



I'm a Scientist & I'm an Engineer Ireland 2018 Evaluation Report

Gallomanor
creating community conversations

 **sfi Discover**
Science Foundation Ireland

Summary

- **Engagement levels in IAS have increased in IAS when compared with the 2017 event.** An additional 11 schools took part (58 in 2018, compared with 47 in 2017), and 420 additional students registered (1,958, up from 1,538). Students asked nearly twice as many questions as were asked in 2017 (5,057, up from 2,559).
- **We have demonstrated the success of online engagement in terms of reaching students who are normally underserved by the sector.** 1,360 students from SFI target counties took part (58% of total students). These students asked 3,425 questions in ASK, and contributed nearly 10,000 lines of live chat.
 - Additionally, the project continues to offer scientists and engineers the opportunity to engage with students on a national level, without the need for travel from their place of work: *"I loved the idea of getting the chance to engage with younger students on a national level, all without having to travel around the country."* — **Engineer, post-event interview**
- **Students reported that they were inspired to study STEM subjects, saw that scientists and engineers are people like them, and saw how what they learn in school relates to the world around them:**
 - *"I've learnt a lot about the daily tasks of a scientist and how much science and scientific research means to society and even in our daily everyday lives. Although, most importantly I've realized that I myself want to pursue a career related to science."* — **Student, post-event survey**
 - *"I have learnt that scientists aren't just super geniuses or evil scientists (only some!). I have learnt that scientists are also like everyday people I meet!"* — **Student, post-event survey**
 - *"i thought having a job that has go to do with science would be very stressful day to day but the scientist i have met and read about made me aware of the good parts of being a scientist and that made me change my ways of thinking and motivated me into thinking of taking up a job that includes S.T.E.M."* — **Student, post-event survey**
- **The online format allowed every student in the class to engage:**
 - *"I really liked the communication format because students, not having to speak in front of everybody, felt free to ask questions that might have been very curious to them but that would have never asked in person, because shy or afraid (wrongly) to look less clever."* — **Scientist, post-event survey**

- When asked to rate the effectiveness of the projects in terms of engaging the whole class — on a scale from 1 (not very effective) to 5 (highly effective) — teachers gave an average score of 4.3 (n=26).
- *“Every chat I did I felt like all the kids were fully engaging and really wanted to learn more about engineering.”* — **Engineer, post-event interview**
- **Taking part revitalises scientists’ and engineers’ attitudes to their own work:**
 - 74% (n=23) reported improved enthusiasm towards their own work; 70% (n=23) reported an increased appreciation of the value of their own work.
- **Taking part develops participants’ interest in, confidence, and skill at public engagement and communicating their work:**
 - 74% (n=23) of scientists and engineers reported an increased interest in public engagement; 70% (n=23) reported increased confidence, and 70% (n=23) increased skill at communicating their work.
- Severe weather and snow during Engineers’ Week in February 2018 led to significant school closures; **despite this we managed to maintain some level of engagement in the IAE project even during the closures.**

Objectives, outputs, and outcomes

Objective	Output
<p>I’m a Scientist (IAS): 5 zones during Science Week in November 2018:</p> <ul style="list-style-type: none"> ● 2 zones themed for secondary students, relating to key areas named in the SFI Research Prioritisation Steering Group Report. ● 1 zone for primary students, themed around a science strand of the Primary science curriculum. ● 1 Wellcome zone that is general, and 1 biomedical themed. 	<p>Ran 5 IAS zones during Science Week in November 2018, meeting our objective.</p>

