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Campaign for Science and Engineering in the UK

CaSE 07/12

Assessing real educational value

Response to the House of Commons Education & Skills Committee Inquiry into *Testing and Assessment*

1. Campaign for Science & Engineering is pleased to submit this response to the Committee's inquiry into testing and assessment. CaSE is a voluntary organisation campaigning for the health of science and technology throughout UK society, and is supported by over 1,500 individual members, and some 70 institutional members, including universities, learned societies, venture capitalists, financiers, industrial companies and publishers. The views of the membership are represented by an elected Executive Committee.

2. CaSE is naturally very interested in science education as the source of the scientists and engineers of the future. We are also concerned that those citizens who are not scientists – the majority – should both appreciate science for its own sake as part of our culture and also be able to participate in decisions in which science plays a role.

3. Our members in universities, learned societies and companies have a close interest in what is happening in schools. We believe that concerns are especially serious in the sciences (and some other disciplines such as languages) because they are cumulative. What can be taught at one level often depends very much and in some detail on what has been learned before.

4. Much of CaSE's membership comprises university lecturers and professors, providing a complimentary viewpoint from organizations representing teachers that may also be responding to this consultation. These members typically see students immediately after they have left school. Because they are themselves teachers, they are in a position to provide a unique and valuable perspective on many issues in school teaching. They also have views of their subjects that are both broader and deeper than most teachers or officials can have.

5. Our membership also includes both industrialists and school teachers, so this response is also informed by practical experience of the current system of assessment and testing and by the experience of employers who need to interpret the results of the system.

6. In general, when compared with their predecessors, students who have come through the schools since the national tests were introduced are less well prepared and more focused on examinations. For example a survey of the UK's Deans of

Science showed that on 58% of university science courses, fewer than half of the students embarking on them had the 'necessary or appropriate' mathematical skills expected of them. For practical skills and elementary knowledge, the figures were 47% of courses and 34% of courses. 80% of Deans of Science said that over a decade the average fresher student's elementary knowledge had declined[1].

7. We do not doubt that students appear to work harder at school than those of ten or fifteen years ago, but too much of this extra effort appears to have been devoted to the narrow and unremitting demands of national tests.

8. It may be that the present regime of frequent national testing was appropriate when it was introduced. After the abolition (in most education authorities) of the 11+ and before the introduction of the National Curriculum, schools were left very much to their own devices. One headmaster joked at the time that schools were like the BBC - the only compulsory subjects were sport and religion. This was eventually considered to be unsatisfactory, and new initiatives including the National Curriculum and the Literacy and Numeracy Strategies were introduced, as were the Key Stage tests.

9. But even if the frequent national tests were necessary when they were first introduced, we believe that the time has come to consider whether they are still needed, and our view is that they are not. In short, there are some good arguments for having a well-defined core to the national curriculum and other arguments for some national tests, but there should not be a rigid curriculum and overly-frequent testing.

The relative difficult of subjects

10. We have not responded to all the questions that were put by the Committee. There is, however, one additional point that we wish to make because it directly affects science, and that concerns the relative difficulty of different subjects at GCSE and A-level.

11. We are very concerned that the QCA has allowed the standards of subjects to vary so that mathematics, physics and chemistry (and languages) are considerably harder than most others, if harder subjects can be defined as those in which people of the same general academic ability are expected to get lower grades than they would in other subjects[2].

12. Students factor anticipated grades into their choice of subject and they typically (and appropriately) perceive the sciences as relatively difficult. Nevertheless, all A levels yield the same number of points for the same grades, despite evidence that many of the newer subjects (such as Sociology and Business Studies) are easier than the sciences[3]. Students benefit from getting more points by choosing easier A levels, and schools and colleges may encourage them to do so because it enhances their own performance in league tables. In response to this, some universities, such as Cambridge, now require applicants to score their points in traditional subjects, while the University of Chester has started awarding double points for Further Mathematics.

13. Inequality in the difficulty of subjects, may not greatly affect students who are committed to studying science or a science-related subject at university, and who are therefore competing only with other students taking the same A-levels. It is,

however, bound to discourage those who have not yet made up their minds and who know that admissions tutors in many university departments will be more concerned with their points than with the subjects in which these were obtained. This is a strong disincentive to continue studying science.

14. CaSE believes it to be essential that the nation recognizes the inequality among A levels and that we increase the academic requirements of the less challenging ones. On no account should the more challenging subjects be simplified.

Responses to specific questions:

General Issues

Why do we have a centrally run system of testing and assessment?

15. National tests provide the Government and parents with information about schools and colleges. They also provide comparable information about the achievement of individual students to employers, universities and the students themselves.

What other systems of assessment are in place both internationally and across the UK?

16. Systems vary quite widely among countries, but as far as we know few if any other nations put such sustained pressure on children by having such frequent national testing as England, or a similar system of league tables.

Does a focus on national testing and assessment reduce the scope for creativity in the curriculum?

17. Yes, inevitably. A question that demands a simple answer or a straightforward procedure is relatively easy to mark. A good teacher can judge how much credit to give for an attempt at something requiring more thought and reasoning, but it is very hard to devise a national mark scheme that will ensure all candidates are treated fairly.

18. If there is frequent national testing, then the curriculum – at least those parts of it that are actually taught – will concentrate on those aspects of the subject that lend themselves most readily to national testing. This may exclude much of what we most want the children to be learning, and indeed precisely the parts that they may well find most interesting. There is a great deal of science that could excite and stimulate young people but which is not easy to assess, least of all on a national mark scheme.

19. We also believe the focus on national testing reduces the scope for creativity of individual teachers.

Who is the QCA accountable to and is this accountability effective?

