

**I'm a
Scientist**
Get me **OUT** of here

**I'm an
Engineer**
Get me **OUT** of here

*I'm a Scientist
& I'm an Engineer:*

2018–20 **STFC Legacy Award** **Evaluation Report**

June 2020

MangorollaCIC



Science and
Technology
Facilities Council

Background

I'm a Scientist (IAS, imascientist.org.uk) and *I'm an Engineer* (IAE, imanengineer.org.uk) are online public engagement projects that give school students across the UK real interactions with scientists and engineers.

Scientists and engineers create profiles on the website and engage directly with school students through answering posted questions, and in real-time, text-based chats. Students ask questions about whatever they want; questions about careers, the scientists'/engineers' research, as well as their wider interests and lives outside of work.

Through taking part, students engage with STEM professionals from a diverse range of backgrounds, disciplines, and industries. They get to see scientists and engineers are normal people with hobbies, interests, pets, and families. They learn about STEM careers and opportunities in higher education, while seeing how what they learn in school relates to the world around them.

The events run three times every year — in March, June, and November — and are split into 'zones'. Some zones are themed, featuring STEM professionals all working around the theme; while others are unthemed (or 'general zones'), featuring a wider variety of scientists or engineers. Each zone has six scientists or engineers, and a target of reaching 450 students.

In 2018 we received an STFC Legacy Award to engage 9,000 students with STFC science and engineering, in 20 match-funded zones over 2 years. This report is a summary of the objectives we have met and evaluation of the zones following the STFC Evaluation Framework.

An additional five zones were funded through end of year funding offers in March 2019 and March 2020.

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Summary

- **We ran 24 zones across 5 events between November 2018 and March 2020:**
 - 20 IAS zones
 - 4 IAE zones
- **142 STEM professionals took part:**
 - Scientists and engineers showed students a wide range of backgrounds, careers, and routes into STEM.
- **9,516 students logged in with 91% actively engaging. Students from 169 schools engaged.**
 - 67% of participating schools were widening participation or in underserved areas.
- **The activity had a positive impact on students, teachers, and scientists and engineers:**
 - Teachers reported that the activity was effective in improving students' motivations towards STEM, helping students see how STEM relates to the world around them, challenging stereotypes, and developing students' awareness that STEM qualifications can be useful even if students don't want to work in science.
 - *[A student] took part in the family live chat in the evening. The next day she was so excited and told me she couldn't believe her luck in getting access to these scientists and getting all her questions answered. She had screen shot all her answers and brought them into class. Her motivation and love of learning was given a great boost. — **Teacher, post event survey***
 - 75% of scientists and engineers reported an increased enthusiasm towards their own work. 67% reported an increased appreciation of the value of their work.

Objectives & outcomes

Objective

1. Produce 20 match-funded zones over two years, with a focus on reaching students under-served by other STEM engagement opportunities and at Widening Participation (WP) schools.

- 16 Zones in I'm a Scientist (8 zones each year, 2 for primary schools each year)
- 4 Zones in I'm an Engineer (2 zones each year)

2. Recruit at least 240 teachers to take part with 500 classes. Note we overbook zones to allow for dropout and expect around 400 classes / 9,000 students to be involved (at least 450 per zone, the average for 2016/17 zones)

At least 40% schools are located more than 30 minutes from STFC sites and HEIs or are WP schools.

Outcome

24 STFC zones were run over the 2 years:

- 20 IAS zones were run, 4 were for primary schools
- 4 IAE zones were run

Additional funding was provided to run 5 additional zones in March 2019 and March 2020. A 25th zone in I'm an Engineer in March 2020 was cancelled due to a lack of match funding.

Over the different events, a total of 376 teachers from 336 schools requested up to 1,656 classes in STFC-funded zones.

After being allocated places, teachers from 169 schools participated across the different events (with a number of schools taking part in multiple events). 572 classes participated.

