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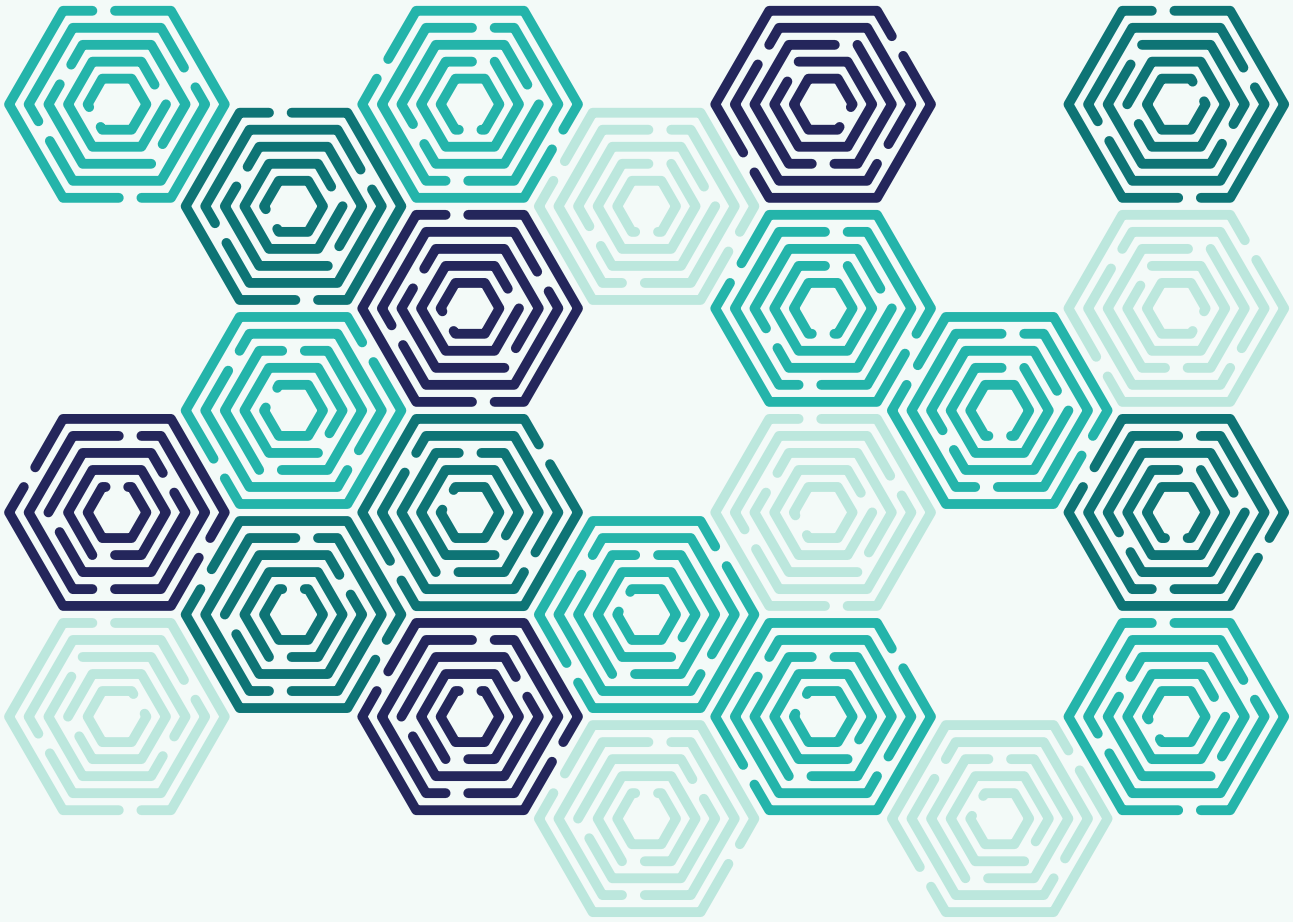

ENERGY QUEST 2024/25: EVALUATION REPORT

Results from the evaluation of the 2024/25 Energy Quest programme

Contents

Executive summary

The 2024/25 Energy Quest programme reached 6,295 students across 85 schools in the UK, delivering hands-on workshops designed to increase awareness of careers in engineering and technology. The evaluation includes data from 1,738 students from 54 unique schools, 28 teachers from 20 unique schools, and 6 facilitators who delivered Energy Quest workshops. Our findings show that Energy Quest is a highly engaging and impactful programme for both students and teachers.

Programme impact

Energy Quest was designed to support students in developing their STEM identity and increasing their Science Capital, as these are key predictors of future STEM aspirations (Archer et al., 2015; Dou & Cian, 2022). The programme's Theory of Change outlines how practical experiences, career exposure, and inclusive messaging can foster interest and confidence in engineering careers.

Evaluation findings show that:

- **94% of students** reported learning more about engineering careers
- **71%** were motivated to do more practical problem-solving activities
- **69%** said they were more interested in becoming an engineer after the workshop
- just over half **(53%)** said Energy Quest made them feel like they could become an engineer if they wanted to
- students from underrepresented backgrounds, including girls, disabled students, and those from priority schools, reported high levels of engagement and impact,
- girls were particularly enthusiastic about the hands-on and team-based elements

Teacher outcomes

- **96% of teachers** agreed the workshop provided meaningful opportunities for students to apply science and problem-solving
- **67%** reported increased motivation to suggest engineering careers to students.
- teachers who engaged with CPD were more likely to feel confident promoting engineering pathways and rated the CPD highly

Delivery insights

- teachers praised the accessibility and inclusivity of the content, though some noted the need to tailor it for students with disabilities or special educational needs

Conclusion

Energy Quest effectively builds students' knowledge and interest in engineering careers, providing them with the opportunity to participate in engaging, hands-on activities. The programme contributes meaningfully to students' understanding of engineering and their confidence in pursuing it, aligning well with EngineeringUK's long-term goal of enabling young people from all backgrounds to be informed, inspired, and progress into engineering careers.

