following submission present shared concerns about the speed at which the Department intends to remove funding from Level 3 qualifications in applied sciences.

The sciences are essential to a thriving society and global prosperity and make a significant contribution to the economy of the UK. In a world where global challenges and advances in technology bring both uncertainty and new possibilities the sciences have a critical role to play, and a successful STEM education is essential for ensuring for ensuring we have a sustainable supply of people with the curiosity, knowledge and skills to address these challenges.

Our joint submission to covers the following aspects of the Education Committee inquiry:

- The strengths and weaknesses of the current system of post-16 qualifications, with reference to A Levels, T Levels, BTECs and apprenticeships, in preparing young people for work or further and higher education.
- The benefits and challenges the Government's proposed changes to Level 3 qualifications would bring, with reference to any implications for BTECs and routes into apprenticeships.
- The extent to which the Government's review of Level 3 qualifications will impact disadvantaged groups, students from minority ethnic backgrounds, students known to the care system, and students with special educational needs or disabilities, and what measures might be put in place to mitigate any negative impacts

Our organisations:

The **Association for Science Education (ASE)** is the largest subject association in the UK. Members include teachers, technicians and others involved in science education. The Association plays a significant role in promoting excellence in teaching and learning of science in schools and colleges. Working closely with the science professional bodies, industry and business, ASE provides a UK-wide network bringing together individuals and organisations to share ideas and tackle challenges in science teaching, develop resources and foster high quality Continuing Professional Development. The Association for Science Education can trace its origins back to 1900. Incorporated by Royal Charter in October 2004, the ASE operates as a Registered Charity.

The **Institute of Physics (IOP)** is the professional body and learned society for physics in the UK and Ireland, inspiring people to develop their knowledge, understanding and enjoyment of physics. We work with a range of partners to support and develop the teaching of physics in schools; we encourage innovation, growth and productivity in business including addressing significant skills shortages; and we provide evidence-based advice and support to governments across the UK and in Ireland. Our members come from across the physics community whether in industry, academia, the classroom, technician roles or in training programmes as an apprentice or a student. However, our reach goes well beyond our membership to all who have an interest in physics and the contribution it makes to our culture, our society and the economy.

The **Royal Society of Biology (RSB)** is a single unified voice, representing a diverse membership of individuals, learned societies and other organisations. Our world-leading biosciences sector contributes strongly to the economy, and to society. We are committed to ensuring that we provide Government and other policymakers, including funders of biological education and research, with a distinct point of access to authoritative, independent, and evidence-based opinion, representative of the widest range of bioscience disciplines.

With about 45,000 members in over 100 countries and a knowledge business that spans the globe, the **Royal Society of Chemistry (RSC)** is the UK's professional body for chemical scientists, supporting and representing our members and bringing together chemical scientists from all over the world. Our members include those working in large multinational companies and small to medium enterprises, researchers and students in universities, teachers and regulators

1. Our organisations are supportive of a post-16 qualifications landscape that is coherent and equitable, and prepares young people to progress into a range of careers and further and higher education opportunities in the chemical, biological and physical sciences and more widely.

2. Our organisations are concerned that the rapid removal of funding from applied qualifications in Science, Technology, Engineering and Maths (STEM) at Level 3 will limit the opportunity for many students to study STEM subjects at Level 3, reducing the progression of learners into higher education, higher apprenticeships and technical training, and the workplace further exacerbating existing skills shortages. We are concerned that this will disproportionately affect those from underrepresented groups, worsening equity, diversity and inclusion in our sectors and losing talent from these groups.

T Levels

3. In principle, our organisations welcome the new Science T Level and we have offered support and input during the development of this qualification. The T Level is a flagship new technical qualification for students aged 16-19, the Science T Level is designed to lead directly into specialised occupations such as laboratory technician. Dedicated technical pathways are essential for developing vital skills for the chemical, biological and physical sciences.

