

Ofqual: New A Level Regulatory Requirements

Response by the Wellcome Trust

January 2014

Key Points

- We are deeply concerned by the proposal that science A level grades should no longer include direct assessment of practical skills. Practical experimentation is the essence of science and must be a core part of A levels — otherwise the qualifications misrepresent the nature of the subject and can only be deemed tests of science theory. Of graver concern, experience suggests that many schools will not prioritise the teaching of practical skills unless they are adequately assessed.
- We are concerned that there is inconsistency between the Department for Education's position and that of its Regulator and Inspector. Qualifications for a number of other subjects successfully include teacher-assessed and non-examined work, and direct practical assessment is included at different stages of science education.
- Ofqual and exam boards must tackle the issue of practical grade inflation. We recommend that this is addressed now so that practical skills can be validly and reliably included in single grade. Furthermore, recently shared data show that there are examples of non-examined assessments that discriminate between students just as well as examined tests do. Ofqual should consider how these can be extended more widely.
- Practical work enthuses and engages students in science and other STEM subjects. These skills are highly valued by employers and critical for progression into higher education science disciplines — it is vital that they are developed at A and AS level.

Introduction

1. The Wellcome Trust has a long-standing commitment to supporting inspirational and high-quality science education, believing that the future of science depends on the quality of education today. The science pipeline starts early, and well-equipped and inspired students will form the next generation of science leaders, innovators, researchers and technicians. Science education is also vital to ensure that all young people obtain the skills and knowledge needed to live in an increasingly technological age. We are therefore pleased to submit evidence to Ofqual's consultation on reforms to A level regulatory requirements.
2. Our response focuses on the implications for practical science assessment as these issues are of paramount importance to the Trust. Our primary concern is the proposed removal of direct practical assessment from science A level grades. We also include some general points about the practicalities of the proposed changes.

Consultation Response

Science is a practical subject

3. The Trust has very serious concerns about Ofqual's proposal to remove direct assessment of practical skills from the weighting of science A level grades. Written exam questions can be used to test whether students know and understand certain experimental and investigative methods, but cannot test their ability to work with accuracy and precision, or be used to ensure that students have actually had

practical experiences rather than learnt to pass written questions. A system in which students can achieve top grades without demonstrating their ability to carry out experiments misrepresents the nature of science as a practical subject, and such qualifications can only be deemed to assess science theory.

Fail to examine, fail to teach

4. Examinations are a key driver of teachers' behaviour and we are extremely concerned that the current proposals would lead to a serious decline in the teaching and learning of practical skills. This is detrimental for a number of reasons:
 - Practical work enthruses students in science and other STEM subjects, and engaging students should be at the heart of education policy. In a study of young people's attitudes to science education, 37% mentioned the chance to do experiments as factor that had encouraged them to study science¹. Numerous initiatives funded by the Government, industry and other organisations are trying to boost numbers of STEM graduates and a reduction in practical work would undermine these efforts.
 - Practical work is an essential part of training for university study², higher apprenticeships and jobs in science and engineering.³⁴⁵⁶ Without these skills, students would be ill-equipped to progress to the next stage of their career and be unable to test whether they are indeed inclined and suited to such progression. At present employers and universities report that school-leavers lack practical skills and the current proposal would undoubtedly exacerbate this shortfall. Indeed, a recent letter to *The Times*⁷ expressing concern about the current proposals and emphasising the importance of practical work was signed by a range of organisations including Universities UK and the Confederation of British Industry.
 - If practical science teaching and learning is not weighted in the final grade, it may see a steeper decline in low-resourced schools engendering a two-tier system.

Ofqual must address issues of malpractice

5. Ofqual has outlined problems with the current system of controlled practical assessment in which concerns of malpractice are a recurrent theme, and proposes to address this by recording a separate practical grade. Rather than side-stepping the issue, Ofqual should instruct exam boards to take urgent steps to eradicate malpractice.
6. Ofqual reasons that levels of malpractice would be reduced under its proposed framework because "*teachers will not feel under pressure to exaggerate or be over-generous in their assessment, because the assessments will not contribute to the grade*"; the implication being that teachers would be less likely to cheat because the stakes would no longer be as high.