Introduction

About Energy Quest

Energy Quest is a 2-hour in-school workshop for 11-13-year-old students, that covers a range of topics focused on thinking like an engineer or technician. It includes practical activities on electricity generation and water filtration and embeds engineering and technology careers and role models throughout. It also shows students that the engineering and technology sectors are growing and there are lots of different ways to become an engineer, technician or work in technology. The session provides students with hands-on practical science experiences that we know have been declining in the classroom since 2016[1] even though they are the most motivating aspect of science for students, especially those less engaged students.

2024/25 reach

In 2024/25, Energy Quest was delivered to 6,295 students at 85 schools across multiple regions of the UK including London and the South East, the Midlands, Wales and Scotland. With some schools registering for multi-day Energy Quest delivery to reach more of their students, a total of 89 engagement days (when a school has at least one Energy Quest workshop) were delivered across the UK. A total of 171 teachers engaged in the programme, including the new continuing professional development (CPD) resources. Across the 89 engagement days, a total of 45 volunteers (professionals who joined the workshop to speak about their career) participated.

Theory of Change and programme evaluation plan

We developed the Theory of Change for the Energy Quest programme (Figure 1) using EngineeringUK's Impact Framework[2], lessons learned from previous evaluations of EngineeringUK's activities for schools[3] and existing research on the development of Science Capital[4] and STEM identity formation[5] in young people.

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[1] The Science Education Tracker 2023 (SET, 2024) showed that access to practical science has declined significantly since 2016, with only 26% of GCSE students doing hands-on practical work at least once a fortnight in 2023 compared with 44% in 2026: **EngineeringUK & The Royal Society (2024)**. Science Education Tracker 2023 (Wave 3). www.engineeringuk.com/set

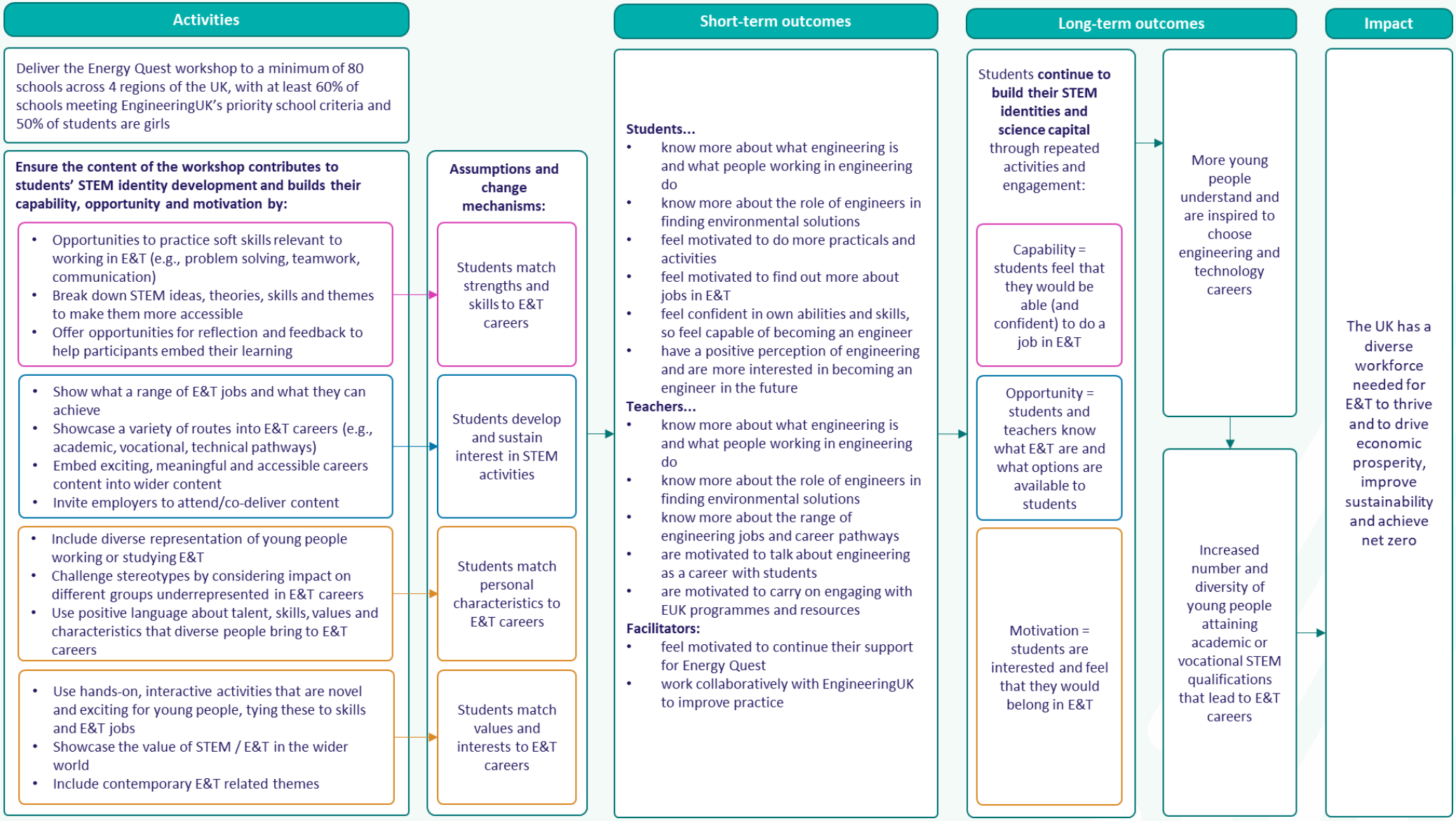
[2] EngineeringUK's Impact framework reflects how engineering and technology outreach activities contribute to young people's educational and career choices.

[3] Example reports and infographics for our individual programmes are available on our website: Research and insights listing and summarised in our annual report (What does EngineeringUK measure evaluation across all programmes?).

[4] The concept of Science Capital was developed by Louise Archer and colleagues, for example: **Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015).** "Science capital": A conceptual, methodological, and empirical argument for extending Bourdieusian notions of capital beyond the arts. Journal of Research in Science Teaching, 52(7), 922–948. https://doi.org/10.1002/tea.21227

[5] We draw upon Howard and Walsh's model of STEM identify formation, with particular attention to how aspirations evolve in middle childhood and early adolescence, as this is the target age range of the Energy Quest programme: **Howard K., & Walsh, M. E. (2010). Children's conceptions of career choice and attainment: Developmental stages.** Journal of Vocational Behavior, **76(2)**, 143–152. https://doi.org/10.1016/j.jvb.2009.11.003

Figure 1: Energy Quest 2024/25 Theory of Change



Note E&T = engineering and technology; STEM = Science, Technology, Engineering and Maths

The evaluation plan for the 2024/25 iteration of Energy Quest was drawn from the Theory of Change and evaluated the programme's content and delivery methods alongside its impact on students and teachers.