<p>I'm an Engineer (IAE): 3 zones during Engineers Week in February 2018</p> <ul style="list-style-type: none"> • 1 zone will be themed on a key area in the RPSG Report. • 1 zone will be a Space Zone, to match with the objectives of ESERO Ireland. • 1 Wellcome zone related to a biomedical engineering theme. 	<p>Ran 3 IAE zones during Engineers Week in February 2018, meeting our objective.</p>
<p>25 scientists, 15 engineers and 2,800 students from, 80 schools engaging with each other.</p>	<p>27 scientists and 15 engineers were recruited to take part, and 2,752 students from 84 schools logged in. These figures meet or exceed targets, with the exception of the number of students logging in, falling just short of the 2,800 target.</p>
<p>At least 75% of the students actively engage with the scientists and engineers.</p>	<p>2,337 students (85%) actively engaged; exceeding target of 75%.</p>
<p>Offer places to at least 30 schools from SFI target counties.</p>	<p>Target to offer places to at least 30 schools from SFI target counties was exceeded. 54 schools in target counties applied and were offered places (41 in IAS, 20 in IAE; 7 schools offered places in both events), of these 37 took part (32 in IAS, 11 in IAE; 6 schools took part in both events). 1,360 students from these schools took part (58% of total students), asking 3,425 questions (58% of total), and contributing 9,968 lines of live chat (54% of total from students).</p>
<p>100,000 people viewing imascientist.ie and 8,000 viewing imanengineer.ie in 2018</p>	<p>Between 1 January and 12 December 2018 the IAS site received 249,971 page views from 84,179 users; and the IAE site, 47,482 page views from 7,863 users. These numbers fall just short of targets of 100,000 and 8,000 users respectively.</p>
<p>50 teachers use Learning Zone.</p>	<p>The Learning Zone was promoted among Irish teachers on our mailing lists, however engagement overall was lower than anticipated; it is possible that the engagement levels we saw reflect the interest from teachers at the moment and we need to find the correct, lower level of resource required to meet that demand.</p>

	The Learning Zone evaluation can be found at: about.imascientist.org.uk/2018/science-of-learning-zone-2018-evaluation-report/
200 parents and guardians of students log in to the Parent Zone.	Evaluation following a pilot of a zone for parents (about.imanengineer.org.uk/2018/01/28/engaging-parents-with-engineering/) suggested that it would be better to encourage family members to take part in the same zone as their children. We ran evening chats in each zone. 118 students actively took part, of which an estimated 27% (according to previous on-page survey data) did so with at least one family member. This falls short of the 200 family member target.
400 school students use Careers Zone.	Objective to have 400 students use the Careers Zone is in progress. All teachers from target county schools who took part were offered access to Careers Zone. 10 teachers took up the offer; 4 were given access in April following IAE, and 6 in December following IAS. We'll continue to encourage the Irish teachers to sign up. We've also identified the need for more Irish scientists and engineers to have profiles in the Zone and will be growing this pool throughout 2019.

Objective

Students see the wide range of cutting edge science and engineering happening across Ireland. Get a better understanding of how science is done in the real world. Stereotypes about scientists are smashed, students see that the scientists are normal people they can relate to.

Outcome

Students saw the wide range of cutting edge science and engineering happening across Ireland, gained a better understanding of how science is done in the real world, and saw that scientists and engineers are normal people they can relate to.

Scientists and engineers taking part represented a wide range of industries and research areas including computer science, 3D printing, neuroscience, marine biology, genetics, satellite and spacecraft design, robotics, and others.

When asked to rate the effectiveness of the projects — on a scale from 1 (not very effective) to 5 (highly effective) — teachers gave average scores:

4.5 (n=26) for challenging stereotypes about scientists and engineers.