4. While recognising that it is still early in the delivery of the science T Level, we have concerns about the geographic distribution of T Level provision both in and of itself, and in relation to industry. It is not clear who has oversight of ensuring providers map geographically, and technically, to local industry to ensure there is complete coverage of provision and placements. Anecdotally, we have heard that some students currently studying the science T Level have so far been unable to secure placements. We are concerned that there is a risk that learners will get to the end of the programme without having done a placement, or that the responsibility falls on individual learners to secure a placement.

5. Ultimately, geography should not be the key determinant of whether someone can take a T Level. **We recommend that the Department for Education monitors the distribution of providers and availability of placements at subject Level.**

6. Progression opportunities from T Levels remain unclear. Many universities are yet to state whether they will accept T Level achievers onto degrees in chemistry and other sciences. We recommend that there is monitoring of numbers of Higher Education Institutions (HEIs) that list T Levels as an acceptable entry qualification and the number of learners that are enrolled with a T Level at that institution.

7. Our organisations have met with the Department for Education to discuss their work mapping T Levels to A Level qualifications, with a view to supporting HEIs setting entry requirements. Original proposals for T Levels included a transition programme that would support T Level students who wished to progress to higher education, however the idea of a transition programme appears to have been suspended with T Levels now being intended as a route straight to higher education with no additional support. A transition route approach may have to be revisited to bridge the gap between T Levels, which were not designed for direct entry to higher education, and the entry requirements set by HEIs.

8. We are concerned that if progression opportunities are less favourable, T Levels may be less attractive to those students who do not want to commit at 16 to a specific technical occupation whereas academic options tend to leave career options broader at this point. In addition, it will potentially be challenging for sectors where there are no available Higher Technical Qualifications and where HEIs may not be accepting T Levels as an entry qualification. Overall, we are concerned about the lack of clearly defined and confirmed progression routes from T Levels and would welcome further information about these.

A Levels

9. Chemistry, Biology and Physics A Levels are well-established qualifications that support progression into further study in the sciences. However, these A Levels are widely perceived as being more difficult than many other A Level subjects. There is significant statistical evidence to suggest that grading standards across subjects are not aligned, meaning that science A Levels are among the hardest subjects in which to achieve to achieve high grades[ii].

Applied science qualifications

10. Applied science qualifications such as BTEC and Cambridge Nationals are achieved by around 25,000 students every year, the majority study BTEC qualifications[iii]. Many of these students progress to higher education; data from Pearson highlighted in our joint briefing suggests around 14,000 students progressed from BTEC Applied Science to university in 2017. In 2015/16 a significant proportion of university students held a BTEC qualification in STEM and medicine (~28% biological sciences, ~27% subjects allied to medicine, ~19% engineering and technology, ~8% physical sciences)[iv].

11. Applied science qualifications can support progression directly into the workplace, or to study at Levels 4 or 5. They can lead to an apprenticeship or be studied as part of an apprenticeship. Level 3 BTEC students have good longitudinal outcomes. Nuffield Foundation funded research suggests that over 60% graduating BTEC students gain a 2:1 or above[v]. When students' characteristics are taken into account, earnings differentials for degree study are similar for the BTEC and A Level routes, suggesting long-term outcomes are equivalent[vi].

12. Our organisations are concerned by the rapid removal of funding from applied science qualifications at Level 3. We remain supportive of the Department for Education's aims for a technical qualification landscape that is coherent, with qualifications that are relevant and high quality, and which offer good preparation for employment or further study, while meeting the needs of young people.

13. Our organisations are concerned that the rapid removal of funding from applied general qualifications will reduce overall participation, and increase inequality in participation, in sciences at Level 3 and above. These qualifications are well-used and recognised, and play a valuable role allowing a wide range of students to keep their options open in regard to progression in the sciences. They should remain funded, certainly pending establishment of the Science T Level in the landscape and evaluating its success in supporting students' progression to a range of outcomes in sciences.

Our concerns regarding the removal of funding for applied science qualifications are as follows:

Applied science qualifications such as BTEC and Cambridge Nationals support successful and flexible progression, this flexibility will be lost with narrower T Level options as the only route for students.