9,516 students logged in, 91% actively engaged through asking a question, taking part in a live chat, posting a comment, or casting a vote.

67% (113/169) of participating schools were located more than 30 minutes from an STFC site or HEI, or were a WP school.¹

¹ For information on how we identify WP schools, see: about.imascientist.org.uk/under-served-and-wp/

<p>3. Recruit at least 120 STEM professionals working in areas of STFC science and technology:</p> <ul style="list-style-type: none"> Recruit a diverse set of participants in terms of gender (50% female, 50% male across the zones), academic background, seniority, place of work. 	<p>142 STEM professionals took part in the zones.</p> <ul style="list-style-type: none"> 70 women (49%) 72 men (51%) Academic roles (64%) <ul style="list-style-type: none"> 40% PhD Student 14% Postdoctoral 10% Lecturer, professor, technical, or support Other places of work: <ul style="list-style-type: none"> 13% Private sector 23% Government or public sector <p>An additional 25 STFC Facility staff and STFC grant-funded researchers have taken part in <i>IAS Stay at home</i>.</p>
<p>4. Host 320 live chats between students and scientists/engineers across the zones</p>	<p>429 live chats took place</p>
<p>5. Have £10,000 spent on further science and engineering engagement by the STEM professionals voted the winners by the students (£500 per school zone winner)</p>	<p>£12,000 of prize money has been distributed to 24 zone winners.</p> <p>To date, £4,500 has been spent by winners. Winners are given 12 months in which to complete and report on their projects². Reports will be published at:</p> <ul style="list-style-type: none"> IAS reports: about.imascientist.org.uk/category/prize-winner/stfcwinner/ IAE reports: about.imanengineer.org.uk/category/prize-winner/stfcwinner/ <p>A number of prize winners have provided outline plans for the use of their prize money, though noted that plans have been delayed or postponed due to the outbreak of Covid-19.</p>

² A number of projects have been delayed by the global COVID-19 pandemic in 2020. Projects will be completed when safe and appropriate, with reports being published in due course.

<p>6. Give 9,000 participating students access to the Careers Zone (careers.imascientist.org.uk), allowing them to ask questions about STEM careers year round. All scientists/engineers invited to be part of Careers Zone to continue engaging.</p>	<p>9,516 students logged into STFC zones. All were given access to the Careers Zone.</p>
<p>7. Evaluate the zones within the STFC evaluation framework to learn from the experience. Produce a report for each zone, in addition to mid term and end of grant reporting.</p>	<p>Zone reports were produced following each event³, and the activities were evaluated within the STFC evaluation framework⁴, with metrics and evaluation being uploaded to ResearchFish each year.</p>
<p>8. 120,000 additional unique site visitors to the STFC zones which remain online with all the answers to questions about STFC science and technology like 'What does the large hadron collider do?'</p>	<p>Between November 2018 and June 2020 the zones have received more than 109,000 page views from non-logged in users.</p> <p>These numbers will continue to increase as the zones will remain online and visible for people to view in the future.</p>

³ See also: *Activity; Summary of activity in the zones; Zone reports*

⁴ See also: *Learning outcomes*

Activity

Zones

In the events from November 2018 to March 2020, we ran 24 STFC zones:

Event	IAS zones	IAE zones
November 2018	<ul style="list-style-type: none">■ Fast computing■ Crystallography■ Einsteinium (non-themed)	
March 2019	<ul style="list-style-type: none">■ Imaging■ Nuclear■ Rutherfordium (non-themed)■ Dubnium (non-themed)■ Seaborgium (non-themed)	<ul style="list-style-type: none">■ Energy■ Milligram
June 2019	<ul style="list-style-type: none">■ Particles■ Space (non-themed)	<ul style="list-style-type: none">■ Milliampere (non-themed)
November 2019	<ul style="list-style-type: none">■ Electromagnetic■ Nuclear■ Roentgenium (non-themed)	<ul style="list-style-type: none">■ Detection
March 2020	<ul style="list-style-type: none">■ Electromagnetic■ Particles■ Space■ Copernicium (non-themed)■ Flerovium (non-themed)■ Livermorium (non-themed)■ Moscovium (non-themed)	

Participating schools

Students from 169 UK schools actively engaged in the STFC-funded zones during the 2 years, with 39 participating in multiple zones.