20. To whom (if anyone) the QCA is accountable is far from clear to the people and organisations we represent. It is very difficult for subject communities to have any effective influence on what the QCA does or decides, even though its actions and decisions (or inaction and lack of decision) can have profound effects on the futures of these subjects.

What role should exam boards have in testing and assessment?

21. In a system where national testing is so influential, the exam boards have a great deal of power. Their decisions can have profound effects on what is taught

and how it is taught, and yet they do not consult even to the extent that the QCA does. If the boards are to remain in much the same form that they are now, the various interested parties must be given a greater say in what they do.

22. It is critical that the three competing exam boards are closely monitored to assure parity in the level of attainment required for the same grades. Obviously, there is a risk of increasingly less challenging assessments, as these boards operate in an open market, and the chief concern of their customers is to obtain the highest grades they can.

National Key Stage Tests

The current situation

Does testing help to improve levels of attainment?

23. If "levels of attainment" means performance on the tests, then the current tests are indeed successful. The real issue, however, is whether the pupils are actually learning more, and there seems to be no attempt being made by the QCA to calibrate the tests to help decide this. (There is evidence – not from the QCA – that the improvement in A-level performance in mathematics does not reflect more learning[4].)

To what extent is there 'teaching to the test'?

24. University lecturers report that teaching to the test is evidently becoming more and more prevalent. They see this in the poor subject knowledge and general competence of many students with very good grades. It can also be seen in the students' attitude and approach: after years of being taught with the next national test very much in mind, many of them find it hard to learn in any other way.

Does the importance given to test results mean that teaching generally is narrowly focused?

25. From observing students and talking with them, many members of CaSE believe that the focusing is much greater and more widespread than the Government, QCA and the exam boards realise, though Ofsted has commented on it at least in mathematics[5]. For many teachers, if something is in the curriculum but not on the exam specification, then it will almost inevitably not be taught. We have been told that even many good teachers, who would prefer to teach in what they – and we – consider a better way, are being pressured by their schools into adopting the safer policy of teaching to the test.

What role does assessment by teachers have in teaching and learning?

26. Formative assessment is of course very important, but we are happy to leave that to the professional judgement of the teachers. The problem is summative assessment, and especially national summative assessment. This has a role in defining what is expected and as medium term motivation, but it must be used sparingly. The tail must not be allowed to wag the dog.

The future

Should the system of national tests be changed?

27. Yes.

If so, should the tests be modified or abolished?

28. Bearing in mind that national tests are very expensive to set, organise and mark, that preparing for them takes valuable time away from teaching and learning, that

they distort the curriculum, and that they put pressure on the children, the goal should be to have as few as possible. In particular, we see very little justification for the present Key Stage 3 tests. As most of the children will be in the same schools two years later when they take their GCSEs, these tests tell us nothing about either the children or the schools that we do not already know or will not soon find out.

The Secretary of State has suggested that there should be a move to more personalised assessment to measure how a pupil's level of attainment has improved over time. Pilot areas to test proposals have just been announced. Would the introduction of this kind of assessment make it possible to make an overall judgment on a school's performance?

29. It is not clear how this would be better than a comparison of test performance at two stages (be they Key stages, GCSE or A-levels) at judging school performance. It seems unnecessary and is likely to introduce new complexity and administrative burdens into our already over-loaded schools.

Testing and assessment at 16 and after

Is the testing and assessment in "summative" tests (for example, GCSE, AS, A2) fit for purpose?

30. No.

Is holding formal summative tests at ages 16, 17 and 18 imposing too great a burden on students? If so, what changes should be made?

31. In order to reduce the negative effects of frequent testing, it seems that it would be beneficial to eliminate one of these series of tests. We would support a move to a baccalaureate based-system to replace AS and A levels, providing the students with the possibility of keeping their subject-base broad without increasing the level of assessment. The curriculum structure should not be based on the assumption that students will already have decided by age 14 or even 16 whether or not they are going to become scientists or engineers. English education has long been criticised for making young people choose between the "two cultures" at too early an age. We should be trying to allow students to keep open as many opportunities for as long as possible, not bringing forward the date at which they must choose to shut down some options.

32. As a general point, because it is usually only the last qualification a person obtained that really matters, we should be reluctant to devote too much effort and resource to assessment that will soon be superseded.

To what extent is frequent, modular assessment altering both the scope of teaching and the style of teaching?

33. Modular assessment has some advantages, but it leads to fragmentation of the course and a concentration on that which can be learned quickly and in bits. Students arrive at university having forgotten much of what was in the early modules, and they find it difficult to cope with courses that are taught in a more holistic fashion. Teachers also have very little freedom of manoeuvre; the closer the next external assessment, the more closely they must conform to what the assessor will require.

How does the national assessment system interact with university entrance? What does it mean for a national system of testing and assessment that universities are setting entrance tests as individual institutions?

34. Now that more than 90 per cent of students with two or more A-levels continue in full time education, A-level has become more an entrance examination than a qualification in its own right, and it should be designed and judged with that in mind. If more than a very few universities consider it necessary to set their own entrance tests, that must cast serious doubt on the usefulness of the whole system. (See also earlier comments on how universities awarding places merely on the basis of A-level points attained encourages students to take easier subjects.)

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Notes and references

[1] *Skills and knowledge of science students entering higher education*, CaSE, 2003

[2] A range of studies and evidence, showing consistent results, is available via www.cemcentre.org

[3] Study calls for grading reform, Paul Hill, *Times Higher Education Supplement*, 3 September 2004

[4] See, for example, the contribution from the Department of Electronics at York University to Diagnostic Testing for Mathematics (ISBN 07044 23731), published by the LTSN Maths Team and available at <http://mathstore.ac.uk/mathsteam/packs/diagnostic_test.pdf>

[5] Evaluating mathematics provision for 14-19 year olds, Ofsted, 2006.