

Response to Ofqual on completing GCSE, AS and A Level Reform in England

Response prepared by the Education Policy Advisory Group on behalf of the Royal Statistical Society

1. Background to this response

The Royal Statistical Society (RSS) is one of the world's most distinguished statistical societies. It is a learned society for statistics, a professional body for statisticians and a charity which promotes statistics for the public good. Among its core activities, the RSS seeks to support and promote statistical education and statistical literacy in its broadest sense, including across the curriculum. We have undertaken two major reviews of statistics' place in England's curriculum in recent years: *The Future of Statistics in our Schools and Colleges*, and *A world full of data: statistics opportunities across A-level subjects*.^{1, 2}

2. To what extent do you agree or disagree that the benefit of having additional (to those already being reformed) GCSE, AS and A level subjects is worth any additional costs incurred by exam boards in developing core content (common content across all exam boards offering a qualification)?

The RSS would like to respond to this question with regard to statistics as an additional subject.

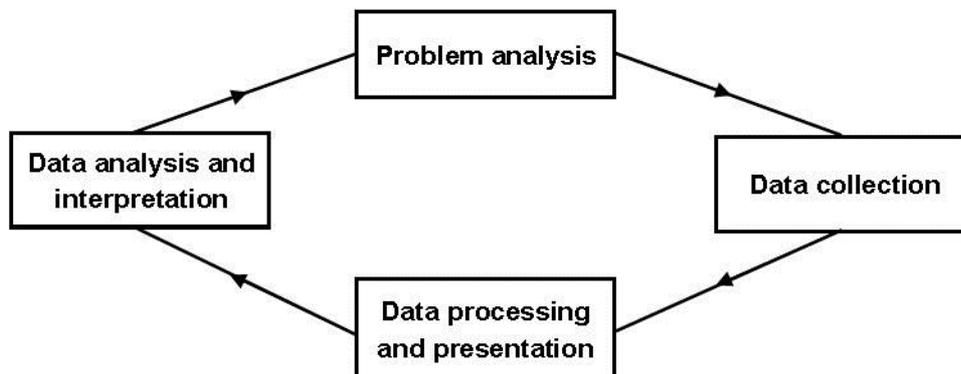
2.1. Statistics at Level 2 (GCSE statistics)

Statistics is not simply a branch of mathematics. It is a distinct activity, which is fundamentally about information, numerical data, and about applying quantitative skills to real problems. Our research reports, referenced above, have established statistics' breadth of use. We have found GCSE Statistics a worthwhile qualification which emphasises the interpretation of data more than the former or current GCSE Mathematics, and even with the wider emphasis on quantitative methods at GCSE (for example in Geography), it is likely to continue to be useful to offer a baseline more broadly in statistical methods and data handling. Study of statistics as its own subject at GCSE / Level 2 also helps to provide an anchor for statistics teaching within schools, and experience of the statistics cycle, outlined overleaf. The statistics cycle promotes a way of understanding the world that is transferable across a range of subjects and

¹ Porkess, R. (2012). *The Future of Statistics in our Schools and Colleges*. London: the Royal Statistical Society and the Actuarial Profession. Available from: <http://www.rss.org.uk/uploadedfiles/userfiles/files/The%20Future%20of%20Statistics%20in%20our%20Schools%20and%20Colleges.pdf> (Accessed: July 2014)

