

Senedd Cymru
Y Pwyllgor Plant, Pobl Ifanc ac Addysg

Ymchwiliad i effaith argyfwng Covid-19 ar blant
a phobl ifanc yng Nghymru

COV 201
Ymateb gan: Y Gymdeithas Gemeg Frenhinol

Welsh Parliament
Children, Young People and Education Committee

Inquiry into the impact of the Covid-19 outbreak on
children and young people in Wales

COV 201
Response from: Royal Society of Chemistry

Written evidence from the Royal Society of Chemistry to the Senedd Children, Young People and Education Committee's inquiry into the impact of Covid-19 on children and young people in Wales.

27 January 2020

Introduction

1. The Royal Society of Chemistry is an international organisation connecting chemical scientists with each other, with other scientists, and with society as a whole. Founded in 1841 and based in London, UK, we have an international membership of around 50,000. We use the surplus from our global publishing and knowledge business to give thousands of chemical scientists the support and resources required to make vital advances in chemical knowledge. We develop, recognise and celebrate professional capabilities, and we bring people together to spark new ideas and new partnerships. We support teachers to inspire future generations of scientists, and since lockdown began we have provided free remote teaching support for all teachers of chemistry.¹
2. The Royal Society of Chemistry is submitting this evidence because we believe that an excellent chemistry education, from primary education onwards and across academic and vocational settings, is vital for the chemical sciences. It sets the foundations for progression into further learning and the profession, and can also be a valuable experience for young people regardless of their career aspirations. We have a number of concerns about the short and long-term impacts of Covid-19 on chemistry education across a range of settings, as well as initial teacher training.
3. The impact of Covid-19 on education has been more significant for some students than others, students from disadvantaged backgrounds have been particularly impacted,² and there are concerns that existing inequality gaps will be accentuated.³ The impact on disadvantaged students is of particular concern for the chemical sciences because we already see disparity of experience, and access, for students from disadvantaged backgrounds.

4. In collating this response, we have drawn on expertise and insights from across our member community, including teachers and training providers. The response has also been informed by our established policy positions, published research and guidance and the work of our colleagues across the organisation. We have summarised our evidence and key recommendations in the table below.

Summary

Section	Key recommendations	Paragraphs
<p>The impact on practical or laboratory work at all educational stages <i>Practical work in educational settings is, inevitably, significantly impacted. This leads to longer term concerns about skills development, and also loss of the motivational aspect that many teachers identify.</i></p>	<p>The Royal Society of Chemistry recommends that Welsh Government and associated public bodies take into account the particular impacts of the pandemic on practical subjects such as chemistry, and what this means for long-term skills development. More detailed recommendations are set out in paragraph 11.</p>	<p>5-11</p>
<p>The impact on initial teacher education (ITE) <i>Covid-19 has had a significant impact on initial teacher education. We have concerns about the disruption to student placements and what this will mean for teacher training and developing expert chemistry teachers.</i></p>	<p>The Royal Society of Chemistry recommends that the Welsh government make immediate plans for extra support for trainees who will have missed essential teacher training time due to Covid-19 restrictions. A strategy for teacher training catch-up needs to recognise the importance of practical skill development for chemistry teachers, which we are happy to advise on</p>	<p>12-15</p>
<p>The impact on this year's newly qualified teachers (NQTs) <i>NQTs' initial teacher training last academic year was significantly impacted by Covid-19. We are concerned about the long-term effect of lost opportunities to develop essential skills.</i></p>	<p>The Royal Society of Chemistry recommends that the Welsh government enable additional support for NQTs who missed training opportunities both during their training year but also due to the continued restrictions that have reduced opportunities for skill development. We suggest funding to enable additional face-to-face subject specific CPD, once Covid-19 allows, concentrating on practical work.</p>	<p>16-17</p>