The map (right) shows UK schools which actively participated.

Widening participation and underserved schools

113 schools (67%) were identified as widening participation schools⁵, or were more than 30 minutes drive from a major-research HEI or STFC site.



⁵ For information on how we identify WP schools, see: about.imascientist.org.uk/under-served-and-wp/

Participating scientists & engineers

142 scientists and engineers took part in the zones.

49% (72) of the participants were female, and 51% (70) male.

14% (20) of participating scientists and engineers were from a Black, Asian or Minority Ethnic Background.

The map (right) shows locations of UK institutes and workplaces from where scientists and engineers took part.

Additionally, scientists and engineers also took part from the European Space Agency in the Netherlands, and CERN in Switzerland.



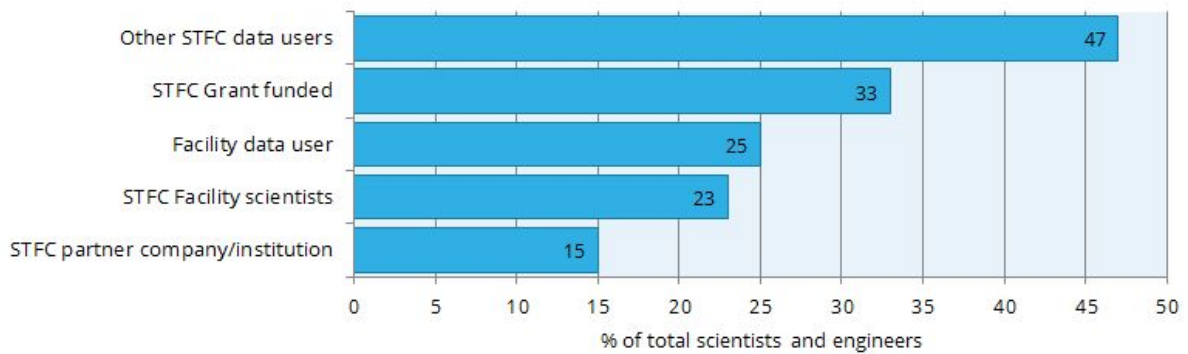
STFC connections of participants

Priority for places in zones was given to scientists and engineers directly connected to the STFC. They could be:

- employed by STFC at Facilities such as Boulby Underground Facility, Diamond Light Source or the UK Astronomy Technology Centre
- working for a company that partners with STFC
- funded by a STFC research grant
- using data from STFC Facilities and STFC funded projects

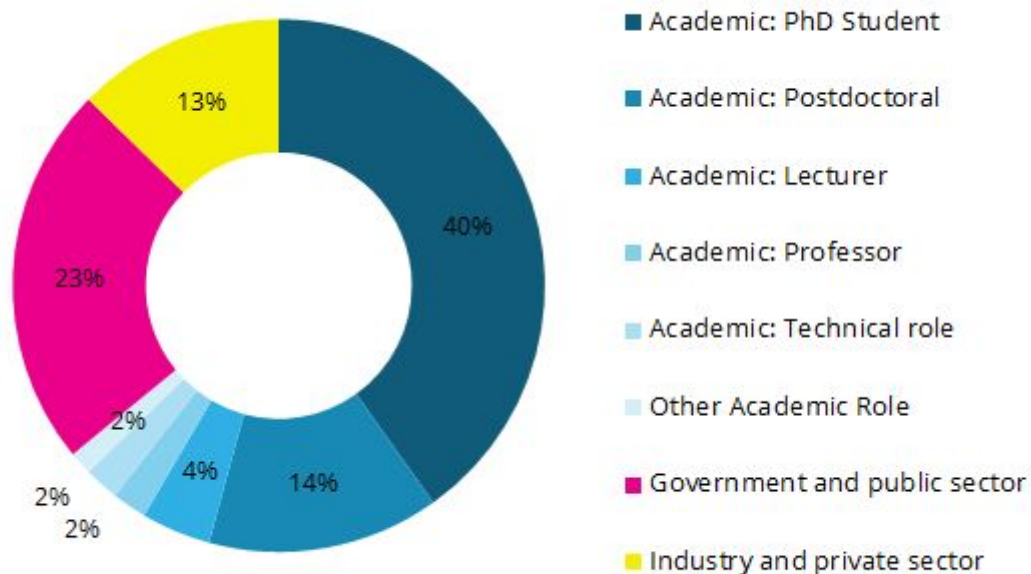
We asked scientists and engineers to identify any of the above connections when they applied.

