SQA Assessment Consultation 2020
Response by the Scottish Computing Education Committee of the BCS

Links:

Survey: https://www.smartsurvey.co.uk/s/TechnicalConsultation2021/
(**Closing date 24th Aug)**

SQA Arrangements for N5/H/AH
https://www.sqa.org.uk/sqa/94837.html

SQA Proposed modifications: https://www.sqa.org.uk/sqa/files_ccc/2021-nc-proposed-modifications.pdf

Our previous consultation with teachers
https://drive.google.com/file/d/1hes5touL29MmADYPQ3-XFhY0KeMAWsN8/view?usp=sharing

Survey questions:

Do you have any comments on the proposed approach to course assessment for National 5 / Higher Computing Science in 2021?

The BCS Scottish Computing Education Committee (SCEC) is a recently formed group under the umbrella of the British Computing Society (BCS) Academy, consisting of those centrally involved in Computing Science education in Scotland: school teachers, educational researchers, and representatives of higher and further education, of industry and of relevant groups such as Education Scotland, the IET, the RSE, SQA, SDS and ScotlandIS. The views expressed here reflect those of the members of the committee, as all as incorporating views from computing teachers, who we have surveyed widely.

Our view is that the current proposal to make no change to the curriculum at all exam levels over the following year places enormous pressure on students and teachers and in many cases will make it impossible for students to complete the full curriculum. We acknowledge that removing some parts of the curriculum is not ideal, but believe it is the only way to provide a fair opportunity for learners to adequately complete the course in the time they will have available to them.

We suggest that some potential topics are dropped from the exam and the coursework, in order to allow for this reduced curriculum. We acknowledge the concern raised in the SQA's proposals that the validity of the qualification must remain; however, we believe that removing a part of the curriculum would allow exam questions on the rest of the curriculum that were as deep as in previous years, thus fairly judging the CS attainment of students.

The CS curriculum is very crowded and many teachers were finding it difficult to fit the entire syllabus in in normal times. Due to Covid, students have missed 4-6 weeks of regular teaching where teachers would have expected to begin the syllabus, meaning that it is going to be extremely difficult to cover everything. In addition, many learners will be progressing onto higher levels of qualifications without having fully completed the previous level due to school closures. Additionally, there is a risk of further school closure either locally or nationally over the next academic year; students in such schools would be at risk of missing core parts of the curriculum without time to catch up on these after they return.

For any such changes, the impact on future studies and on employability would need to be considered to ensure that, in addition to getting fair grades, students do not lose out in the future. We believe that this is achievable, and if decisions are made to cut parts of the curriculum for this year, we would be happy to work with SQA to explore the impact and necessary changes on curricula at higher levels in future years. Whilst obtaining a broad knowledge of different areas of computing is desirable, the fundamental requirement in CS is to develop computational thinking and practical skills, and we believe this will be easier to obtain for students if they have the space to be taught a shorter syllabus well than if they need to cram too much into an infeasibly short time. For those that go on to study Computing in further or higher education, prior knowledge of the subject is not assumed, and therefore students entering universities and colleges would not be disadvantaged by any lost content. They would be more disadvantaged if they hadn't had the opportunity to engage deeply with any topics because of the need to cover too much.

Computing is a subject with significant demographic inequalities, particularly in gender. There is evidence that suggests that different parts of the curriculum are more appealing to different demographics. In removing part of the curriculum, it is essential to maintain a core curriculum that has broad appeal and is not likely to further increase demographic inequality.

SCEC was a contributor to the RSE's Learned Society Group letter in May 2020 to the Cabinet Secretary for Education and Skills and the Scottish Government COVID-19 Education recovery group, offering our experience and networks, and emphasising the importance of engaging with teachers on this matter before schools broke up in June. We were disappointed to learn, in a meeting of the Learned Society Group with Sue Pope in June, that next year was planned to go ahead as normal. Whilst we understand a reluctance to remove well-established content, we feel these are exceptional times and that removing some of the breadth of the curriculum would not impact on the standard of qualifications as long as the depth remains the same.

We appreciate that schools teach topics in a different order, and any part of the curriculum that is removed may have already been taught in some schools, leading to wasted time and effort. However, most schools have many pupils who were unable to engage effectively during lockdown for a range of reasons, and they will therefore need to repeat a lot of the material that was covered during that period. We also believe that, though not ideal, this is preferable to a situation in which many learners simply cannot complete the syllabus in time. Any problems around this can be mitigated by clear communication with teachers.