	<p>3.9 (n=26) for supporting student learning about how science works.</p> <p>86% (71/83) of students responding to the post-event survey agreed that they know more about scientists' lives, after taking part in IAS, and 90% (75/83) that they know more about scientists' jobs.</p>
<p>Students get inspired to study STEM subjects, seeing how what they learn in school lessons is used in careers in the real world.</p>	<p>Students were inspired to study STEM subjects, and saw how what they learn in school used in careers in the real world.</p> <p>91% (84/92) reported that they are more likely to go on to university or higher education after taking part.</p> <p>89% (83/93) said they have gained a better understanding of how science/engineering relates to their life.</p> <p>94% (87/93) said they are inspired to find out more about science/engineering.</p> <p>Teachers rated the project's effectiveness on a scale from 1 (not very effective) to 5 (highly effective), giving average scores of:</p> <ul style="list-style-type: none"> • 4.6 (n=26) for helping students see how science/engineering relates to the world around them. • 4.5 (n=26) for developing students' awareness of science careers.
<p>Scientists and engineers get to understand what students think about their jobs and their role in society.</p>	<p>Scientists and engineers gained better understanding of what students think about their jobs and their role in society.</p> <p>91% (21/23) reported that their understanding of how students view science/engineering had increased.</p>
<p>Scientists and engineers get lots of practice and opportunity to improve their communication skills. Their enthusiasm and confidence for outreach increases.</p>	<p>Scientists and engineers improved their communication skills, and enthusiasm and confidence for outreach.</p> <ul style="list-style-type: none"> • 74% (17/23) reported that their interest in public engagement had increased. • 70% (16/23) said their confidence in communicating their work had increased. • 70% (16/23) said their skill at communicating their work had increased.



Background

I'm a Scientist (IAS, imascientist.ie) and *I'm an Engineer* (IAE, imanengineer.ie) are two projects following the same format. They're X-factor style competitions for scientists and engineers where students are the judges. Students talk online with scientists and engineers. They break down barriers and the students begin to see STEM and STEM careers as something for them.

Scientists and engineers create online profiles. School students across Ireland read the scientists' and engineers' profiles, ASK them questions, challenge them in fast-paced live text CHATS, and then VOTE for their favourite to win a prize of €500 to spend communicating STEM to the public.

The events are split into zones of 5 or 6 scientists or engineers, and around 350 students in each. Zones are either themed (e.g. Health, Environmental Care, or Genes Zone) or general, where they are named for elements in IAS or SI units in IAE, with a broad range of scientists or engineers taking part (e.g. Neon Zone).

IAS is a global event; having also run the UK, Vietnam, Spain, Kenya, the US, Australia, and Malaysia. IAE runs in Ireland and the UK.

In 2017 Science Foundation Ireland funded Gallomanor to run zones in IAS and IAE during 2018:



Audience and activity

Our primary target audience are school students in Ireland; Primary Level, Junior Cycle (Secondary Level), and Senior Cycle (Secondary Level). Students are given access to the site by their teachers, to whom we promote the projects.

During the two events, our primary (registered on the site) audiences comprised:

- **809 people took part in IAE**, February–March 2018
 - 15 engineers
 - 794 students (78% active in ASK, CHAT, VOTE, or comments)
- **1,985 people took part in IAS**, November 2018
 - 27 scientists
 - 1,958 students (88% active)

Full zone breakdown is shown below.

	Registered students	% Active students ¹	Scientists / Engineers
IAS			
Environmental Care Zone	433	91%	5
Genes Zone	409	85%	6
Neon Zone	502	90%	5
New Materials Zone	322	83%	6
Smart Data Zone	292	87%	5
IAE			
Health Zone	357	80%	5
Robotics Zone	183	82%	5
Space Zone	254	74%	5
Total	2,752	85%	42

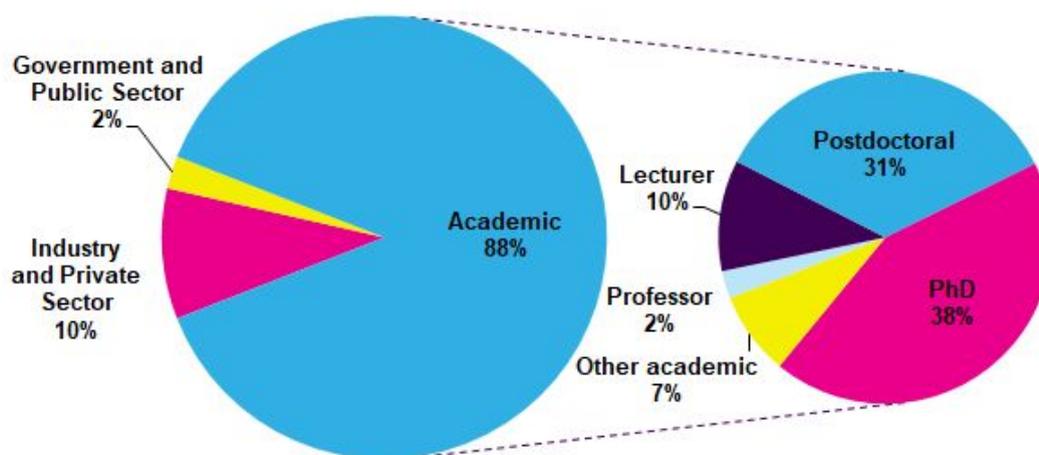
In addition to our primary audience, between 1 January and 12 December 2018, 84,179 people viewed the IAS site, and 7,863 people viewed the IAE site.