The chart (below) breaks down the different connections of participants. (Some participants stated multiple connections). Occasionally a zone had a place available, but no suitable STFC connected applicants. Places then went to people working in areas related to STFC science and technology or on a career path we wanted to highlight, such as technician or apprenticeships.



Professional background of participants

64% of participants were in academia, 13% worked in industry or the private sector, and 23% in government or the public sector. 8 participants were in technical roles in their sector.



Summary of activity in the zones

	Total	Average per STFC zone	IAS averages 2012–2020
Schools	169	9	10
Students logged in	9,516	397	385
Active students ⁶	91%	90%	87%
Live chats	429	18	16
Ask questions asked	10,967	457	637
Ask questions approved	5,087	212	284
Ask answers given	10,344	431	512
Votes	7,517	313	301

Zone reports

For each zone, zone reports comprise summary activity data, examples of good engagement, and preliminary feedback. These are published following each event and are available online:

- **IAS zone reports:**
about.imascientist.org.uk/category/zone-reports/stfc/
- **IAE zone reports:**
about.imanengineer.org.uk/category/zone-reports/stfc/

⁶ % of students who actively engaged through asking a question, taking part in a live chat, casting a vote, or posting a comment.

Learning outcomes

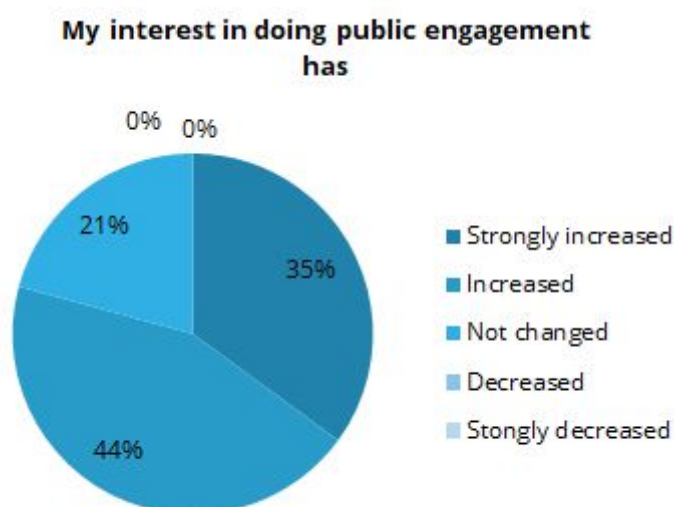
In this section we discuss learning and evaluation in terms of the STFC Generic Learning Outcomes.

In 2019, Dr Jen DeWitt, an Associate Senior Research Fellow on the core Science Capital team, conducted an evaluation of IAS to see how the experience might support students' science capital. This research comprised student focus groups, teacher interviews, surveys, and analysis of content generated on the IAS site.

