

## **IOP response to SQA consultation on assessment arrangements 2020-2021**

- 1. IOP answered with similar text for National 5 and Higher Physics.**
- 2. Slightly different text for Advanced Higher Physics.**
- 3. A response on Equality and Accessibility.**

### **SQA consultation questions in blue and IOP responses in black**

#### **3. To what extent do you agree that it is appropriate that modifications to course assessment be considered in line with the following guiding principles?**

(a) The delivery and assessment of subjects that are constrained by current social distancing measures. For example, in practical and performance-based components.

Strongly agree

(b) Increasing learning and teaching opportunities, where possible.

Strongly agree

(c) A more flexible approach to assessment for learners, whilst retaining the validity of the qualifications.

Strongly agree

#### **5. To what extent do you agree or disagree with the proposed approach to course assessment for National 5 Physics in 2021?**

Strongly disagree

#### **7. To what extent do you agree or disagree with the proposed approach to course assessment for Higher Physics in 2021?**

Strongly agree

#### **6. Do you have any comments on the proposed approach to course assessment for National 5 Physics in 2021?**

and

#### **8. Do you have any comments on the proposed approach to course assessment for Higher Physics in 2021?**

The Institute of Physics welcomes the proposal that examination papers should be reduced in length next year. However, the Institute considers that the proposals are inadequate and is disappointed that action was not taken sooner to give students and teachers clarity well in advance of Scottish students returning to schools for the 2020-2021 academic year. The proposal as it stands only reduces the burden on candidates for 30 minutes during the examination itself. There is no change in the teaching and learning requirements of the course and no allowance for disruption to teaching and learning due to the time already lost in the summer term, requirements for social distancing, particularly during practical work, or any potential future local or national lockdowns. This is despite acknowledgement by SQA that there are particular issues in subjects with a practical or performance element.

In summary, the Institute of Physics recommends:

- The need to complete the Assignment is removed
- A reduction in sampled content in the examination paper is considered
- Optional questions and adjustments to the format of the examination paper are considered
- SQA makes explicit their commitment to practical science, and its place in the curriculum even if it may appear to some that expectations for practical skills and techniques are reduced next year.

In May, the Institute of Physics along with our partners in the Learned Societies Group, wrote to the Cabinet Secretary for Education and Skills and Scottish Government COVID-19 Education recovery Group, identifying a need for a reduction in assessed course content for 2020-2021, offering our experience and networks, and highlighted the importance of engaging with teachers on this matter in June 2020 before schools broke up for summer. We did so recognising the challenges of topics being taught in different orders in different schools, or even between classes in the same school, and sought to tackle those challenges through input from our education committee, wider membership, staff and our team of IOP Scotland physics coaches.

Early in June, following a letter from Paul Hardaker, IOP Chief Executive, raising our concerns about disruption due to the COVID-19 pandemic, particularly in terms of the effect on underrepresented and disadvantaged groups, representatives of the Institute met with Sue Pope. During that meeting we raised our concerns regarding the need for suitable amendment of 2020-2021 assessment arrangements and early communication about this to stakeholders. Subsequently, towards the end of June, the Learned Societies Group also met with Sue Pope, where we were disheartened to learn that 2021 was being planned for “*as normal*”. We recognise a reluctance to remove well-established content from courses in our subject, however, we consider this could be achieved without impacting the long-term curricular standards in our subject, and that reducing the breadth of assessed content would not impact the standard of Scottish qualifications as the depth of examination questions would remain the same.

Potential harmful outcomes of not reducing examined content are:

- students have to be taken through all the content at a high pace and their learning will be only superficial; i.e. they will not have lasting gain from what is essentially, a cramming year
- some students do not finish the course or some content is left out, thereby leaving them disadvantaged should that question come up in the examination; this will make the examination inequitable and, to an extent, invalidate its result as they will be based as much on chance (what content you happened to cover) rather than on capability.

The opportunity to publish adjustments before the new school year has now been lost, however, we still advocate for a reduction in assessed content and believe that positive action can be taken to reduce the burden on teachers and students during 2020-2021. While reducing the length of examination papers to previous requirements is a good first step, we must ensure that cohorts due to sit examinations in 2021 are not further disadvantaged.

As stated in the Learned Societies Group’s letter, it is a common occurrence for students in Scotland to begin their studies for the next academic year during the summer term. Students have therefore already missed a crucial 4-6 weeks of face-to-face teaching and learning for their 2020-2021 qualifications, and in the sciences such an absence is most keenly felt around opportunities missed for practical activities. Even when face-to-face teaching is now taking place, practical activities are being further disrupted due to ongoing social distancing and hygiene requirements. The possibility of further disruption during 2020-2021, through local lockdowns, or national lockdowns due to a second wave, remains very real. The Institute considers strongly that sensible preventative arrangements must be made now to mitigate against further disadvantage for these students, rather than relying on a last minute approach should major disruptions re-occur.

