

Science Education Tracker 2023

Foreword

A good science education helps shape our understanding of the world we inhabit and the Universe beyond and makes a major contribution to a rounded education that all young people need and deserve. Thinking scientifically helps develop curiosity, creativity and the skills to innovate. Ensuring more young people experience the best possible STEM (science, technology, engineering and mathematics) education will undoubtedly contribute to the UK's economic growth and stability while providing the skills and opportunities to enable more future citizens to flourish in all aspects of their lives.

The Science Education Tracker (SET) explores young people's views and perceptions of science, science education and their career aspirations with respect to STEM. We are delighted to present here the findings of SET 2023, the third in a series of national surveys, first established by the Wellcome Trust in 2016 and repeated in 2019. The top-notch methodology and large representative sample of 11–18 year olds in England enable a detailed glimpse of how young people's experiences are changing. We are very grateful to Wellcome for their financial support of the latest survey and thank the 7,256 young people who participated.

In the four years between the previous and current surveys, external factors have changed considerably. There is now a stark recognition of the climate emergency with hundreds of thousands more people needed to enter STEM careers in the UK to help us mitigate and adapt to it. It is therefore very concerning that we see a decline in young people's interest in science at school, notably amongst younger girls, and while interest in science careers is stable through school, interest in engineering and technology careers drops off with age, despite the fact that a third of students are interested in a career that would help tackle climate change.

The 2023 survey also follows the first pandemic in a century. COVID-19 hugely disrupted young people's education. Schools were closed for extended periods, teaching moved online, and public examinations were replaced by teacher assessment. Although schools have now reopened, indications of the damaging effects of the pandemic on young people are apparent in the SET 2023 findings. For instance, students' self-perceptions of their ability across STEM and non-STEM subjects have fallen markedly compared to 2019.

The move from physical to virtual classrooms during the pandemic evidences the adaptability of the teaching profession under immensely difficult circumstances and teachers' dedication to their work. It also demonstrates the remarkable extent to which digital technologies are changing the nature of teaching and learning. However, these technologies need to be used appropriately and their usage should not displace hands-on practical science, which is a key motivator for young people to engage with science, especially those from groups underrepresented in STEM. Unfortunately, SET 2023 findings show clear evidence of overuse of videos to teach practical science at the expense of both teacher demonstrations and 'hands on' practical work. In fact, the SET series shows that access to hands-on practical work has been declining since 2016. This means many young people may leave school without a sound appreciation of scientific methodologies, which are crucial for understanding how science works and being able to engage with scientific issues.

Many factors are likely to account for this marginalisation of hands-on practical work, such as the embedded use of videos in teaching (partly in response to the pandemic); the persistent difficulties schools have in recruiting and retaining subject specialist science teachers and technicians; resourcing constraints due to squeezed school budgets; but crucially also the demands of the high-stakes, standardised, assessment and accountability system that so heavily influences how science is taught.

The importance of having a sufficient supply of well trained and qualified teachers cannot be overstated. SET 2023 findings show young people value being taught by teachers whom they perceive as ‘good’, citing this as a key motivation for learning about science and computer science. Sadly, not all schools have specialist science, mathematics, computer science and design and technology teachers, especially in areas of economic disadvantage, and girls are more sensitive to teaching quality. This poses a significant challenge to achieving equity in science and computing education and to nurturing the next generation of STEM professionals. Girls are also more likely than boys to doubt their ability in science and computing, to consider that science is not for them, and to be less likely to choose to study STEM subjects post-16 or be interested in pursuing a STEM career. This difference is particularly pronounced for engineering careers, which interest less than a third of girls but nearly two-thirds of boys.

Regrettably, some students are put off science (and computing) because they perceive them to be uninteresting and difficult. By contrast, SET 2023 findings show that most young people engage with science outside school, and are particularly motivated by experiences working with STEM professionals, with a significantly higher percentage of students surveyed in 2023 than in 2019 agreeing science is important for society and relevant to their future career.

These contrasting findings indicate that students perceive, experience and respond differently to science inside and outside the classroom. The increasing negativity towards school science, and reduced emphasis on hands-on practical work, underscores the need for a comprehensive review of science education in England and a new approach to making a career in teaching STEM subjects an attractive proposition. Unless action is taken, the existing skills and gender gaps are likely to widen, making it harder to create a more prosperous, more resilient, and healthier society.



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