This report, discussed in the following section, is available on the IAS site:

- ***I'm a Scientist: Supporting Science Capital***, September 2019
about.imascientist.org.uk/student-impact/

Inspiring participants to 'do' something new

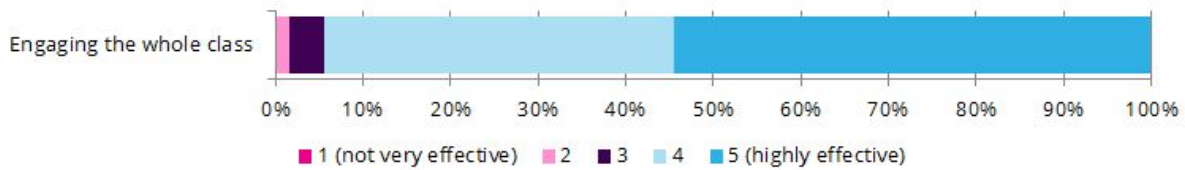


Impact on how participants 'feel'

People felt welcome

6,932 (91% of students logged in) actively engaged with the project, through asking a question, taking part in a live chat, casting a vote, or posting a comment.

Teachers gave an average rating of 4.5/5 (n=180) for engaging the whole class.



Scientists commented:

- *I thought [the moderators] were really helpful, They made me feel very welcome and valued.*
- *I loved the moderators and the staff room. I really think that the sense of humour, kindness and just general enthusiasm they demonstrated help me hugely. Everyone was always so happy to help and put me at my ease (via phone, email or in staffroom).*

People felt inspired

92% (165/180) of teachers reported that they felt inspired to find more themed activities for their students after taking part.

When asked about their experience taking part, teachers commented:

- *The students were actually cheering when the first scientist answered a question. It was a fantastic moment.*
- *[During the live chat] there was so much excitement with the children when they saw the scientist replying. The buzz they got from it was fantastic. It is a long time since I've seen children buzzing from science.*
- *One of my pupils faces barriers with Literacy. He was thoroughly engaged and was delighted that he had questions answered by the scientists. What a way to motivate children with additional support needs. Another pupil took part in the family live chat in the evening. The next day she was so excited and told me she couldn't believe her luck in getting access to these scientists and getting all her questions answered. She had screen shot all her answers and brought them into class. Her motivation and love of learning was given a great boost.*

One scientist commented: *Apart from the obvious gains for the students taking part, I personally found taking part in this event to be a useful way of self-reflecting on my self and my work. I really enjoyed the wide range of students who took part, from those clearly interested in a career in science asking incredibly thought provoking questions, to those acting a little bit more silly, who amongst their 'fun' questions provided some actually really insightful questioning.*

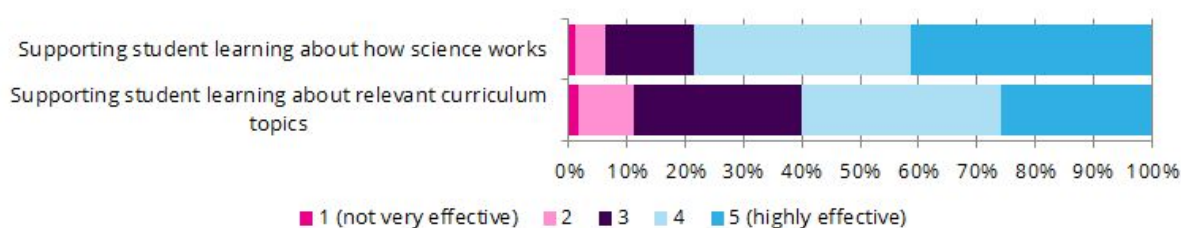
People felt involved

One teacher commented: *It allows the quietest of pupils to have a voice and to understand science/engineering opportunities and facts to become a reality in their own world. Promotes great conversations before, during and after the event.*

Our research into how IAS aligns with Science Capital found that the online, pseudo-anonymous, informal nature of the activity encouraged students to ask personally relevant questions and have direct interaction with scientists. Anonymity was found to breed confidence, where being out of the spotlight of face to face interaction makes it easier for students to ask questions that are personally relevant to them. (SCS, pg. 2)

Activities were pitched at the right level

Teachers gave an average rating of 4.1/5 (n=176) for supporting student learning about how science works, and 3.7/5 (n=178) for supporting student learning about relevant curriculum topics.