Impact evaluation

A primary aim of the evaluation is to continuously improve programme delivery, with a particular interest in whether the content of the workshop is accessible, inclusive and engaging for students and teachers. This part of the evaluation also looked at whether teachers felt the workshop delivered the opportunities we expect it to for students, and which elements they appreciated in particular (for example, the hands-on nature of the activities or providing students with the chance to hear from an engineering professional).

We looked at 6 key outcomes for students:

- how much they learned about engineering jobs and careers
- the roles of engineers in finding solutions to climate change and other environmental problems
- whether the workshop made them want to do more practical problem-solving activities
- whether the workshop made them want to know more about jobs in science, technology and engineering
- if attending the workshop made them feel like they could become an engineer if they wanted to
- if attending the workshop made them more or less interested in becoming an engineer in the future

In exploring the impact of the workshop on these outcomes, we considered how students' responses differed based on: (i) which delivery partner facilitated their workshop; (ii) which practical activities they participated in; (iii) how many activities they did overall; and (iv) whether they were from an EngineeringUK priority school or not. Beyond these differences in programme delivery, we also explored whether there were additional differences related to students' gender, ethnicity, disability status and eligibility for free school meals.

As outlined in the Theory of Change for the programme, we expect the impact of the Energy Quest programme to extend beyond those identified for students. Specifically, we expect the workshop to also inform teachers' knowledge and perceptions of engineering and engineering careers. More specifically, we identified 5 target short-term outcomes for teachers:

- increased knowledge of engineering and what engineers do
- increased understanding of the role engineers play in finding solutions to climate change
- increased awareness of the range of engineering jobs and engineering career pathways
- feeling motivated to suggest engineering careers to students
- feeling motivated to continue doing STEM outreach and careers activities with their students

A new element to Energy Quest in 2024/25 was the addition of a CPD opportunity for teachers. Our evaluation explored teachers' participation in this opportunity and whether their experiences differed from those who had not engaged with this content.

Method

We adopted a mixed method, multi-informant approach to evaluate the 2024/25 Energy Quest workshops, collecting feedback from:

- 1,738 students from 54 unique schools
- 27 teachers from 20 unique schools

The student feedback survey

The survey was available in an online format or a paper format to encourage participation from as many schools as possible (5 of the 54 participating schools used the paper format). EngineeringUK's evaluation team provided the survey to all schools interested via the workshop facilitator and lead teacher. Students were asked to complete the survey after they had taken part in their Energy Quest workshop.

The survey took roughly 5 minutes to complete. We used 2 types of questions to measure the key outcomes for students. The following outcomes were measured using a Likert scale structure, meaning that students responded on a 5-point scale with 1 being a negative response and 5 being positive:

- how much they learned about engineering careers
- whether the workshop made them feel like they could become an engineer if they wanted to
- whether the workshop made them more interested in becoming an engineer in the future

The other 3 outcome measures below were measured using a binary response option, whereby students could simply select 'yes', 'no' or 'don't know'.

- whether they learned about the role of engineering in finding solutions to climate change and other environmental issues
- has Energy Quest made you want to do more practical problem-solving activities in the future
- has Energy Quest made you want to know more about jobs in science, technology and engineering

Finally, there were 2 open-ended questions on the student feedback survey:

- what did you enjoy most about your Energy Quest workshop?
- how could Energy Quest help make engineering jobs more appealing to you?

Responses were analysed using an inductive thematic approach, looking both at the breadth and coverage of the themes uncovered as well as whether there were differences in which students mentioned certain themes.

Sample description

There were 1,738 valid responses to the student feedback survey from 54 unique schools (28% of students reached by the programme). Most students completed the survey online, but paper versions were supplied to 5 schools and entered manually.

At a school level, almost three-quarters of the sample were from an EngineeringUK priority school (72%), with just under a third being from a school with above average proportions of students eligible for free school meals (30%).

In terms of student demographics:

- 51% of survey respondents were female, 45% were male and 4% identified as other or don't know
- 12% of students were Asian, 8% Black, 6% from mixed ethnic backgrounds, and 3% from other ethnic backgrounds; the remaining 71% were white[6]
- 13% of students said that they had a disability or special educational need[7]
- 17% were eligible for free school meals[8]

While girls, students from UK minority ethnic backgrounds, and disabled students were well represented in the sample (see footnotes for comparisons to national averages), there was an underrepresentation of students eligible for free school meals. Students' free school meal status was also strongly related to which delivery partner had facilitated the workshop, and as such group differences based on this characteristic were uninterpretable.

Students were from across the UK, including Wales (41%), Scotland (34%), London and the South East (14%), and the West Midlands (11%).

With regards to the open-ended questions, 1,648 students (95% of the sample) commented on what they enjoyed most and 351 students (20% of the sample) made suggestions as to how we could make engineering jobs more appealing to young people. Both of these include students who have made comments like 'not sure' and 'don't know'.

In terms of what students did in their workshops, most watched the video of Carlotta lost in the woods (67%) and thought or talked about what was in Carlotta's backpack (61%). Over three quarters (77%) of students did the dirty water activity and 95% did the fruit-powered battery activity, while significantly fewer students (28%) did the design a shelter activity. When asked

[6] In 2024/25, 30% of state-funded secondary students in England were from UK minority ethnic backgrounds (68% white, 2% unclassified): DfE 2025 Create your own tables - Explore education statistics - GOV.UK (explore-education-statistics.service.gov.uk)

[7] In 2024/25, 16.5% of students in state-funded secondary schools in England had a special education need (SEN) or an Education, Health and Care (EHC) plan: Special educational needs in England

[8] In 2024/25, 27% of state-funded secondary students in England were eligible for free school meals (68% white, 2% unclassified): DfE 2025 Create your own tables - Explore education statistics - GOV.UK (explore-education-statistics.service.gov.uk)

whether they enjoyed the activities they had taken part in 82% of students enjoyed the water filtration activity, with 587 students (34% of the sample) mentioning this activity in an open-ended comment about what they enjoyed the most about the workshop. 71% of students also said that they enjoyed the fruit-powered battery activity 'quite a lot' or 'a lot', with 410 students commenting on this activity as well in their open-ended responses (24% of the sample). Enjoyment of the making a shelter activity was less pronounced with 61% of those who did this activity responding positively and only 76 students commenting on this in their open-ended response (4% of the sample). However, it is worth reminding readers that due to time constraints only 28% of the sample (roughly 487 students) did this activity.