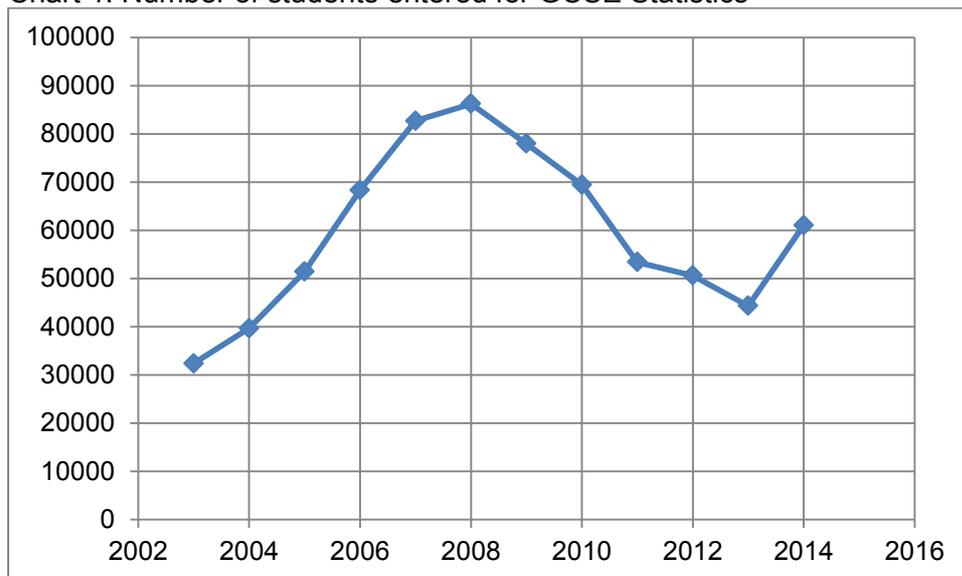
² Porkess, R. & Dudzic, S. (2013). *A world full of data: Statistics opportunities across A-level subjects*. London: The Royal Statistical Society and the Institute and Faculty of Actuaries. Available from: <http://www.rss.org.uk/uploadedfiles/userfiles/files/A-world-full-of-data.pdf> (Accessed: July 2014)

situations. Students analyse a problem to plan their own experiment or statistical approach. They then collect their data, they process and present their data, and they analyse and interpret their findings. GCSE Statistics should continue to ensure experience of this.



GCSE Statistics is quite widely taught, with 44,336 students examined in 2013, roughly equivalent to music (see chart 1 below for trend). By allowing teachers to specialise to some extent in the subject, it should also help to develop much needed expertise in the teaching of statistics and quantitative methods.^{3, 4}

Chart 1: Number of students entered for GCSE Statistics⁵



³ RSSCSE (2012). *Teaching Statistics in British Secondary Schools*, September 2012, Available from: http://www.rsscse.org.uk/images/stories/ts_pedagogy_full_report.pdf (Accessed: July 2014)

⁴ Hodgen, J. Pepper, D. Sturman, L. & Ruddock, G. (2010). *Is the UK an outlier? An international comparison of upper secondary mathematics education*. London: Nuffield Foundation.

⁵ Data from Joint Council for Qualifications (1993-2013) *Student Performance Analysis: National percentage figures for GCSE grades* [online]. Available at: <http://www.bstubs.co.uk/gcse.htm> (Accessed: July 2014)
 2013 and 2014 data from Ofqual (2014) *Provisional summer GCSE and IGCSE entries* [online] Available at: <http://ofqual.gov.uk/standards/statistics/provisional-summer-gcse-igcse-entries/> (Accessed July 2014)

We therefore strongly support the continuation of GCSE Statistics to prepare students for further study in quantitative methods across subjects, and for some to specialise in statistics at A-level. The content of the subject needs to be looked at in light of recent qualification reforms. This redevelopment is worthwhile and is of interest to RSS education specialists, and we would seek to advise the examining bodies on this.

2.2 Statistics at Level 3 (AS and A-level statistics)

We note that current uptake of Statistics AS and A-Level is far lower than its uptake as a separate subject at GCSE.

However, the Society has an interest in supporting the development of specific courses at Level 3 in statistics.

We note that the AS Level Use of Mathematics has played a welcome part in teaching the data handling cycle, but is not being considered for reform. Many of its useful elements are being absorbed into exam bodies' new 'core maths' developments and will be made available by this means. Thus we are not too concerned about the removal of this qualification.

The proposed specification for A Level Mathematics includes welcome improvements for statistical content. With the increasing use of data collection and analysis in subjects from biology to sociology, business studies to psychology, there is an increasing need for students to have opportunities to understand statistics in practice⁶, applying and embedding their theoretical knowledge.

Once again there would be issues to resolve in light of reforms. The level of distinction between statistics A-level and statistics within mathematics would need to be considered, as would the distinction from new 'core maths' qualifications' statistical content. Overlap with the statistics in mathematics would be necessary, but the level of specialism would be greater, leading to an A Level in Statistics, rather than in Mathematics.