One teacher commented: *It appeals to children with all types of abilities and gives them the opportunity to ask questions at their own level of understanding. The scientists are very kind and answer the questions at different levels. I have always found the enthusiasm of the scientists involved to be contagious and the children get very excited when questions are answered.*

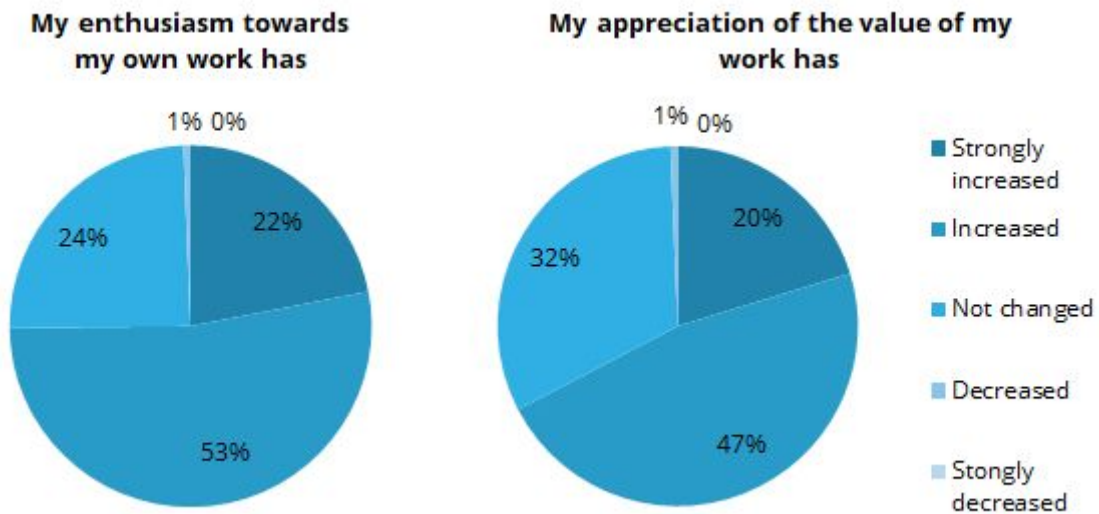
People were satisfied

97% (151/155) of scientists and engineers reported enjoying taking part. 86% (134/155) would participate again, and 95% (146/154) would recommend it to a colleague.

92% (165/179) of teachers reported that they would recommend the activity to colleagues.

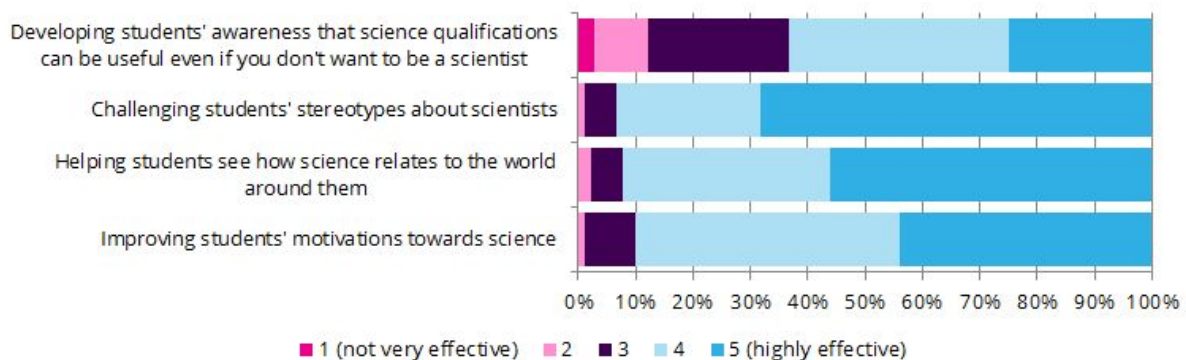
Impact on how people 'value' science or technology

75% (116/155) of scientists and engineers reported an increased enthusiasm towards their own work. 67% (103/153) reported an increased appreciation of the value of their work.