Most students remembered learning about the different jobs that engineers can do (84%). Around a third recalled an engineer talking about their own job (32%), whilst roughly half remembered learning about how much money engineers can earn (51%). It is worth noting that the above is based on students' recollections of their workshop. However, the proportion of students recalling an engineer volunteering at their workshop aligns with the information collected from facilitators, which stated that engineers visited 31% of workshops delivered. As such, we used students' responses on this question as an indicator of whether a professional engineer had presented in their workshop in the analysis presented below.

Analytic approach

For continuous student outcome measures (how much they learned about engineering careers, whether the workshop made them feel like they could become an engineer if they wanted to, and whether the workshop made them more interested in becoming an engineer in the future), we used multiple regression to identify statistically significant differences between groups. This approach allowed us to look at the relative influence of each variable compared to one another. For example, exploring whether there was a difference in how girls and boys replied to the question about the workshop's impact on their interest in becoming an engineer regardless of which delivery partner facilitated the session and their other demographic characteristics.

In contrast, the 3 binary outcome measures (learning about the role of engineers in finding solutions to climate change, motivation to do more practical problem-solving activities, and motivation to find out more about jobs in science, technology and engineering) were analysed using chi-square analysis. Thus, the statistically significant differences in these outcomes reported here do not take other factors into account. Future evaluations of the Energy Quest programme will ask about these using a Likert-scale instead of a binary response to explore the relative contribution of different delivery-level and student characteristics to key outcomes.

Treatment of 'don't know' responses

For a number of survey questions, we gave students the option to say they weren't sure by selecting 'don't know'. These responses were treated differently, depending on the research question, as including or excluding them has repercussions on the percentages reported. Percentages presented at the sample level include students who selected 'don't know', allowing us to see what proportion of students selected the different response options overall. For example, the 63% of students saying they learned about the role of engineers in finding solutions to climate

change is based on the whole sample, with an additional 27% of students saying they didn't know if they learned this and 10% saying that they did not.

In contrast, when looking for group differences in the multiple regressions and chi-square analyses, we exclude students who selected 'don't know'. It is also worth noting that there were two questions for which students did not have the option of responding 'don't know', one on how much they learned about engineering jobs and careers and the other on their interest in becoming an engineer.

The teacher feedback survey

We asked teachers to complete a 10-minute online survey about their experience of the Energy Quest workshop. This survey covered practical elements, such as how teachers planned for and selected students to participate in the workshops, as well as their opinions on the content, its accessibility to all learners, and what kinds of opportunities the workshop offered students. It also asked teachers about the impact of the workshops on the target outcomes related to knowledge and motivation.

Teachers were very positive about the inclusivity and accessibility of the workshop content in the survey. All 27 teachers who replied to the survey (100%) said the content of the workshop was accessible to learners of all abilities, pitched at the right academic level, and that it was delivered at the right pace to maintain students' attention. 18 out of 27 teachers (67%) also said that the facilitator successfully adapted content for students with special educational needs, including 2 teachers who noted that the session was slightly less engaging for students with disabilities or special educational needs. Almost all teachers (89%) said that the Energy Quest session made the engineering sector seem inclusive of people from diverse backgrounds (the remaining 3 teachers, 11%, replied 'don't know').

Sample description

The survey was completed by 28 teachers (24 English, 4 Welsh-speaking; representing 16% of the 171 teachers reached in 2024/25) from 20 unique schools (representing 24% of the 85 schools reached). As one teacher who responded was not present during the workshop, the results below are based on a final sample of 27 teachers from 19 unique schools. The majority of teachers (89%) said they have been teaching for more than 5 years.

With regards to the 19 unique schools represented in the sample, 8 did not meet EngineeringUK's priority school criteria and the remaining 11 schools were from a mix of priority schools (2 for above average free school meal eligibility, 6 for above average free school meal eligibility and ethnicity, 1 above median ethnicity and 2 special schools).

Analytic approach

Given the sample size, the quantitative analysis presented below is limited to descriptive statistics and cross-tabulations. There were 2 open-ended questions in the survey asking teachers what they liked about Energy Quest and what EngineeringUK might do to improve it. Comments were analysed using an inductive thematic approach, letting the responses guide the insights drawn.

Results

Impact on students

Overall, students were very positive about their experience of Energy Quest:

- 94% said they learned a lot (41%) or a bit more (53%) than what they already knew about engineering jobs and careers (6% said very little or none)
- 63% of students said that they had learnt about the role of engineers in finding solutions to climate change (10% said no, 27% were not sure)
- 71% of students said that Energy Quest made them want to do more practical problem-solving activities (11% said no, 18% unsure)
- 63% said it motivated them to find out more about jobs in science, technology and engineering (17% said no, 19% unsure)
- 53% said that attending the Energy Quest workshop made them feel like they could definitely (15%) or probably (38%) become an engineer if they wanted to (6% definitely not, 25% probably not, and 16% unsure)
- 69% of students reported that the Energy Quest workshop made them a lot (22%) or a little more (47%) interested in becoming an engineer (27% no change, 2% a little less and 2% a lot less interested)

Many of the above outcomes were reiterated by students in their own words when asked what they enjoyed most about the workshop. Students were very positive about their Energy Quest experience with the majority highlighting the hands-on practicals (170 responses, 10% of the sample) and working as part of a team (151 responses, 9% of the sample) as particularly engaging (Table 1). Along the same vein, 115 students (7% of the sample) commented that they enjoyed learning about engineering and what engineers do, which also included learning about the different roles and careers within engineering.