<p>Teacher workload and wellbeing <i>We are concerned about teacher wellbeing as a result of an increase in workload - needing to adapt to a new way of teaching, the shift to blended learning, as well as physical distancing regulations.</i></p>	<p>The Royal Society of Chemistry recommends that the Welsh Government monitor the impact of Covid-19 on teacher wellbeing and take measures to ensure teachers' wellbeing is prioritised in the short and longer term.</p>	<p>18-20</p>
<p>The impact of Covid-19 on the implementation of Curriculum for Wales <i>Covid-19 has side-tracked the implementation process as teachers have had less time to focus on it.</i></p>	<p>The Royal Society of Chemistry recommends that additional protected time be put in place for teachers to be able to prepare for Curriculum for Wales.</p>	<p>21-24</p>
<p>The impact on school and sixth-form education and learners' progression <i>We are concerned about the prospect of increased attainment gaps, learners' experience in preparing for chemistry assessments in 2021, and barriers to progression in chemistry for those who have lost learning time.</i></p>	<p>The Royal Society of Chemistry recommends that Welsh Government ensures that students who have the motivation and potential to progress in post-compulsory chemistry routes, are supported to do so, and are not unfairly hindered in doing so through lower attainment following a significant learning gap.</p>	<p>25-30</p>

The impact on practical or laboratory work at all educational stages

5. Development of practical skills and understanding of the role of investigative processes are core aspects of the chemistry curriculum. Additionally, experience of practical chemistry plays a role in engaging many learners with the subject. Clearly, disruption to, and interruption of, practical work is unavoidable in the present context; measures must be taken to minimise the spread of coronavirus and ensure the safety of both learners and staff. However, it must be recognised that, the longer these changes are required, the greater the impact will be on progression at every stage. This will be true in terms of the levels of skill students have developed, but also potentially in the extent to which students still choose chemistry in post-compulsory stages.

The Royal Society of Chemistry recommends that Welsh Government and associated public bodies take into account the particular impacts of the pandemic on practical subjects such as chemistry, and what this may mean in the long term for the continued development of people with vital skills to support future research and innovation.

6. Evidence from our community demonstrates that practical work is not only interrupted in periods of partial school closure, but that schools have also been experiencing difficulties in periods when all learners were attending due to the necessary safety and hygiene measures.
7. In October we surveyed 199 chemistry teachers across the UK and Ireland about how covid-19 has impacted their teaching and learning, including with regard to practical work. While the number of respondents from Wales was small (9), there was a consistent picture in terms of practical work across the UK. Practical work was identified as one of the bigger concerns for the remainder of the year, with many teachers expressing concern that the absence of practical experiences was contributing to a loss of motivation for learning chemistry among their students.
8. Common issues in providing practical experiences in the autumn term were:
 - The logistical impacts of hygiene requirements such as needing to quarantine or sanitise equipment.
 - Insufficient equipment, for example to allow for quarantining or to allow learners to work individually.
 - Groups being timetabled in non-laboratory classrooms.
 - Difficulties related to classroom management, primarily in relation to physical distancing requirements.
9. All but one respondent from Wales indicated that they were conducting fewer practicals in the autumn term than would normally be the case; across all respondents this was 84%. Open responses showed it was common for teachers to be running no practicals at all, only very few, or only teacher demonstrations. This indicates that it is likely that some learners will now have had no practical chemistry experience for almost a year. It seems probable that this situation will continue for some months at least.
10. In addition to the impacts on learners, we have concerns on long-term impact on trainees and newly qualified teachers not having had the opportunity to develop their expertise in teaching practical work.
11. Our particular recommendations in relation to practical work are:
 - i) Guidance and support to education providers needs to take the needs of practical subjects into account wherever possible, so that practical work can continue where appropriate and insofar safety requirements allow.
 - ii) In some situations, alternative approaches to chemistry practical work such as microscale can make it easier to allow learners to work

individually, or to conduct practical work outside of laboratory settings. The Royal Society of Chemistry continues to support teachers with a range of resources.⁴

- iii) Alternatives such as videos and simulations can never fully compensate for the laboratory experience, but are useful in continuing learning about investigative techniques and processes. Schools and learners should be supported, where necessary, in accessing the technology required to experience these forms of learning.
- iv) Trainee teachers must be allowed to teach practical work where it is safe to do so as part of their training in schools.
- v) Welsh Government and associated bodies should express long-term commitment to the development of practical skills as a core part of the chemistry curriculum.
- vi) The development of practical skills needs to be a long-term consideration in understanding and mitigating the effects of Covid-19 pandemic on education at all levels. As the extent and magnitude of the impacts on learning and engagement become clearer, we will need to collectively consider what best support we can put in place to recover development of vital skills.