This could take the form of an A Level Statistics that allows students to gain more experience and understanding of statistics in practice – applying and contextualising the theoretical understanding gained from mathematical statistics, addressing the questions that arise from taking samples, extending their knowledge and skills in using computers to handle large data sets.

In particular, statistics at A-Level should offer students distinct coverage of, and practice in, quantitative methods, data collection and data analysis. This is covered to a greater or lesser extent in other subjects, but the option of pursuing statistics as a discipline at this stage should be encouraged.

⁶ Porkess, R. & Dudzic, S. (2013). *A world full of data: Statistics opportunities across A-level subjects*. London: The Royal Statistical Society and the Institute and Faculty of Actuaries. Available from: <http://www.rss.org.uk/uploadedfiles/userfiles/files/A-world-full-of-data.pdf> (Accessed: July 2014)

3. To what extent do you agree or disagree with the following statement?

Core content – common content across all exam boards offering a qualification – will help make sure qualifications are fit for purpose.

Strongly agree / Agree / Disagree / Strongly disagree / Don't know or no opinion.

Comment: The core content for statistics should be agreed as it is redeveloped. The necessary extent of comparable core content would need to be discussed, to ensure that syllabuses have the opportunity and flexibility to bring in new ideas that can later be absorbed into the core.

4. To what extent do you agree or disagree with the following statement?

Core content – common content across all exam boards offering a qualification – will help make sure qualifications are comparable across exam boards.

Strongly agree / Agree / Disagree / Strongly disagree / Don't know or no opinion.

Comment: This assumes that if two exam boards have the same content they will set comparable questions. A large element of common content may be necessary for comparability but it is certainly not sufficient. Comparability is conditional on matters that are not specified in the question – so we have answered Don't know.

5. To what extent do you agree or disagree that exam boards should consult with stakeholders and take their views into account when developing core content for all reformed GCSE, AS and A level qualifications?

Strongly agree / Agree / Disagree / Strongly disagree / Don't know or no opinion.

Comment: We agree that there should be consultation with stakeholders when developing core content for all reformed GCSE, AS and A level qualifications. Careful consideration should be given to what body should conduct the consultation, and how a consultation is implemented. The implications of exam boards being made responsible for developing core content must be fully considered. This is particularly important for those subjects where only a small number of exam boards may take an interest in a qualification. Under the new system, one awarding body would need to persuade the other bodies to work with them to develop core content. It is not clear that this process is workable.

6. Are there any other stakeholders you believe should be consulted?

Learned societies and professional bodies.

7. Please indicate the extent to which you agree or disagree with each statement below:

GCSE/AS/A level subjects should be easily distinguished from other GCSE/AS/A level subjects.

Strongly agree / Agree / Disagree / Strongly disagree / Don't know or no opinion.

We agree that different subject study should be distinguished but we also recognise that statistics is learned across a range of subjects and that there is a benefit from interdisciplinary work. This tension should be constructively resolved to preserve the independence of assessment in different subjects, and to ensure that learning of concepts is consistent across subjects, and acknowledges the overall student experience across subjects.

GCSE/AS/A level subjects should be capable of being validly assessed (mainly by exam assessment, except for those essential skills that can't be assessed by an exam).

Strongly agree / Agree / Disagree / Strongly disagree / Don't know or no opinion.

Comment: As for question 5, this statement contains several sub-questions, which we would prefer to consider separately.

- We agree that GCSE/AS/A level subjects should be validly assessed.
- We are not convinced that valid assessment is strictly equivalent to “exam assessment, except for those essential skills that can't be assessed by an exam”.
- There is scope for further evaluation of the effect on teaching from using mainly exam assessment, and for this to inform Ofqual's policy. The stipulation to assess mainly by exam may overly limit the use of assessed practical work that has great scope to assist the learning of scientific and quantitative methods. The case that it will *not* damage this has not been conclusively made.

Thus overall, we disagree with this statement.

The RSS thanks the following members of the Education Policy Advisory Group for their advice on this response:

- Stella Dudzic
- Professor Harvey Goldstein
- Roger Porkess
- Neil Sheldon, RSS Vice President for Education and Statistical Literacy

Response submitted by Scott Keir, Head of education and statistical literacy on 30 July 2014.