If we use the Science Education Tracker (SET)[9] for comparison, the results above are quite positive. For example, in the SET sample, just under half (46%) of young people in years 7 to 13 were interested in engineering as a career. In our sample, attending Energy Quest increased interest in nearly 7 out of 10 participating students. This is encouraging, as it suggests the Energy Quest workshops effectively engaged young people in general, and not just those who were already interested in engineering careers. There are key differences, however, in how the questions were phrased in SET and within our evaluation survey, as SET asked about perceived capability and interest in general, while ours was a post-workshop measure and asked young people explicitly about perceived change in these areas. Thus, the above comparison needs to be interpreted with caution.

[9] **EngineeringUK & The Royal Society (2024)**. Science Education Tracker 2023 (Wave 3). www.engineeringuk.com/set

Table 1: What students enjoyed most about their Energy Quest workshop

Theme/code	Frequency	%
Experiments/practical/hands-on/interactive	170	10
Working as a team/doing activities with friends	151	9
Learning about engineering and what engineers do	115	7
Fun/fascinating/cool/interesting/amazing	104	6
Problem-solving	48	3
Enjoyed everything/all activities	35	2
Opportunity to be creative/design process	32	2
Doing/learning something new	27	2
The teacher/presenter	21	1
Feeling of success/competitive element	20	1
Communication and social skills (sharing ideas, asking questions, listening to others)	13	<1
Related to real-life scenarios/survival	13	<1
Making the marshmallow tower	8	<1
Able to do the activity without assistance/working hard	6	<1
Meet the Future You Quiz	6	<1
Like science/STEM	4	<1
Climate change	4	<1
Getting a prize	1	<1

Beyond comparing it to the SET, teachers echoed students' positivity in terms of both engagement with the content and the opportunities presented. For example, all 27 participants rated Energy Quest as actively engaging their students very well (89%) or quite well (11%).

Teachers were asked about the different opportunities offered to students in the workshop, and the extent to which they thought the session provided young people with the chance to:

- **apply their knowledge of science:** 89% agreed (48% 'to a large extent', 41% 'to a very large extent')
- **undertake practicals:** 96% agreed (11% 'to a large extent', 85% 'to a very large extent')
- **practice problem-solving:** 100% agreed (30% 'to a large extent', 70% 'to a very large extent')
- **think like an engineer:** 93% agreed (22% 'to a large extent', 70% 'to a very large extent')
- **meet an engineer:** 41% agreed, while 48% said the opportunity was offered to little or no extent; 11% (3 teachers) said they did not know

In their own words, teachers said that they appreciated Energy Quest because it let students:

- participate in hands-on learning and practicals
- see science in real-life applications or as something students could relate to
- think about a career in STEM / as themselves as an engineer
- apply their problem-solving skills
- be creative
- work as a team
- meet an engineering professional

At the beginning of each session, only 2 or 3 hands went up when [the facilitator] asked if they'd consider a STEM career. By the end of each session, nearly all of the pupils wanted to be an engineer (and now knew the branch of engineering that had captivated their interest.

- Energy Quest 2024/25 teacher

It was excellent the feedback from the pupils was very positive. I liked the fact the students were hands on and had a problem to solve. I also liked that they thought about what sort of engineer would suit them.

- Energy Quest 2024/25 teacher

Differences related to student demographics

Table 3 summarises the proportions of students agreeing to each outcome variable overall and broken down across the individual demographic characteristics. Overall, there were very few significant differences in outcomes across demographic groups. Even where differences were observed, for example, among girls and students eligible for free school meals described below, responses were still highly positive, indicating broadly consistent experiences across all groups.

Ethnicity. Notably, there were no significant differences related to students' ethnic background in their quantitative responses. Within their open-ended responses, there were some slight differences in how white and UK minority ethnic students described their experiences in their open-ended responses. White students were more likely to talk about the activity explicitly (for example, cleaning the dirty water and making a battery) while UK minority ethnic students tended to mention what it was about the activity that they enjoyed (for example, experiments that were hands-on and interactive and working as part of a team).

I enjoyed working with my group to complete the tasks and learning about the engineering process. I'd love to become one as I would like to go into science. It was super fun!

- Female UK minority ethnic student

Disability. There were very few statistically significant differences related to students' disability when other factors, such as their gender and whether they heard a professional engineer speak about their job, were taken into account. Encouragingly, students with a special education need or disability (91%) were more positive about the workshop's impact on their motivation to do more practical, problem-solving activities than non-disabled students (86%).

Free school meal eligibility. We could not fully explore group differences related to free school meal eligibility in the current sample for 2 reasons. First, as noted in the sample description, the proportion of students eligible for free school meals in the current sample (17%) was considerably smaller than the national average (30%). Second, this demographic characteristic was strongly correlated with students' geographic region, and which delivery partner facilitated the workshop. As such, any significant differences could not be interpreted, as these could reflect differences related to where students live or who delivered the session.

Gender. In contrast, there were a number of significant differences related to student gender (Figure 2), mirroring those reported at the national level[10] and in evaluations[11] of EngineeringUK's The Big Bang Fair and Big Bang at School. While girls and boys reported similar experiences in terms of what they learned about in the workshop (such as about what engineers do and how engineers help find solutions to climate change), compared with girls, boys were more positive in terms of:

- wanting to do more practical activities (89% vs. 84%)
- wanting to find out more about jobs in science, technology and engineering (84% vs. 75%)
- whether Energy Quest made them more interested in becoming an engineer (76% vs. 64%)

It is worth noting that girls also tended to be less positive about whether Energy Quest made them feel like they could become an engineer if they wanted to (76%) compared with boys (54%), but this difference was not statistically significant after the influence of other factors (such as priority school status) was taken into account.

However, within the qualitative data, girls were either similarly positive about how much they enjoyed the session to boys or more so. For example, 10% of girls and boys alike said that they enjoyed the experiments being hands-on and interactive. Girls were more enthusiastic about the water filtration activity (mentioned by 37% of girls compared to 31% of boys) and working as a team (mentioned by 11% of girls compared to 7% of boys). The selection of quotes from female students below illustrates the messages girls took away from the workshop:

> Getting practical experience and learning how my aspirations get into engineering which I hadn't thought about before

> I enjoyed most doing the water cleaning activity because I was building team skills and using my imagination to create and designs because me and my friends created a successful design

[10] **EngineeringUK & The Royal Society (2024).** Science Education Tracker 2023 (Wave 3). www.engineeringuk.com/set

[11] EngineeringUK's evaluation reports are available at: www.engineeringuk.com/research-and-insights/our-research-and-evaluation-reports/

How engineering helps with little everyday stuff some that we didn't even know has something to do with it and how they come up with brilliant ideas and the teamwork

I enjoyed it very much. My favourite was the teamwork that we used to solve problems and figure out what to do.