¹ The Wellcome Trust Monitor Wave 2, Tracking Public Views on medical research – Clemence et al. (2013).

² Reiss M., Abrahams I. & Sharpe R. (2012). Improving the assessment of practical work in school science.

³ <http://www.gatsby.org.uk/~media/Files/Education/Improving%20the%20assessment%20of%20practical%20work%20in%20school%20science.aspx>

⁴ <http://www.ukces.org.uk/assets/ukces/docs/publications/high-level-stem-skills-exec-summary-full.pdf>

⁵ http://www.cbi.org.uk/media/1051530/cbi_edi_education_skills_survey_2011.pdf

⁶ Grant, L. (2011). Lab Skills of New Undergraduates: Report on the findings of a small scale study exploring university staff perceptions of the lab skills of new undergraduates at Russell Group Universities in England. London: Gatsby Charitable Foundation.

⁷ Grant, L., & Jenkins, S. (2011). Practical Skills of New Undergraduates: Report on research workshops delivered on behalf of the Gatsby Charitable Foundation. London: Gatsby Charitable Foundation.

⁷ The Times (December 2013). Teaching science <http://www.thetimes.co.uk/tto/opinion/letters/article3954966.ece#commentsStart>

7. When the apparent downgrading of practical assessment was highlighted, the Chief Regulator defended the plans, saying that practical work would still be taught because the proposed framework would *“in fact show more detailed information about the student’s practical abilities than the current arrangements”* and would still be important to students and higher education institutions. This contradicts the position highlighted in the point above — either practical assessment remains an essential part of science qualifications and the incentive for malpractice continues, or our concerns about the downgrading of practical assessment are well-founded. Either way, the quality of the teaching of practical science would remain unchanged or deteriorate.
8. The consultation proposals do not make it clear whether the separate reporting of practical skills would be as a grade or as a simple pass/fail statement. It must be assumed that it would be a grade, because a pass/fail would be almost meaningless as a source of information for universities. We also fear that universities would find the complexity of a two-grade system difficult to handle when processing large numbers of applications; most likely they would overlook the practical score to simplify procedures. Furthermore, direct practical assessment only reflects one component of fully developed experimental skills, with other elements derived from written assessment and included in the A level grade. It would be vital to monitor how universities use any information they are given on science performance.

Inconsistency in approaches across organisations and subjects

9. We urge Ofqual to consider Ofsted’s recent report *Maintaining curiosity: a survey into science education in schools*⁸, which says that best practice puts *“scientific enquiry at the heart of science teaching”* and recommends that Ofqual *“ensure that qualifications include assessment of the skills needed for scientific enquiry.”* The report notes concerns expressed by employers, higher education institutions and professional bodies that *“too many school leavers are not well-enough equipped scientifically with practical, investigative and analytical skills.”*
10. Furthermore, the proposed changes are not aligned with new A level content criteria published by the Department for Education in October. This includes *“applying accuracy and judgement in practical work”* and *“keeping appropriate records of experimental activities”*. These skills would not have any real weighting under Ofqual’s assessment proposals. Content criteria and regulations must be considered contemporaneously.
11. It would be most beneficial if Ofqual worked with the schools inspectorate Ofsted to ensure that the quality of practical work is monitored in schools and with Ofsted and the Department for Education to communicate its importance.
12. Direct practical assessment is given weighting in the GCSE science grade but not the A level qualification. This inconsistency does not reflect the ever-increasing centrality of practical work as education progresses into employment or tertiary education. Endorsement of non-examined assessment is also inconsistent between subjects. Of particular note is geography, where Ofqual has taken advice from the Royal Geographical Society and allocated 20% of the A Level grade to fieldwork. It has also committed to work with exam boards to address difficulties with non-examination assessment. We understand that this change was in recognition of the negative consequences of the removal of direct assessment from the qualification.

