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Experienced science teachers' views of the National Curriculum

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KEY FACTS

Policy area: Secondary science education
Research question: What are the views of very experienced science teachers about the different versions of the secondary science National Curriculum?
Methods: Interviews with 14 very experienced science teachers from across England
Research stage: Early findings

Summary of the research

14 very experienced science teachers working in state schools England were interviewed about their views on the different versions of the secondary science National Curriculum and testing arrangements. All had over 20 years' experience; 10 had over 25 years' experience. Interviews were conducted by Dr Victoria Wong from June-November 2024 and averaged 55 minutes in length. The teachers were asked to reflect on how different versions of the Key Stage 3 and 4 secondary science curricula had influenced their teaching practice and focused on: practical work; science literacy; mathematics in science; communication in science and student motivation.

Policy recommendations

- A reduction in factual content of Key Stage 4 science.
- A greater focus on thinking and working scientifically across Key Stages 3 and 4.
- More accessible examinations at Key Stage 4.
- An alternative science qualification for students expected to achieve grades 1-2 at GCSE.
- Greater coherence between the secondary science and mathematics curricula.

Key findings

Purpose of science education

- For many of the teachers, science is about critical, logical thinking and several argued this is under-emphasised in the current curriculum.
- Many teachers highlighted that science education was part of the wider purpose of education: enabling students to be active members of society and lead fulfilling lives.

Challenging examinations

- There was very widespread agreement that very challenging examinations at GCSE are demotivating for a wide range of students.
- Many argued that there was a pressing need for an alternative to double award science for students who might be expected to get grades 1-2 at GCSE.
- The need for all students to experience a sense of success while studying science was emphasised.

GCSE content

- All teachers agreed that learning about the ideas of science and scientific knowledge is important.
- Most teachers thought that there is too much content in the GCSEs with several arguing that the first content to be cut should be the learning of facts that do not relate to important science concepts.
- Most argued that students should not have to rote-learn formulae but rather be expected to apply them.
- Many argued that it was not possible to teach the current Key Stage 4 content in two years, leading to a majority teaching it over three years.
- Many suggested that they did not want large changes to be made to the curriculum at Key Stage 4: that some of the content should be cut and a greater focus given to scientific literacy but that changes should otherwise be evolutionary not revolutionary.

Practical work

- All the teachers thought that practical work was an important part of science and wanted its use in school to continue to be supported in the curriculum and financed appropriately.
- Most suggested that practical work needed to be formally assessed to enable it to remain a key component of the science curriculum.
- Most felt that the current system of assessing practical work through the terminal assessments was the most viable assessment option. Many argued that historical teacher assessments significantly increased workload.
- Several teachers lamented that in many schools students rarely, if ever, now encounter investigations or project work in science. They argued that such extended practical activities were valuable and motivating for students and taught a range of skills including planning, while recognising that they were time consuming and challenging to assess.
- Several argued that having a small number of required practicals had reduced the amount of practical work in Key Stages 3-5 and narrowed what many schools offered.

Working scientifically or How Science Works or Science Literacy

- Most welcomed the additional focus on How Science Works from 2008 as they believed it to be a very important part of science education, helping all students to understand the world and make informed decisions.

- Several felt the reduced focus on science literacy in the science curriculum since 2015 to be a loss, leading to less focus on developing students' scientific skills such as critical thinking, evaluation, data and analytical skills, and to students being introduced to less contemporary science.

Mathematics in science

- All the teachers thought that there should be mathematics in the science curriculum, although not all agreed with the policy of having set percentages of mathematics in examinations.
- A majority wanted to see greater coherence between the mathematics and science curricula, arguing that unnecessary differences between them confuse learners.

Writing in science

- Most teachers thought that writing and communicating in science was important.
- Teachers' opinions were divided on the current long answer (6-mark) questions. Several argued that questions were too often broad but mark schemes precise, leading to many students misinterpreting the questions and unfairly losing several marks in examinations.

Key Stage 3

- Many suggested that currently students make little progress in science at KS3 and therefore there was more appetite for change to Key Stage 3 science. Many argued for an interesting programme of study appropriate for 11-13s, building on primary science while preparing students for Key Stage 4.

Teacher flexibility and consistency

- Teachers are flexible and change their practice, particularly in response to assessment changes, because they are motivated to give their students the best strategies to be successful in their examinations.
- In many settings there is intense pressure for conformity and consistency between teachers by Senior Leadership Teams, often leading to a homogeneous, non-enriching curriculum. Accountability measures are believed to drive this desire for consistency.
- The consequent loss of autonomy and space to be creative practitioners was experienced as profoundly demotivating for experienced teachers and had led to several who taught in such schools to leave.

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