I really enjoyed designing the water filter because it was really interactive and it helped me understand what engineers do and design

Taken together, the general positivity of girls' responses on the outcome measures and how they described their own experiences suggest that Energy Quest is engaging and relevant for girls, supporting their interest and enjoyment in engineering activities.

As seen in Table 2, the most striking gender differences in the current sample were for students' feeling like they could become an engineer if they wanted to (22%p gap) and interest in becoming an engineer (11%p gap). It is worth noting however, that boys and girls were more positive on both outcomes compared to SET (2023). While the gap in young girls' and boys' perceived capability of becoming an engineer mirrored that reported in the SET (2023) sample (which was 23%p on average), the difference in girls' and boys' interest in becoming an engineer in the current sample was much smaller compared to general interest in SET (34%p).

Future evaluations should also consider the relevance of students' year group and prior engagement with STEM activities in exploring the effectiveness of the workshop across different groups and ensuring Energy Quest has a positive impact on students regardless of their existing interest in engineering and technology.

Figure 2: Summary of outcome measures overall and by gender

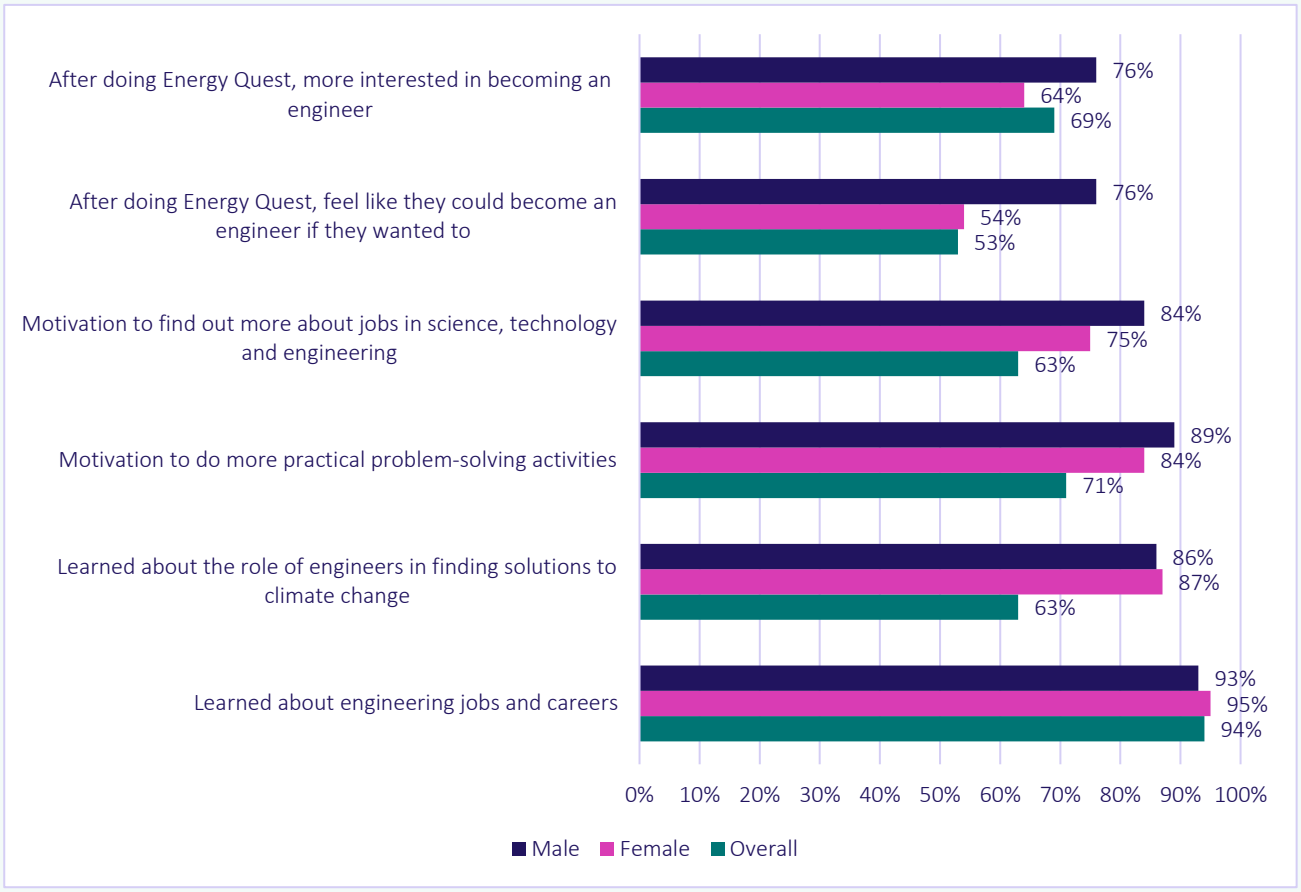


Table 2: Summary of demographic differences across outcome measures for young people

Outcome	Overall (n=1,738)	Gender			Ethnicity			Free school meals			Disability		
		Female	Male	Base	UK minority ethnic	White	Base	No	Yes	Base	Disabled	No disability	Base
Learned about engineering jobs and careers	94%	95%	93%	1,639	93%	95%	1,547	94%	93%	1,562	93%	95%	1,398
Learned about the role of engineers in finding solutions to climate change	63%	87%	86%	1,198	88%	86%	1,145	86%	90%	1,161	85%	87%	1,053
Motivation to do more practical problem-solving activities	71%	84%	89%	1,361	88%	86%	1,301	88%	82%	1,313	91%	86%	1,155
Motivation to find out more about jobs in science, technology and engineering	63%	75%	84%	1,320	79%	79%	1,259	80%	77%	1,275	85%	79%	1,193
After doing Energy Quest, feel like they could become an engineer if they wanted to	53%	54%	76%	1,385	68%	63%	1,309	66%	58%	1,325	71%	65%	1,406
After doing Energy Quest, more interested in becoming an engineer	69%	64%	76%	1,645	74%	68%	1,552	70%	67%	1,567	72%	71%	1,398

Differences related to delivery methods and content

We looked at 3 delivery-level variables to gain a better understanding of whether young people's responses varied depending on what activity they did, how many activities they did in total, and whether they attended an EngineeringUK priority school.