We began to reach out to Computing Science teachers in our networks to gain feedback regarding the future of the Computing Science course on the 19th August 2020. We consulted a number of Computing Science teachers to find what they would like to see in the form of a poll through Twitter and the National Computing Science Slack group. Due to the

limited time we cannot claim this is the view of all Computing Science teachers and we are aware that not all recommendations will be agreed by all teachers.

As of the 22nd of August we had received 96 responses to the poll, which asked what changes they would like to see. The breakdown of which are below:
● No changes to the current set up of coursework and exam - 3 votes.
● 100% exam - 6 votes.
● 100% coursework - 33 votes.
● Increased coursework weight, decreased exam weight - 54 votes.

Over recent years there have been significant changes to the Computing Science course in compressed time frames and we do strongly believe it would not be wise to make any radical changes to the course content. One thing that appears to be shared amongst the majority of Computing Science teachers is a feeling that there is too much content in the course and that schools and teachers struggle to deliver all the content.

Computer Science is a subject that is of fundamental importance to the national economy, and in which we are already experiencing a significant skills shortage. Despite efforts to improve the situation, we are still seeing reductions in the number of students at all exam levels, with a 26.33% reduction at National 5 and a 42.97% reduction at Higher since 2014 (2.18% and 2.35% reductions respectively over the last year). In addition, the gender divide in computing continues to get worse. Whilst this phenomenon has not been adequately studied, it is widely understood that computing is considered a difficult subject, and this is off-putting to many students. If this problem is compounded in 20/21 by teaching a curriculum that is far too large for the available time, and therefore difficult and stressful, this could have a significantly negative impact on students' perceptions of the subject, which could be disastrous to the economy and to the opportunities of young people in Scotland.

In summary, we suggest the following:
-   In the current exceptional circumstances, our priority should not be maintaining the full breadth of the existing curriculum, but rather on creating an environment in which all young people can develop core CS skills at an appropriate level and be assessed fairly on them.
-   The content of the curriculum for 20/21 must be redesigned due to the significant loss of classroom time already experienced and potential future loss due to local and/or national closures. We must have a curriculum that can reasonably be completed under these circumstances.
-   The curriculum for higher levels in future years must be adapted with the current changes in mind.
-   Clear communication must be maintained whenever appropriate with schools, teachers, learners and parents about how and why the curriculum and hence the assessments are changing.
-   A clear and well communicated plan for assessment in uncertain circumstances should be developed. This should not just happen at crucial points - e.g., at exam time, if exams have to be cancelled - but throughout the year so that all stakeholders know what to expect in different circumstances and are able to adequately prepare themselves.

Here we list some draft recommendations and rationale of what content could be removed from the Nat 5 and Higher curriculum, and how more weight could be given to practical

coursework. We feel these changes would be easiest to make and have least impact on the learning outcomes for students: https://docs.google.com/spreadsheets/d/1EXOiH-OMr1dOfU-m4M11wxLvO49OLSgYpzmC3fP3vGU/edit?usp=sharing

We would like to emphasise that we do not believe that removing the coursework element completely is a good solution. Whilst this would be easy to do and may be a sensible approach for some STEM subjects, this would not be appropriate for computing. We believe that practical assessment is a much more accurate way of judging computing skill than exams; our surveys of computing teachers (pre-Covid) revealed that many thought that exams should be downgraded or removed as they are not an effective way of judging CS ability. Many students with potential in CS perform much better in practicals than in exams, and marking only on exams will discourage such students and make it difficult or impossible for them to progress further in CS. Additionally, if exams next year have to be cancelled, a practical assessment grade will give a plausible and verifiable basis for overall grade estimation.

Equality and Accessibility

Are there any potential equality or accessibility issues introduced by the approach proposed for Computing Science? What are they?

The ability of students to effectively study whilst schools are closed varies considerably and is strongly demographically affected, with students from disadvantaged backgrounds less likely to have adequate access to computers, high-quality internet and adults who are able to support them appropriately. Students that have been disengaged with learning for several months are more likely to have a hard time reengaging in education, and there is also evidence to suggest that any break in learning experienced by students from disadvantaged backgrounds leads to a disproportionate impact on those students. Current localised outbreaks of Covid indicate that disadvantaged areas are disproportionately affected, and hence students in these areas are at a higher risk of suffering further disruptions to their education over the next academic year. Access to high-quality internet is also a crucial issue for students in some rural areas.

It is therefore essential from an equalities point of view to assume that students are only able to study effectively whilst schools are open; hence the time available for covering Nat 5s, Highers and Advanced Highers has been significantly reduced this year, with the possibility of further reduction due to additional school closure. Whilst, as we outline above, we believe reduction of the curriculum is crucial for all students, it is especially important for certain demographics, and maintaining a level playing field for all students should be at the forefront of planning the next academic year.