¹ % of registered students who submitted a question in ASK, took part in a live CHAT with scientists/engineers, commented, or cast a VOTE.

Scientists and engineers

27 scientists took part in IAS, and 15 engineers in IAE. The gender split was not even this year, slightly favouring male participants (15M:12F in IAS, and 9M:6F in IAE). However, 6 of the 8 zone winners were female.

7% of the participating scientists and engineers were from a black or minority ethnic background.



Above: Work sectors of participating scientists and engineers, and academic levels.

Below is a breakdown of the workplaces represented in the IAS and IAE events, and the numbers of scientists/engineers from each:

Trinity College Dublin	9	Royal College of Surgeons Ireland	2	Stryker Ireland	1
National University of Ireland Galway	8	University College Cork	2	Techworks Marine	1
Dublin City University	4	Dublin Institute of Technology	1	University of Hull	1
Teagasc Food Research Centre	3	European Space Agency	1	University of Limerick	1
University College Dublin	3	Lismore	1	Waterford Institute of Technology	1
Cork Institute of Technology	2	MSD	1		

Schools and students

2,337 students (85%) actively engaged with the scientists and engineers by asking a question, taking part in a live chat, casting a vote, or writing a comment. 1,360 students were from schools in SFI target counties.



Above: Schools signed up to take part in IAE, February–March 2018 (left) and IAS, November 2018 (right).

We estimate that around 30 students took part with their families from home, to engage with the scientists and engineers.

Key activity figures

	IAS			IAE		
	Historic IAS Zone average	2018 Zone average	2018 Zone total	Historic IAE Zone average	2018 Zone average	2018 Zone total
Scientists/ engineers	5	5	27	5	5	15
Schools	11	12	58	10	9	26
Registered students	369	392	1,958	284	265	794
% Active students	85%	87%	88%	84%	79%	78%
Questions asked	593	1,011	5,057	472	294	882
Questions approved	262	416	2,081	233	193	578
% Questions approved	45%	47%	41%	50%	65%	66%
Answers given	497	563	2,814	435	226	678
Comments	64	80	400	44	17	52
Votes	300	344	1,718	225	162	486
Live chats	16	18	92	13	13	38
Lines of live chat	4,136	4,692	23,459	3,331	1,858	5,574
Chat lines per chat	271	253	255	245	148	147

Impact and evaluation

There are two main strands to our evaluation:

1. **Formative** — We continually review our activities and look for improvements in what we do and how we do it. To this aim we use web metrics, observation of schools during the event.
2. **Summative** — Thanks to site metrics we can see exactly how students and scientists are interacting: how many questions are asked, how many votes are cast, which are the most active schools and scientists, and other measures. The 2018 Zone Reports are available on the IAS and IAE sites.

With the help of online surveys we look at scientist and engineer public engagement behaviour, as well as students' attitude to science and engineering. Additionally, short interviews were conducted with a group of scientists and engineers; these were conducted over the telephone, and via email.

Scientists and engineers

100% (23/23) of scientists and engineers responding to the post-event surveys reported that they enjoyed taking part in the projects.

91% (21/23) of scientists and engineers responding to the post-event survey said that their understanding of how students view science/engineering had "increased" or "strongly increased".

Scientists and engineers gained renewed enthusiasm toward their own work, and developed their skills and confidence toward public engagement.