⁸ Ofsted (2013) *Maintaining curiosity: a survey into science education in schools* <http://www.ofsted.gov.uk/resources/maintaining-curiosity-survey-science-education-schools>

We encourage Ofqual to take heed of this example. We believe that if it is possible to include non-examined assessment in geography, it is also possible in science.

Identifying the best approach for direct practical assessment

13. We believe that Ofqual has too readily accepted the awarding organisations' contention that it is too difficult to develop reliable and discriminating direct assessment of practical scientific skills.
14. We were pleased to see limited 2012/13 data, released by Ofqual in January 2014 in response to a Freedom of Information (FOI) request, which show that some non-examined assessments are as good at discriminating between students as examined assessments. Whilst we acknowledge that there are some shortcomings in the current system of controlled practical assessment, we believe Ofqual should look at the most successful examples and consider how these could be extended more widely. We would be pleased to work with Ofqual and exam boards to achieve this. We also urge awarding organisations to routinely publish the evidence base behind their qualifications, especially given the large amounts of public money spent on them.
15. The consultation also raises concern that non-examined units are generally marked higher than examined assessments. If the scores are high, it might be that the practical assessments are pitched at a level which yields a high level of competence. Given that we would like students to have acquired many, wide-ranging practical skills, this might be a good thing, as long as the assessments still discriminate. In either case, the assessments could, if necessary, be made more challenging to reduce any risk of ceiling effects reducing discriminatory power. We also note that some biology non-examined practical assessments yield lower average marks than examined units.
16. The Gatsby Foundation and Wellcome Trust have produced a paper⁹ suggesting that the following alternative approaches to controlled assessment be explored, alongside serious consequences if malpractice is discovered:
 - Direct assessment of practical skills using local school cluster moderation, whereby experienced teachers from nearby schools collectively help standardise each centre's assessment.
 - Requiring students to keep a portfolio of their experiments, detailing methodologies, results and conclusions. These could be verified, stored and marked by teachers, with samples made available to exam boards as part of the assessment process.
17. Some of the rationale behind the removal of direct assessment from the A level grade proposals relates to a lack of trust in teacher assessment, with no attempts to improve the situation. There may be an opportunity to build trust and promote the career development of science teachers through a peer-to-peer moderation process. Trained teachers could perhaps be awarded a 'licence to assess'.

AS level and general concerns

18. The consultation has given little consideration to practical assessment at AS level, except to state that AS levels would be entirely assessed by exam. This may work if

⁹ Addendum to Gatsby Charitable Foundation and Wellcome Trust Paper: Assessment of Practical Work in Science (2013)
<http://www.gatsby.org.uk/~media/Files/Education/Practical%20Science%20Policy%20Note%20Addendum.ashx>

science AS levels include a practical exam, but we need more clarification on the weighting and proposed nature of such an assessment before we can comment sufficiently. However, if AS levels do not include any direct assessment of practical skills, there is a risk that practical work would not be taught. The resulting learning experience of students would likely lead to a dramatic decline in progression to A level. Many other arguments described in the sections above would also apply to AS, including the fact that the qualification would not be an authentic assessment of science itself.

19. The proposed changes to the regulation of science A levels are significant and further clarity is required on the implementation of this ambitious timeline. We request assurances that new developments will be carefully piloted and rigorously evaluated before being refined and rolled out nationally.
20. This must include pressing issues such as the mechanisms for reporting multiple science grades to UCAS and others. Indeed, given that all of the science specification will not have been assessed to derive the A level grade, UCAS may resist awarding science A levels the full points value of other A levels, which would surely have disastrous consequences. Any changes to assessment should be implemented alongside an ongoing and open system of monitoring, with potential for a quick response should negative outcomes be detected.

Final comments

21. The proposal to remove direct assessment of practical skills from science A level grades jeopardises the progression of the next generation of scientists, at a time when the Government is prioritising this field to help drive economic growth. These measures would have serious consequences on the progression of STEM study; compromising skills which are so highly valued and already in short supply.
22. We would be happy to discuss any of these points in more detail if it would be helpful.

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