The Institute of Physics considers SQA’s proposals for Physics, and indeed across the STEM subjects more broadly, do not go far enough in addressing the huge change in students’ experience and the need to maximise the time for high quality teaching and learning in the 2020-2021 courses in the time remaining.

The Institute considers an opportunity has been missed and we had hoped that a decision would have been made in May. We could have worked with SQA and other subject organisations, an offer made back in May, to provide guidance on options for reducing assessed content in 2020-2021 Physics courses, informed by our own curriculum work and by facilitating discussions with our staff, education committee, wider membership and Physics Coach network who have considerable expertise in such matters.

Introducing some choice in questions answered by candidates in examination papers could be beneficial and allow for disruption due to local lockdowns and other restrictions. However, if optionality was to be considered, teachers and students would need notice on which topics would be grouped together, and how. However, we appreciate this sort of change requires time to develop, a significant rewriting of examination papers and there will be issues around comparability of standards between options. With the autumn term already well underway time is of the essence if this is to be achieved.

We recommend removing the assignment. It is a standalone component, it will not yet have been started by teachers, the skills can be assessed by other means (for this one year) and removing it will have very little effect on final grades results. We also recommend that a swift decision to do so is made. The examination paper already always includes some marks available for questions associated with practical skills and data analysis. Much of the time spent on the assignment is actually spent on the research and report writing stages rather than on developing or assessing practical skills, and even in the report writing phase there are aspects, such as the requirement for candidates to not write a full procedure and method but an abbreviated version, that runs counter to the normal advice and practice for writing scientific reports. The experimental phase of the assignment involves group practical work, a potential problem due to social distancing and hygiene around sharing equipment. The removal of the assignment would free up a significant amount of class time for teaching and learning rather than having candidates working under assessment conditions during precious face-to-face teacher contact time. We encourage schools to conduct as much practical work as it is safe to do, in line with guidance from SSERC, and would encourage schools to use time freed up by the removal of the requirement to complete the assignment to conduct practical work and develop the practical skills of students. These are skills valued by industry, further and higher education. Wherever possible, schools should seek to meet the ten benchmarks set out in Gatsby's Good Practical Science report with appropriate adjustments for the ongoing public health restrictions. STEM skills are vital to the economy and addressing challenges of the future. Therefore, equipping learners with practical science skills that could help them secure meaningful employment or transition to further study is essential. Many young people are motivated by practical work and schools should take any opportunity they can to re-engage students after lock down and a loss of face-to-face teaching, and practical activities are a good route to do so while supporting and developing knowledge and understanding.

The Institute is willing to work with SQA, drawing on the knowledge and expertise of its staff, members and coach team during this difficult time to both help develop solutions and communicate them within the physics teaching profession. The Institute considers it unfortunate that SQA did not consult more widely with its NQST and with independent bodies such as learned societies before making these inadequate proposals. The Institute of Physics can quickly and efficiently gather the views of physics teachers in Scotland through its network.

#### **9. To what extent do you agree or disagree with the proposed approach to course assessment for Advanced Higher Physics in 2021?**

Strongly disagree

#### **10. Do you have any comments on the proposed approach to course assessment for Advanced Higher Physics in 2021?**

The Institute of Physics considers that the proposal to make no change to the assessment arrangement of Advanced Higher is inadequate and is disappointed that action was not taken sooner to give students and teachers clarity well in advance of Scottish students returning to schools for the 2020-2021 academic year. The proposal as it stands has no change in the teaching and learning requirements of the course and makes no allowance for disruption to teaching and learning due to the time already lost in the summer term, requirements for social distancing, particularly during practical work, or any potential future local or

national lockdowns. This is despite acknowledgement by SQA that there are particular issues in subjects with a practical or performance element.

In summary, the Institute of Physics recommends:

- A reduction in the number or extent of the experiments assessed during the project is considered
- A reduction in sampled content in the examination paper is considered
- Optional questions or adjustments to the format of the examination paper are considered
- SQA makes explicit their commitment to practical science, and its place in the curriculum even if it may appear to some that expectations for required practical skills and techniques are reduced next year.

We do not agree that retaining a 3 hour examination and the project at Advanced Higher is required to maintain national standards. For the entire history of Advanced Higher and its predecessor the CSYS from 1968 to 2018 this course was assessed using a 2 hour 30 minute examination and the project or investigation. Through the various changes, including the removal of half marks, the number of marks in the examination paper had gradually increased. Experience gathered through our networks, including from teachers listening to candidates and the use of prelims, would suggest these changes had progressively made the time demands during the examination more challenging for candidates. We see no reason why a return to a 2 hour 30 minute examination with an appropriate mark allocation could not continue to maintain national standards as had been the case for five decades.