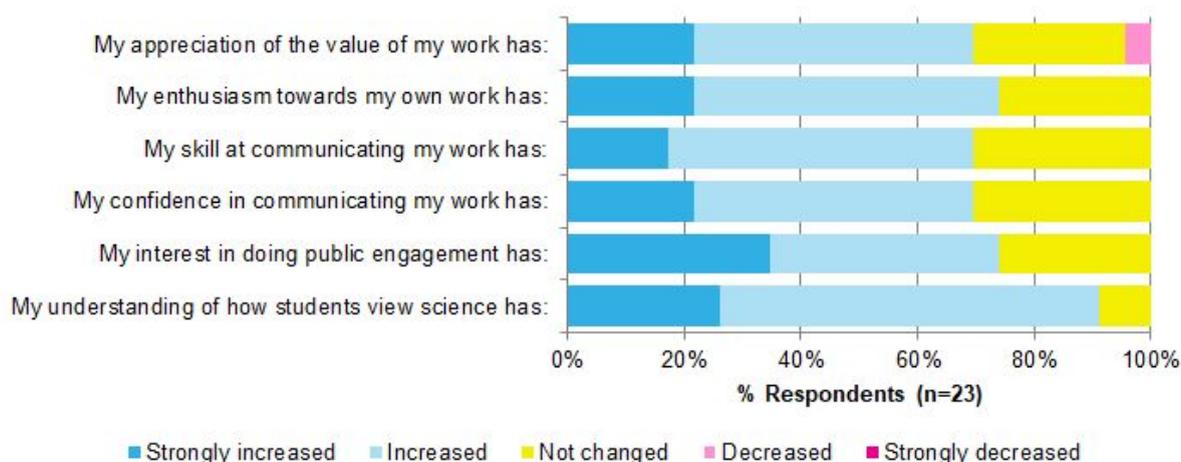
"I've learnt how to target my research towards a lower level and I am now more confident in my communication skills." — Scientist, post-event interview

"The enthusiasm of the students has encouraged me to become more involved in STEM outreach." — Engineer, post-event interview

- 74% (17/23) of survey respondents said that their interest in doing public engagement had "increased" or "strongly increased"
- 70% (16/23) said their confidence in communicating their work had "increased" or "strongly increased"
- 70% (16/23) said their skill at communicating their work had "increased" or "strongly increased".

In post-event interviews participants who had previously not done much public engagement talked about their enthusiasm to continue:

“IAS was my first time engaging with the public as opposed to the scientific community. I really enjoyed it and definitely preferred engaging with the public.” — Scientist, post-event interview.



Above: Post-event scientist/engineer survey data: “After taking part in I’m a Scientist/Engineer:” (n=23)

Concern was raised by one of the scientists interviewed about time requirements. The scientist worried that working in industry did not offer the flexibility required to be able to meet enough of the live chats, and that the time requirement was too high (65% (15/23) of participants reported that they spent up to 2 hours per day participating). We are seeking ways to help scientists with less flexibility in time to take part; including the option to take part as part of a small team.