The impact on Initial Teacher Education (ITE)

12. We believe school placements are an integral part of the initial teacher training experience. They provide the context for trainees to put in practice the theory they have learnt and are essential to creating expert teachers. Whilst we have learnt that relationships between providers and school partnerships remain in place, we have concerns that not all trainees are having sufficient access to the school environment. This is worrying as it means they are missing out on opportunities to develop their pedagogical skills. The ITE providers we have spoken with have helped us to understand that there is quite a lot of variation in terms of trainees' access to school placements. Some started placements in November, a later start date than normal, others are due to start in the new year, whilst others are currently only having online placements. All student placements will be disrupted in some form this year. Even placements that are going ahead will have reduced opportunities for training.
13. In addition, trainees on placement will have reduced opportunities to learn practical skills due to the reduction in practicals detailed in paragraphs 5-11. We have concerns about the effect Covid-19 could have on the in-school quality of provision for the cohort of ITE students who have started this academic year. Chemistry is a practical subject. Learning to teach chemistry involves learning how to use laboratory equipment and chemicals safely with groups of young people. This means that there will probably be reduced opportunities for trainees to hone their skills in this area in a school setting with pupils.

14. We understand there is an increase in the number of chemistry ITE trainees this year⁵. We are worried that due to physical distancing regulations some universities are struggling to accommodate ITE trainees for the laboratory-based part of their training. Some ITE providers have told us that they can re-arrange their teaching order to ensure that practical work is covered later in the year. However, if physical distancing requirements continue past January, they will find it harder to do this. We appreciate that providers are working innovatively to adapt to an online approach to initial teacher education, however the risk for chemistry trainees is reduced skills in the teaching of practical and this will have a long-term impact on students' skills development and motivation to study chemistry.

15. The Royal Society of Chemistry recommends that the Welsh government make immediate plans for extra support for trainees who have missed essential teacher training due to Covid-19 restrictions. This strategy for teacher training catch-up needs to recognise the importance of practical skill development for chemistry teachers, which we are happy to advise on.

The impact on this year's newly qualified teachers (NQTs)

16. This year's cohort of NQTs missed a significant proportion of their initial teacher education year. Teacher training providers worked hard to prepare their students for their teaching careers. They helped trainees use their time out of school to focus on addressing gaps in their subject and pedagogical knowledge. However, these individuals have missed opportunities to reflect on their learning by 'trying it out' in the classroom. Crucially, trainees in the sciences have also lost essential opportunities to develop the skills needed to safely conduct whole class practical work and demonstrations in a laboratory setting. We are concerned about the impact of this lost learning for last year's trainees and how quickly they will be able to catch up. As they continue in their NQT year, they are still missing essential opportunities for development due to the ongoing impact of Covid-19.

17. The Royal Society of Chemistry recommends that the Welsh government enable additional support for NQTs who missed training opportunities both during their training year but also due to the continued restrictions that have reduced opportunities for skill development. We suggest funding to enable additional face-to-face subject specific CPD, once Covid-19 allows, concentrating on practical work.

Teacher workload and wellbeing

18. This academic year we have already seen a more blended approach to online and in person teaching as some pupils need to self-isolate and lockdown measures are implemented. It seems likely that this will continue in the months to come. So far we have learnt from our community of teachers that a blended approach has contributed to an

increase in teacher workload due to needing to meet the needs of online and in-person teaching. Teachers have informed us that the need to adapt and respond to changing circumstances has increased their workload. The Welsh Government's plan to recruit 900 additional teaching staff as part of 'Recruit, Recover and Raise standards' is unlikely to be an effective solution for the sciences as we know that there are already insufficient chemistry and physics teachers in the system.

19. The added challenges of meeting physical distancing regulations for practical work, mentioned in paragraph 8, will also likely increase teacher workload, where it is being carried out. We therefore, wish to highlight that the possible increase in workload may have a longer-term impact on teacher wellbeing which could in turn have implications for teacher retention.
20. **The Royal Society of Chemistry recommends that the Welsh Government monitor the impact of Covid-19 on teacher wellbeing and take measures to ensure teachers' wellbeing is prioritised in the short and longer term.**

Impact of Covid-19 on teachers' preparations for Curriculum for Wales implementation