Workshop content

We looked at the relationship between 2 of the workshop activities our target student outcomes: designing a shelter (a hands-on practical) and hearing an engineer talk about their job (role model/engaging with a professional).

For the most part, students were very positive regardless of which activity they did. In other words, participating in the design a shelter activity did not seem to boost young people's responses on any of the outcome measures. Similarly, students who recalled hearing an engineer talk about their job were similarly positive in their responding to those who did not recall hearing an engineer talk about their job, except for one key difference. Students who recalled hearing an engineer talk about their job were significantly more like to say that attending Energy Quest had made them more interested in becoming an engineer (73%) than students who did not recall hearing an engineer talk about their job (67%). This suggests that explicit career links (in the presentation or from a discussion with a professional) are particularly tied to young people's interest in a career. However, it is unclear whether it is simply having a professional speak about their job that is the key driver in generating more interest, or if it is that this is more memorable for students who were inspired by the workshop.

As 95% of the students did the fruit-powered battery task, we could not explore any differences related to this activity. Similarly, we could not explore any differences related to doing the cleaning dirty water activity or watching the Carlotta video because whether or not students did these was nearly entirely dependent on which facilitator delivered their session.

Total number of activities

We also explored whether there was a cumulative effect of activities on young people's experiences, but these analyses were inconclusive because: (i) too few students had done only one or no activities, and (ii) we could not account for qualitative differences between the individual activities. In other words, activities like hearing an engineer talk about their job was counted as the same as doing a hands-on practical, although these two things are different in terms of what they engage young people in and what outcomes they are more likely to contribute to. Without additional information about the duration and quality of these activities, the evaluation could not calculate weighted totals (such as total time engaged in an activity) to investigate this factor thoroughly.

EngineeringUK priority schools

Students' responses to the individual outcome measures were relatively consistent across both priority and non-priority schools except for on one item: whether they felt like they could become an engineer if they wanted to. Students from non-priority schools were significantly more likely to

say that after doing Energy Quest they felt like they could become an engineer if they wanted to than students from priority schools (70% and 62%, respectively).

Impact on teachers

Teachers were very positive about their experience overall. 78% of teachers (21 out of 27) rated their experience of the Energy Quest workshop as excellent, with an additional 5 teachers (19%) rating it as good. Teachers enjoyed the Energy Quest workshop and tended to engage with the content and facilitators in different ways. They were very positive about the inclusivity and accessibility of the workshop content, with all 27 participants rating the content of the workshop as accessible to learners of all abilities, pitched at the right academic level, and delivered at the right pace to maintain students' attention.

As part of our Theory of Change (Figure 1), we are also interested in the impact Energy Quest has on teachers, as one of the main influencers in students' career decision-making. Specifically, we explored the impact of Energy Quest on teachers' knowledge of engineering, its applications and career opportunities, as well as how motivated they are to suggest these careers to their students.

Teachers' knowledge of engineering and engineering careers

However, beyond its impact on young people, Energy Quest aims to improve teachers' knowledge and perceptions of engineering and engineering careers. Notably, quite a few of the teachers said they already knew a lot on this subject. For example, 1 in 4 (26%) said they already knew a lot about the role of engineers in finding solutions to environmental problems (see Table 3). When examined on a case-by-case basis, the teachers who said they already knew a lot about engineering in today's world also said that they already knew a lot about the other areas as well (i.e. the role of engineers in finding solutions to environmental problems, the range of engineering jobs, engineering career pathways).

Of those who did not already know a lot on this subject, most said that the workshop taught them (at least) a little across all 4 areas in Table 3, with roughly half learning a lot.

14 out of 26 teachers (1 did not respond) said that they learned a lot about engineering career pathways, which is particularly positive as this tends to be a subject that teachers feel less confident speaking to their students about.

Table 3: Teachers' prior knowledge of engineering

Outcome	Already knew a lot/doing as much as possible		No or very little difference		A little more		A lot more		Don't know/ Missing	
	No.	%	No.	%	No.	%	No.	%	No.	%
Knowledge of engineering in today's world	4	15%	1	4%	10	37%	12	44%	0	0%
The role of engineers in finding solutions to environmental problems	7	26%	2	7%	5	19%	13	48%	0	0%
The range of engineering jobs	5	19%	2	7%	6	22%	14	52%	0	0%
Engineering career pathways	4	15%	2	7%	6	22%	14	52%	1	4%

Teachers' motivation to suggest engineering careers

In terms of motivation, more than half of the sample (15 teachers, 56%) said that having Energy Quest delivered at their school made them much more likely to suggest a career in engineering to a student. An additional 4 teachers (15%) said it had made them a little more likely to do so. Those who said they 'already do as much as possible' (8 teachers, 29%) also tended to be those teachers who said they already knew a lot about engineering (i.e. its applications in today's world, the range of engineering careers, and engineering career pathways).

Uptake and impact of Energy Quest's CPD resources

Across the Energy Quest programme, 171 teachers engaged with the CPD resources. Within the survey sample, 11 teachers out of 27 had done some form of CPD. In total, 10 had done the facilitator-led session with colleagues (all 10 of which had their workshop delivered by See Science) and 1 teacher had watched the video.

Of the 16 who had not participated in any of the CPD options, 4 said they were still planning to engage with these materials. A further 12 teachers said they had not done CPD and were not scheduled to do so. Whether a teacher had done some form of CPD was significantly related to whether they felt they already knew a lot about engineering in today's world and the range of engineering jobs. They were also already doing as much as possible in terms of suggesting these careers to students. In other words, there was a pattern as to which teachers took up CPD, with only teachers who felt they had a need to learn more or had room for improvement engaging with these resources.