Students and teachers

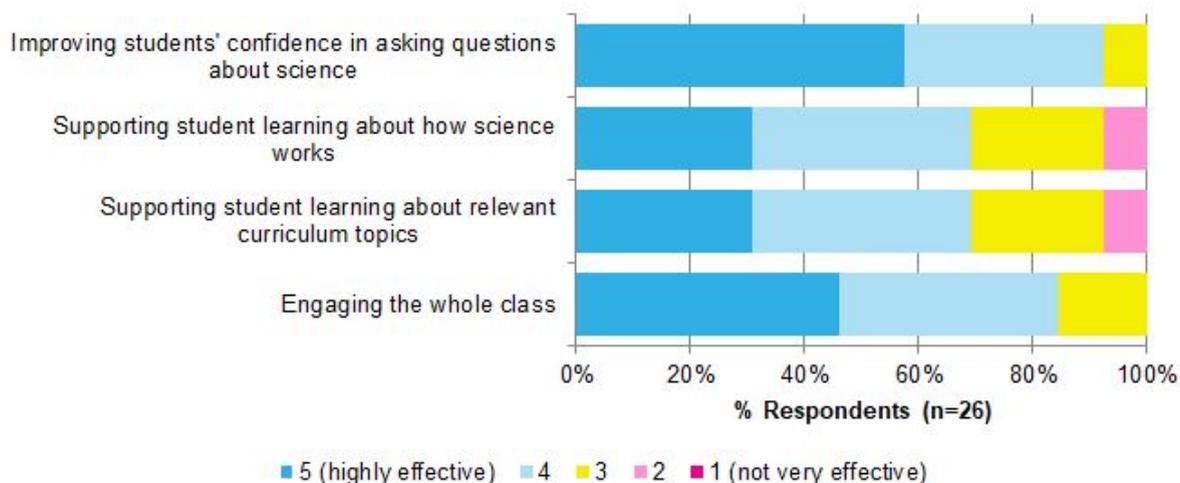
99% (92/93) of students responding to the post-event surveys reported that they enjoyed taking part in the projects. 92% (24/26) of teachers said that they would recommend the activity to a colleague, and 88% (23/26) that they are inspired to find more themed activities for their students.

When asked to rate the effectiveness of the projects in terms of challenging stereotypes about scientists and engineers — on a scale from 1 (not very effective) to 5 (highly effective) — teachers gave an average score of 4.5 (n=26); and of 3.9 (n=26) in terms of supporting student learning about how science works. **86% (71/83) of students responding to the post-event survey agreed that they know more about scientists’ lives, after taking part in IAS, and 90% (75/83) that they know more about scientists’ jobs.**

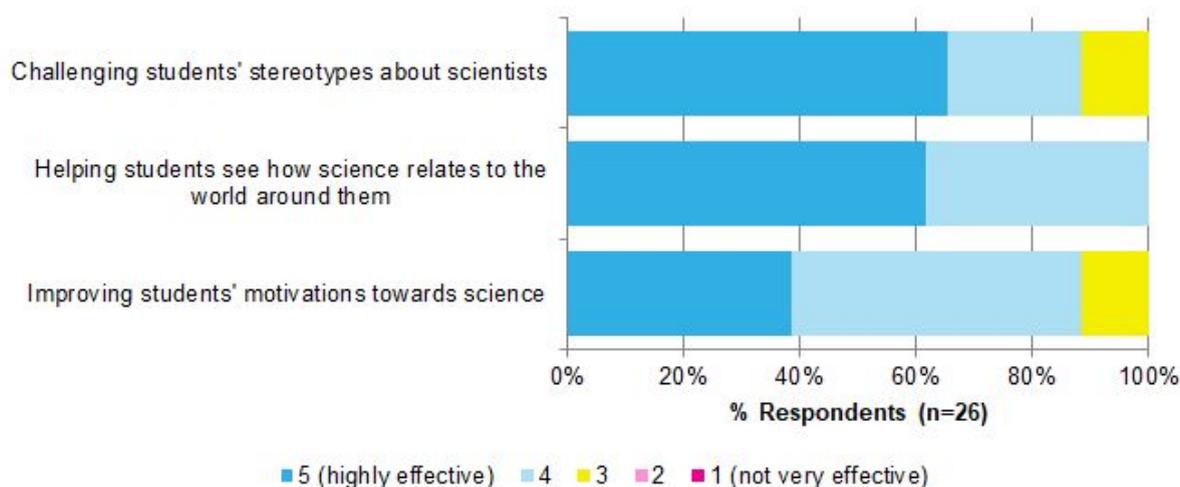
The project was effective in terms of changing students attitudes towards STEM and STEM careers, with 91% (84/92) of students responding to the post-event survey reporting that they are more likely to go on to university or higher education after

taking part in IAS or IAE. 89% (83/93) said they have gained a better understanding of how science/engineering relates to their life, and 94% (87/93) that they are inspired to find out more about science/engineering after taking part.