21. Many teachers we have spoken to are committed to making Curriculum for Wales a success, however Covid-19 has disrupted progress. Teachers have informed us that their Covid-19 response has redirected time away from preparations for the new curriculum. The message from our community is that additional support and protected time is vital to ensure Curriculum for Wales is implemented successfully. Adapting to a new way of teaching, alongside the uncertainty of further disruptions to the education system, will likely result in Curriculum for Wales becoming less of an immediate priority.
22. Whilst the direction from our community is against a delay in the implementation, there is a strong need to have protected time to focus on school level preparations. The Welsh Government needs to recognise the additional pressure and offer further support to teachers and schools.
23. We understand that teacher time and focus has been on assessing and understanding lost learning. There needs to be a balance of addressing catch-up on lost learning and curriculum development. The Minister for Education has been clear in her wish to hear from the profession and understand what would be best given the current challenges. What we have heard from teachers is that Covid-19 has side tracked the implementation process. One teacher in particular told us that she doesn't know when she will have time to focus on the curriculum design. Another teacher said he just hasn't had the time to look into the details yet. Given these reports and in order to ensure successful implementation of Curriculum for Wales, we ask for additional and protected time.

24. The Royal Society of Chemistry recommends that additional protected time be put in place for teachers to be able to prepare for Curriculum for Wales.

The impact on school and sixth-form education and learners' progression

25. It is well documented that significant interruptions to learning have taken place, that these interruptions continue, and that they are not felt equally by all learners. In our recent survey of chemistry teachers, detailed in paragraph 7, we see a similar picture: some teachers considered their learners to be on track, while others considered them several months behind. Disadvantaged learners are more likely to be considered behind. We are specifically concerned about how this will affect (a) learners' choices in favour of chemistry and (b) opportunities to progress, and that existing participation gaps in post-compulsory chemistry education will grow.
26. Alongside interruptions to practical work, chemistry teachers have reported that engagement, motivation and wellbeing are among their biggest concerns for their learners. We are concerned that this may lead to reduced engagement with chemistry, affecting uptake of the subject in post-compulsory education.
27. The prospect of increased attainment gaps raises the risk that those who have missed out most will be less well placed to progress to the next steps of education – regardless of their motivation and potential. This may be heightened for subjects such as chemistry which are often perceived as only suitable for high attainers. This pervasive attitude was a feature of expectations related to chemistry learning highlighted in our recent report *Is chemistry accessible for all?*⁶
28. We recognise that Welsh Government have taken seriously the impacts of Covid-19 on learners' assessment preparation in their decision regarding GCSE, AS- and A-level exams in 2021. However, it is as yet unclear exactly what will come in their place, and to what extent arrangements will – or indeed can – compensate for the fact that learners will be impacted to different extents. We have not seen a clear statement on what the expectations will be in terms of curriculum coverage.
29. We must anticipate that those who have seen the greatest interruptions to their learning are more likely to underperform in assessments relative to how they would have performed in a 'normal' year, and that these students will disproportionately be those already experiencing some form of disadvantage.

The Royal Society of Chemistry recommends that Welsh Government ensures that students who have the motivation and potential to progress in post-compulsory chemistry routes, are supported to do so, and are not unfairly hindered in doing so through lower attainment following a significant learning gap.

30. Approaches to assessments in chemistry qualifications for 2021 should encourage in-depth coverage of the most core areas of the curriculum, providing both a good foundation for progression. This is

preferable to a pressured approach that expects full coverage regardless of the amount of time missed, risking a more superficial level of learning and a poor learning experience. The Royal Society of Chemistry is happy to engage in discussions about areas of the chemistry curriculum that we would consider most relevant to prioritise in these circumstances.

References

¹ *Remote Teaching Support*, Royal Society of Chemistry, <https://edu.rsc.org/remote-teaching-support>

² *COVID-19 and Social Mobility*, Sutton Trust (2020), <https://www.suttontrust.com/wp-content/uploads/2020/04/COVID-19-Impact-Brief-School-Shutdown.pdf>

³ *Covid-19: the impacts of the pandemic on inequality*, Institute for Fiscal Studies (2020), <https://www.ifs.org.uk/publications/14879>

⁴ <https://edu.rsc.org/resources/collections/post-lockdown-teaching-support>

⁵ From the providers we have spoken with and the NFER report:

NFER report, https://www.nfer.ac.uk/media/4143/the_impact_of_covid_19_on_initial_teacher_training.pdf

⁶ *Is Chemistry Accessible for All?*, Royal Society of Chemistry (2020), <https://www.rsc.org/new-perspectives/talent/is-chemistry-accessible-for-all/>