In May, the Institute of Physics along with our partners in the Learned Societies Group convened by the Royal Society of Edinburgh, wrote to the Cabinet Secretary for Education and Skills and Scottish Government COVID-19 Education Recovery Group, identifying a need for a reduction in assessed course content for 2020-2021, offering our experience and networks, and highlighting the importance of engaging with teachers on this matter in June 2020 before schools broke up for summer. We did so recognising the challenges of topics taught in different orders in different schools, or even between classes in the same school, and sought to tackle those challenges through input from our education committee, wider membership, and our team of IOP Scotland physics coaches.

Potential harmful outcomes of not reducing examined content are:

- students have to be taken through all the content at a high pace and their learning will be only superficial; i.e. they will not have lasting gain from what is essentially, a cramming year
- some students do not finish the course or some content is left out, thereby leaving them disadvantaged should that question come up in the examination; this will make the examination inequitable and, to an extent, invalidate its result as they will be based as much on chance (what content you happened to cover) rather than on capability

Early in June, following a letter from Paul Hardaker, IOP Chief Executive, raising our concerns about disruption due to the Covid-19 pandemic, particularly in terms of the effect on underrepresented and disadvantaged groups, representatives of the Institute met with Sue Pope. During that meeting we raised our concerns regarding the need for suitable amendment of 2020-2021 assessment arrangements and early communication about this to stakeholders. Subsequently, towards the end of June, the Learned Societies Group also met with Sue Pope, where we were disheartened to learn that 2021 was being planned for "*as normal*". We recognise a reluctance to remove well-established content from courses in our subject, however, we consider this could be achieved without impacting the long-term curricular standards in our subject, and that reducing the breadth of assessed content would not impact the standard of Scottish qualifications as the depth of examination questions would remain the same.

The opportunity to publish adjustments before the new school year has now been lost, however, we still advocate for a reduction in assessed content and believe that positive action can be taken to reduce the burden on teachers and students next year.

As stated in the Learned Societies Group's letter, it is a common occurrence for students in Scotland to begin their studies for the next academic year during the summer term. Students have therefore already

missed a crucial 4-6 weeks of face-to-face teaching and learning for their 2020-2021 qualifications, and in the sciences such an absence is most keenly felt around opportunities missed for practical activities. Even when face-to-face teaching is now taking place, practical activities are being further disrupted due to ongoing social distancing and hygiene requirements. The possibility of further disruption during 2020-2021, through local lockdowns, or national lockdowns due to a second wave, remains very real. The Institute considers strongly that sensible preventative arrangements must be made now to mitigate against further disadvantage for these students, rather than relying on a last minute approach should major disruptions re-occur.

The Institute of Physics considers SQA's proposals for Physics, and indeed across the STEM subjects more broadly, do not go far enough in addressing the huge change in students' experience and the need to maximise the time for high quality teaching and learning in the 2020-2021 courses in the time remaining.

The Institute considers an opportunity has been missed and we had hoped that a decision would have been made in May. We could have worked with SQA and other subject organisations, an offer made back in May, to provide guidance on options for reducing assessed content in 2020-2021 Physics courses, informed by our own curriculum work and by facilitating discussions with our staff, education committee, wider membership and Physics Coach network who have considerable expertise in such matters.

Introducing some choice in questions answered by candidates in examination papers could be beneficial and allow for disruption due to local lockdowns and other restrictions. However, if optionality was to be considered, teachers and students would need notice on which topics would be grouped together, and how. However, we appreciate this sort of change requires time to develop, significant rewriting of examination papers and there are issues around comparability of standards between options. With the autumn term already well underway time is of the essence.

The project is widely seen as the pinnacle of school physics in Scottish education. In these times of social distancing it does have the benefit of involving individual practical work, unlike the assignments at the other levels, however, it may still require close working between a teacher and students. Many schools are also in the habit of arranging visits of Advanced Higher candidates to universities to conduct elements of their projects, often because they do not have appropriate apparatus. It is becoming clear that this option will not likely be available during 2020-2021. We encourage schools to conduct as much practical work as it is safe to do, in line with guidance from SSERC, and would encourage schools to conduct practical work and develop the practical skills of students. These are skills valued by industry, further and higher education. Wherever possible, schools should seek to meet the ten benchmarks set out in Gatsby's Good Practical Science report with appropriate adjustments for the ongoing public health restrictions. STEM skills are vital to the economy and addressing challenges of the future. Therefore, equipping learners with practical science skills that could help them secure meaningful employment or transition to further study is essential. Young people are motivated by practical work and schools should take any opportunity they can to re-engage students after lock down and a loss of face-to-face teaching, and practical activities are a good route to do so while supporting and developing knowledge and understanding.