When asked to score the effectiveness of the activity — from 1 (not very effective) to 5 (highly effective) — across a range of metrics, teachers gave average scores of:

- 4.3/5 (n=180) for improving students' motivations towards science/engineering
- 4.5/5 (n=180) for helping students see how science/engineering relates to the world around them
- 4.6/5 (n=180) for challenging students' stereotypes about scientists/engineers
- 3.7/5 (n=180) for developing students' awareness that science qualifications can be useful even if you don't want to be a scientist



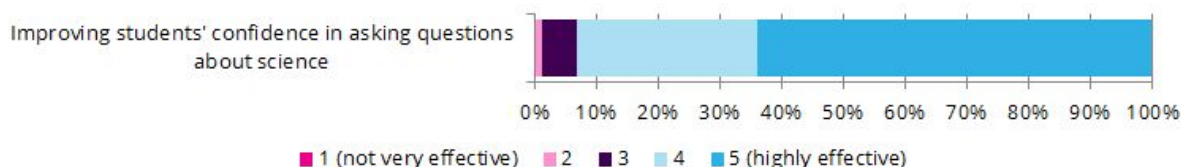
Our research into the impact of IAS on Science Capital found that IAS helps students become more aware of the diversity of, nature of, and routes into jobs in science. It challenged students' impression that a job in science was all consuming and based in a lab. (SCS, pg. 4)

During a focus group, one student commented: *Originally I thought it took out most of your time and you wouldn't have much time to do anything else, but I realise that you have a lot of time to have hobbies still, your job isn't your entire life, it's just a part of it.* (SCS, pg. 4)

Student surveys carried out as part of our Science Capital research found that 78.6% of respondents agreed that following IAS, 'I have a better understanding of how science relates to my life.'

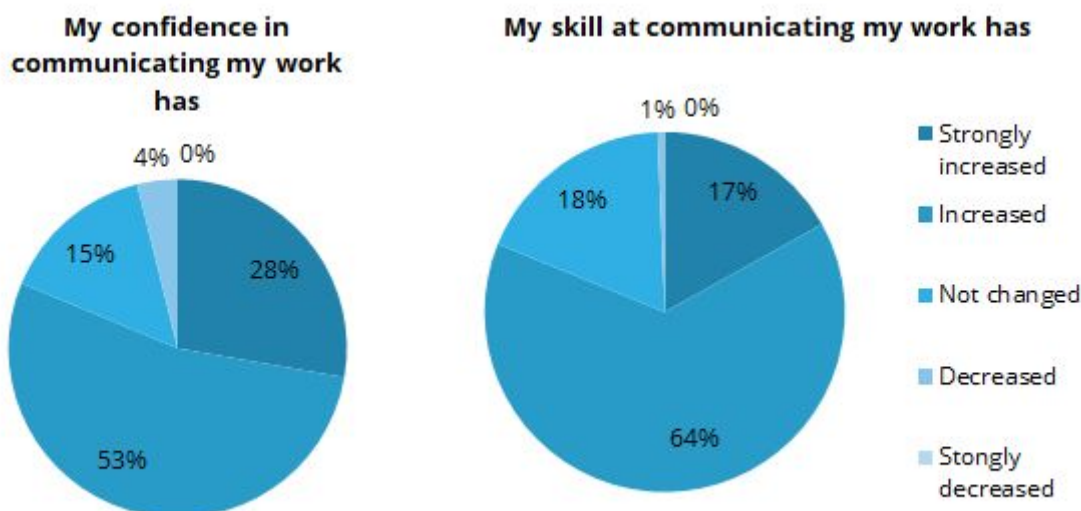
Impact on 'skills'

When asked to score the effectiveness of the project across various metrics, teachers gave an average score of 4.6/5 (n=177) for improving students' confidence in asking questions about science.