Alternatives to applied science qualifications may not be accessible or attractive to students creating a provision gap.

- We are concerned that removing applied science qualifications will create a provision gap that will lead to a reduction in numbers of students studying on science pathways at Level 3 and beyond. This is a significant concern for the Royal Society of Chemistry, as there is concern that chemistry student numbers have dropped from a high point in 2015[vii].
- DfE transition matrices show that students on alternative routes frequently have lower GCSE grades. 75% of students have an average GCSE grade below 5 on the BTEC Extended Diploma Applied Science, compared to 5% for A Level Chemistry[viii]. Applied science qualifications provide a progression opportunity that would otherwise not exist.
- It is not clear whether T Levels will be able to accommodate similar numbers as the existing applied science routes. As outlined in paragraph 4 above, we expect that the requirement to deliver an industry placement, while valuable, means places will inevitably be limited, and there are likely to be gaps in regional coverage. We do not expect the Science T Level route, particularly in its first few years, to accommodate anywhere near the 25,000 students who currently study applied generals in science.
- We welcome the T Level as a progression route into vital occupations such as laboratory technician, however the T Level may offer less flexibility for students who may want to progress further in science but not yet commit to occupation related study at the age of 16.

The provision gap will disproportionately impact students from disadvantaged backgrounds.

- Students who progress to higher education from a BTEC are more likely to have come from disadvantaged backgrounds[v, vi].
- The DfE impact assessment identifies students who receive free school meals, students from the most disadvantaged backgrounds (using Income Deprivation Affecting Children Index), students with special education needs and disability, students from Asian and Black ethnic backgrounds, and male students[ix] as most likely to be impacted by changes to qualifications in the future landscape.
- At GCSE, attainment gaps correlated to socio-economic advantage is well documented.[x] Applied generals in science offer an alternative progression route for students with lower, but still good, GCSEs, who are motivated to study science. These students are more likely to be from disadvantaged backgrounds.
- Chemistry and Physics are less accessible for students from certain backgrounds; undergraduate students in chemistry are less likely to have family members with a background in routine and semi-routine occupations, compared to all subjects. Chemistry students' family backgrounds are much more likely to be in higher managerial and professional occupations[xi]. A Level students from the least financially deprived families are three times more likely to study Physics than students from low income families[xii].

[i] Joint briefing on Level 3 Qualifications in Applied Sciences, Association for Science Education, Institute of Physics, Royal Society, Royal Society of Biology, Royal Society of Chemistry and Royal Academy of Engineering, March 2021, http://www.rsb.org.uk/images/DfE_jointbriefing_level3quals_2021.pdf

[ii] Inter-subject comparability technical report science, Ofqual, November 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/757839/Inter-subject_comparability__-_technical_report_science_.pdf

[iii] Data retrieved from the Ofqual Analytics Vocational and Technical Qualifications Landscape tool: https://analytics.ofqual.gov.uk/apps/VTQ/VTQLandscape/

[iv] Vocation, Vocation, Vocation, Social Market Foundation, January 2018, https://www.smf.co.uk/wp-content/uploads/2018/01/SMF-Vocation-Vocation-Vocation.pdf; using data from HEFCE

[v] Education choices at 16-19 and university outcomes, Nuffield Foundation, January 2022, https://www.nuffieldfoundation.org/wp-content/uploads/2022/01/Qualifications_and_university_outcomes_final.pdf

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[vii] Fears for Britain's standing in world of science as students shun chemistry degrees, The Guardian, August 2019, https://www.theguardian.com/education/2019/aug/31/students-shun-chemistry-degrees-university-applications-fall

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[ix] Review of post-16 qualifications at level 3 in England: impact assessment, Department for Education, July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002076/Impact_assessment.pdf

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[xii] Limit Less, Institute of Physics, October 2020, https://www.iop.org/sites/default/files/2020-11/IOP-Limit-Less-report-2020-Nov.pdf