The Institute is willing to work with SQA, drawing on the knowledge and expertise of its staff, members and coach team during this difficult time to both help develop solutions and communicate them within the physics teaching profession. The Institute considers it unfortunate that SQA did not consult more widely with its NQST and with independent bodies such as learned societies before making these inadequate proposals. The Institute of Physics can quickly and efficiently gather the views of physics teachers in Scotland through its network.

### **11. Are there any potential equality or accessibility issues introduced by the approach proposed for Physics? What are they?**

The Institute of Physics considers SQA's proposals for physics, across the sciences, and indeed across all subjects, do not go far enough in addressing the huge change in student experience, the loss of contact

time in the last academic year and the possible further reduction of contact time this year. Without some adaptation, students will remain at an unfair disadvantage if their school has not been able to provide a full programme of remote and online teaching and learning since March. Even in circumstances where this has been available, many students will not have been able to engage with remote learning due to a lack of digital devices, internet access, a comfortable place to study or family life disruptions caused by the wider impact of Covid-19 on health, jobs and the economy.

Regardless of what happens between now and May 2021 students sitting examinations in 2020-2021 will have experienced reduced teaching and learning time. We are concerned then that the increased pressures on remaining teaching and learning time in 2020-2021 will lead to a decrease in quality and depth of learning, and loss of inspirational elements of our subject. We consider a sensible way to address this is to remove the requirement to complete an assessed assignment and reduce sampled content and to then work with further education, higher education and others who use the qualifications to ensure that any adjustments are acknowledged and accounted for in further progression.

Our position is that either sampled content should be reduced in 2020-2021 examinations to account for disruptions, or a significant statistical approach should be taken after the examinations are sat, to account for disadvantage. In either case, the possibility of ongoing disruptions in 2020-2021 must be taken into account, and a longer term plan developed to consider the impact of these disruptions on progression through education. We do not see this as lowering the bar for the current cohort, we see it as changing the parameters to reflect the unprecedented situation in our education system.

The Institute of Physics also recognises that SQA will likely have already finalised the examination papers it had intended to use in 2021, and that redesigning papers involves a variety of complex processes to ensure content is sampled at appropriate levels for attainment and that adapting an exam paper would not be as easy as removing a given number of questions. This could be a compelling reason for SQA to oppose any changes to the examination process in 2021, however, policy such as this should not be driven by operational considerations of examiners and we would urge SQA to consider this carefully in a situation where subject organisations, such as the Institute, are willing to engage on reducing assessed content in 2020-2021.

The Institute welcomes SQA's commitment to undertake further equality review and to consider any possible barriers for candidates who share protected characteristics or socio-economic disadvantage identified through SIMD metrics, and to develop mitigation plans. It must be acknowledged that some individual students will have faced much more disruption than their peers due to socio-economic status, illness, bereavement, impact of parent or carer job loss due to the pandemic, accommodation instability, the digital divide, staff shortages at centres, and ongoing possibility of local lockdowns and the need to self-isolate. Students who have not had easy access to IT and internet at home have been disproportionately affected by school closures.

There is significant evidence that any break in learning experienced by students from disadvantaged backgrounds leads to a disproportionate impact on those students. This will certainly be true for the disruptions in 2020-2021. We are concerned that students may not re-engage fully with their science studies after such significant disruption, and if studying for an SQA qualification in the sciences is made even more challenging due to the quantity of content to be covered in a shortened timescale, there is a risk that progression in the sciences will drop for these cohorts. There is already evidence that uptake in the sciences in Scotland is in a downwards or stable trend at best compared to increasing uptake elsewhere in the UK. The perceptions of the difficulty of a subject may only be one of many influencing factors, but nevertheless a very significant one, particularly for some already underrepresented groups.

We also recognise that the current situation and proposals, do not take into account the disadvantage already present in the system due to the difference in provision available to students in different schools, between independent and state schools for example. Some independent schools have been able to provide a huge amount of online learning support, with live lessons and direct individual feedback, and

even remote assessments with invigilation. This is in stark contrast with the variability in state school provision during partial school closures since March and the general advice for teachers to not engage in live online lessons. We therefore question whether avoiding a reduction in sampled content, or adding optionality in question papers, does truly avoid advantaging students whose education has been less disrupted than others. This does not seem an equitable approach, and may well lead to further disadvantage for some students. We would argue that a planned approach to reducing sampled content in 2021 would nevertheless benefit those students more than the risk of introducing disadvantage compared with a peer who has been taught and revised for 100% of the content to be sampled.

SQA's technical document states that it will not explore considerations around the 2021 examination timetable. The Institute of Physics understands that work is taking place regarding the timetable, and recommends that a timetable that can extend teaching and learning time, even by a few days, by delaying the traditional examination season would be beneficial for teachers and students.