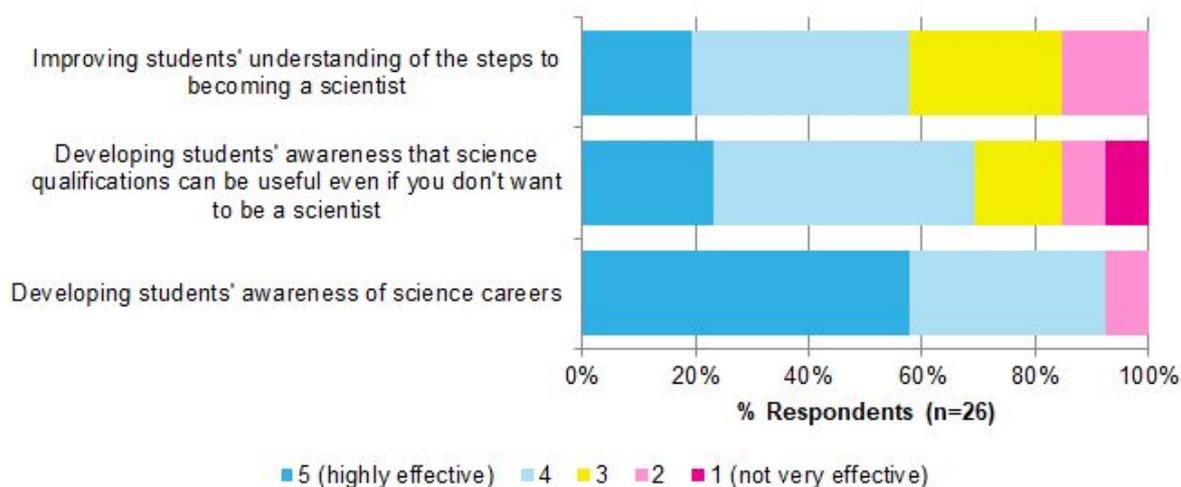
When asked to rate the effectiveness of the projects in terms of helping students see how science/engineering relates to the world around them — on a scale from 1 (not very effective) to 5 (highly effective) — teachers gave an average score of 4.6 (n=26); and 4.5 (n=26) in terms of developing students' awareness of science careers.



Above: Post-event teacher survey data: "On a scale of 1-5, how effective do you think I'm a Scientist/Engineer is for the following?" [Student learning] (n=26)



Above: Post-event teacher survey data: "On a scale of 1-5, how effective do you think I'm a Scientist/Engineer is for the following?" [Attitudes and motivations] (n=26)



Above: Post-event teacher survey data: "On a scale of 1-5, how effective do you think I'm a Scientist/Engineer is for the following?" [Careers awareness] (n=26)

Media coverage

We had extensive social media coverage by scientists, engineers and teachers posting about their experiences on Twitter. We also covered the event in our team's twitter line and encouraged our event moderators to do the same. Funders and the institutions where candidates worked at also helped keep the buzz on social media.

Hashtags were used during the events (#IASIE and #IAEIE) to allow the quantification of our impact in Twitter. Below are some examples:

Challenges and future direction

Severe weather and snow during the February/March 2018 IAE event led to a large number of live chats being cancelled due to school closures. Some students did log in to the site from home to take part in chats and ask questions, however activity levels overall were reduced.

We continue to invest in the IAS platform to make it more effective and efficient. We invest in evaluation to improve our understanding of the project and the environment in which it operates, and to allow us to better communicate the benefits participants gain from participation.

We are also investing in researching and trialling new streams of revenue in the UK, which we hope will prove to be transferable to Ireland including training for researchers and university recruitment.

Development of corporate revenue streams remains an ambition.

The secure future of the overall I'm a Scientist project means that the sites and evaluation will remain online for at least four more years negating a need for an exit plan.

Advice for similar projects

Design your project for all participants. Make sure you consider the needs of scientists and engineers, not just your primary audience.

Design your project for scale from the beginning. If it is effective you'll want to expand.

Design your project to increase equality of opportunity. Make sure you don't exclude people based on culture, language or geography. You may be limited by budget, but don't design inequality into your project.

Provide a purpose to engagement. Don't expect your audience to engage with science just because you think it is cool.

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