One teacher commented: *We have been doing this for a number of years & keep returning as it is so good for children to independently enquire about a science topic - parental engagement is very good also. Thank you for such providing such a well run project - we love being a part of this!*

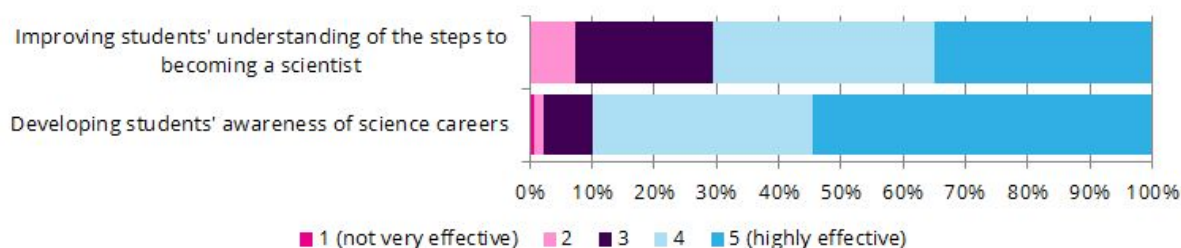
81% (126/155) of scientists and engineers responding to the post-event survey reported an increased confidence in, and 81% (125/154) an increased skill at communicating their work.



One scientist commented: *I thoroughly enjoyed my experience and would highly recommend it to colleagues with an interest in science communication. Although the event is only two weeks, it is like an intensive masterclass on science communication - I feel like my ability to communicate my work has improved greatly over the course of the event.*

Impact on ‘understanding’

When asked to score the effectiveness of the activity across a range of metrics, teachers gave average scores of 4.4/5 (n=180) for developing students' awareness of science careers; and 4.0/5 (n=180) for improving students' understanding of the steps to becoming a scientist.

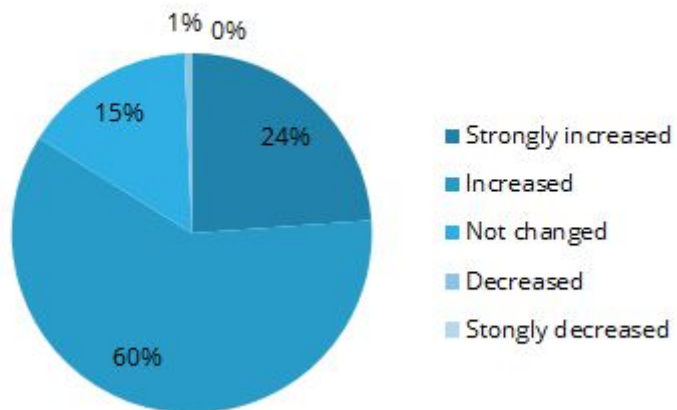


When asked about their experience taking part, teachers commented:

- *Both classes absolutely loved taking part and my class actually clap at the end of the live chat. I think the opportunity to take part in the evening live chat is brilliant as the pupils are able to include others in the family and talk about what they are learning in school. This project encourages a greater understanding and interest in science. Pupils see scientists as real people with interests like their own. It breaks down the stereotypes around the career. Taking part also encourages the pupils to think about the world of work and future careers. The project also links in to aspects of the curriculum and encourages interdisciplinary learning.*
- *They are totally engaged during the live chat and several took part in the live chat in the evening. They love getting the opportunity to ask questions of real scientists to explore their understanding.*
- *They students were amazed that they were talking to real scientists and could find out that they were regular people like them. they also valued the criteria and link to democracy.*

Additionally, 84% (130/155) of scientists and engineers reported an increased understanding of how young people view science and engineering.

My understanding of how students view science/engineering has



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