Briefing note

Level 3 Qualifications in Applied Sciences

The Royal Society of Chemistry is opposed to the removal of funding from applied science qualifications at level 3. We call for the government to properly evaluate the potential impact on chemistry and other STEM subjects – and give time for T Levels to embed – so that their success in supporting progression can be assessed, before level 3 applied science qualifications are de-funded.

Summary

The chemical sciences, and chemistry skills and knowledge are essential to global prosperity and make a significant contribution to the economy of the UK, adding £14.4 billion in value every year[i]. In a world where global challenges and advances in technology bring both uncertainty and new possibilities, the chemical sciences have a critical role to play and a successful chemistry education will ensure we have a sustainable supply of people with the curiosity, knowledge and skills to address these challenges.

Every year, around 25,000 students achieve applied science qualifications. The removal of funding from these qualifications risks closing off this option for thousands of students, at a time when increased participation in science is important to ensure the ongoing development of skills for initiatives such as the Industrial Strategy, increased spend on R&D and Net Zero goals.

Alternatives to applied science qualifications – A Levels and T Levels – may not be accessible or attractive to students who would have previously taken applied science qualifications.

We welcome the introduction of T Levels as a progression route directly into specialised occupations such as laboratory technician and wish to see them succeed. We have provided support and input into the development of this route. We are also 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.

However, T Levels are as-yet untested and their success in supporting progression into higher education, higher apprenticeships and technical training, and the workplace is unknown. Applied science qualifications are disproportionately taken by students from less advantaged backgrounds. We are concerned that removing funding from these qualifications will worsen equity, diversity and inclusion in our sector; chemistry students already tend to be from more advantaged social backgrounds than the wider student population.

Funding should not be removed from existing qualifications until T Levels have had the opportunity to embed, and their success in supporting progression properly evaluated.

Key messages

1. **Applied science qualifications such as BTEC and Cambridge Nationals support successful and flexible progression.**
   - Applied science qualifications are achieved by around 25,000 students every year, the majority study BTEC qualifications[ii]. Many of these students progress to higher education; about 7% of students domiciled in England, Wales or Northern Ireland who are accepted onto a UK chemistry degree hold a BTEC[iii]. Students also progress from BTEC to degree study in related areas such as Biochemistry, Pharmacology and Environmental science as well as other areas of science.
   - 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. 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[iv].
   - The success of progression opportunities from T Levels are as yet unknown. Many universities are yet to state whether they will accept T Level achievers onto degrees in chemistry and other sciences. We are concerned that if progression opportunities are less flexible, T Levels may be less attractive to those students who do not want to commit at 16 to a specific technical occupation.

2. **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 us, as many in our community are already concerned that chemistry student numbers have dropped from a high point in 2015[v].
   - Chemistry and other science 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 chemistry is one of the hardest A Level subjects to achieve high grades in.[vi] This leads to many sixth forms setting higher entry requirements to study chemistry and other sciences than other subjects at A Level.[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. 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.

3. **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.[ix]
   - The DfE impact assessment identifies students who receive free school meals, students from the most disadvantaged backgrounds (using IDACI), students with SEND, students from Asian and black ethnic backgrounds, and male students[x] 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.[xi] 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 is 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[xii].

4. **In principle, the Royal Society of Chemistry welcomes the new Science T level, 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 sciences.

5. **No changes to funding of applied science qualifications should be made until T levels have embedded, and their success evaluated.**
   The Royal Society of Chemistry is extremely concerned that the proposal to remove 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.

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[i] The Chemical Industries Association https://www.cia.org.uk/Policy/Economics

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

iii Data obtained from UCAS (EXACT purchase 003697), relating to Acceptances for Chemistry during the 2018 and 2019 application cycles for applicants domiciled in England, Wales or Northern Ireland.

iv Centre for Vocational Educational Research (2019) 'BTECs, higher education and labour market outcomes using the Longitudinal Education Outcome (LEO) dataset' https://cver.lse.ac.uk/textonly/cver/pubs/cverdp024.pdf

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

vi 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

vii Is chemistry accessible for all?, Royal Society of Chemistry, November 2020, https://www.rsc.org/globalassets/22-new-perspectives/talent/is-chemistry-accessible-for-all/rsc-is-chemistry-accessible-for-all.pdf

viii Department for Education (2020) 'Transition matrices 16-18: 2019' https://www.gov.uk/government/publications/16-to-18-level-3-value-added-ready-reckoner

[ix] Centre for Vocational Educational Research (2019) 'BTECs, higher education and labour market outcomes using the Longitudinal Education Outcome (LEO) dataset' https://cver.lse.ac.uk/textonly/cver/pubs/cverdp024.pdf

[x] https://consult.education.gov.uk/post-16-qualifications-review-team/review-of-post-16-qualifications-aT Level-3/supporting_documents/Impact%20Assessment%20%20Review%20of%20post16%20qualifications%20at%20level%203_.pdf

[xi] Review of SES and Science Learning in Formal Educational Settings (2017) https://royalsociety.org/~/media/policy/topics/education-skills/education-research/evidence-review-eef-royalsociety-22-09-2017.pdf?la=en-GB

[xii] Is chemistry accessible for all?, Royal Society of Chemistry, November 2020, https://www.rsc.org/globalassets/22-new-perspectives/talent/is-chemistry-accessible-for-all/rsc-is-chemistry-accessible-for-all.pdf