For the most part, the impact of Energy Quest on teachers was similar regardless of whether teachers did or did not utilise the CPD resources. The only significant difference was that teachers who engaged with the CPD content were more likely to say that doing Energy Quest had made them more likely to suggest a career in engineering to their students when compared with those who had not engaged in CPD. Notably, 100% of teachers who did CPD said it had increased their motivation to suggest this to a student (82% by a lot, 18% by a little), compared with 50% of those who did not engage in CPD (38% by a lot, 12% by a little).

When asked explicitly about their experiences, those who did the CPD were very positive. 82% of those who participated in a facilitator-led CPD session rated it as 'excellent' with the remaining 8% rating it as 'good'.

Promoting teachers' continued engagement in STEM activities

Teachers were asked about their plans to use Energy Quest resources in the future, including those that would sustain and embed the content that students had engaged with in the workshops. While only one of the teachers said they had already used the follow-on resources for students, 20 (74%) said they intended to use the resources provided. A further 3 teachers were not aware of the resources, meaning there may be room for improvement in how we share and communicate these resources. Notably, there was no discernible pattern around which teachers knew about the resources and which delivery partner had facilitated the workshop, so it seems to be more about general communication of the resources rather than a single point of failure.

A total of 3 teachers said that they did not plan to use the resources in the future. Notably, teachers' plans for using the follow-on resources were not related to whether they worked within a special school. All 3 teachers working in a special school said they planned to use the follow-on resources for students and tended to rate these resources as excellent (2 of the 3, with the third saying 'don't know').

Beyond these resources, of those teachers who engaged with CPD, 82% said it had motivated them to teach their students about engineering and its applications to the real-world, problem-solving nature and careers.

Conclusion

Energy Quest was designed to provide students with meaningful, hands-on experiences that build their understanding of engineering careers, foster positive perceptions of the sector, and support their confidence in pursuing engineering pathways.

Evaluation findings show that Energy Quest successfully:

- increased students' knowledge of engineering and technology careers, with 94% reporting they learned more about the sector
- promoted positive perceptions of engineering, particularly its role in addressing climate change and sustainability

- boosted students' confidence in their own skills and abilities, with over half feeling they could become an engineer if they wanted to
- engaged students across diverse backgrounds, including those from priority schools, SEND settings, and underrepresented groups in STEM

The 2024/25 Energy Quest programme has demonstrated strong alignment with its Theory of Change. These outcomes reflect the programme's contribution to building students' Science Capital, contributing to their accumulation of science-related knowledge, experiences, and social connections that influence aspirations.[12] By offering practical activities, exposure to engineering professionals, and relatable career narratives, Energy Quest helps students see engineering as accessible and relevant to their lives. Students' increased interest in engineering and their belief in their ability to pursue it suggest that Energy Quest is helping to foster students' STEM identity.

Overall, students' responses to the Energy Quest workshop were positive across all demographic groups, with only a few notable differences. There were no significant differences by ethnicity, though students from different backgrounds tended to describe their enjoyment in slightly different ways. Students with special educational needs or disabilities were particularly positive about the workshop's impact on their motivation to do more practical, problem-solving activities. Although gender differences were present, with boys reporting higher increases in interest and perceived ability to become an engineer, girls' self-perceived capability and interest in becoming an engineer were positive overall, and especially so compared with SET. Moreover, girls' qualitative feedback highlighted strong enjoyment of the teamwork and hands-on aspects of the workshop.

While the programme was broadly successful, the evaluation identified areas for improvement, including strengthening the career messaging, providing teachers and students with clear 'next steps' and adapting it for use in specialist settings. These refinements will help ensure that Energy Quest continues to support equitable access to engineering careers and contributes meaningfully to the long-term development of students' STEM aspirations.

Recommendations

Based on the feedback from students, teachers and facilitators, we recommend the following adjustments to the Energy Quest content and delivery:

Reframe content as social impact of energy

Connect the practicals to social impact, how solving energy problems can directly contribute to solving real-world problems as this is particularly effective for girls and providing students with a sense of purpose.[13] Framing each activity around real energy challenges drawn from volunteers' work, highlight how solving energy problems contribute to the United Nations' Sustainability

[12] **Archer, L., Dawson, E., DeWitt, J., Seakins, A., & Wong, B. (2015).** "Science capital": A conceptual, methodological, and empirical argument for extending Bourdieusian notions of capital beyond the arts. Journal of Research in Science Teaching, 52(7), 922–948. https://doi.org/10.1002/tea.21227

[13] **Royal Academy of Engineering (2021).** Engineering Skills for the Future: Inspiring Girls into Engineering.

Development Goals, and how these connect to social good (sustainability, helping others and inclusivity) to make the content resonate with young people.

Strengthen career messaging

While career messaging is in the content, there is an opportunity to embed engineering and technology content more explicitly throughout the workshop, especially green careers, to:

- teach students about the role of engineers in finding solutions to climate change
- ensure students make clear connections between activities and future pathways

Continue to support schools and delivery partners in finding professional volunteers

Having a professional join the workshop and talk about what they do was not only highlighted as a key feature by teachers but also tied to generating interest in engineering careers amongst students. However, the geographic spread and availability of volunteers are barriers to including this element in all sessions. Future iterations of Energy Quest should explore ways of supporting delivery partners in overcoming these and continue its aim of having a volunteer attend.

Strengthen support for 'next steps' by enhancing CPD offer for teachers and direct links to resources

63% of students said they wanted to find out more about jobs in science, technology and engineering, but the results of the teacher survey revealed that teachers had not had the chance, at the time of the survey, to use any of the follow-on resources for students. Continue to emphasise the information on engineering and technology career pathways presented in the content and to signpost educators so they are aware of activities they can do with their students and feel equipped to support this. As teachers who did the CPD were more likely to say that Energy Quest had made them more likely to suggest a career in engineering to their students, continue to deliver these resources and enhance their impact by showing teachers relevant and real opportunities for their students.

Expand the remit of future evaluations

The student survey used in this evaluation did not include a marker of students' current engagement levels in STEM, or whether Energy Quest had a similarly positive influence on students' knowledge of, motivation towards and interest in jobs in technology. Future evaluations should expand the current survey to include these and explore key findings (such as the influence of a volunteer on students' interest levels and interactions between different demographic characteristics) in greater detail.

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