



*promoting social mobility and diversity in Science, Technology,
Engineering and Maths (STEM).*

External Evaluation Report

This report summarises the external evaluation of the In2scienceUK Work Placement Programme (in2scienceuk.org). This evaluation was conducted by Zsolt Analytics and funded by NESTA and the Department for Digital, Culture, Media and Sport. The evaluation aimed to identify the impact of the In2scienceUK programme on participants and to relate this to the In2scienceUK theory of change.

Background to In2scienceUK

Young people from disadvantaged backgrounds face significant barriers to their progression to STEM degrees, apprenticeships, and careers. For example, only 10% of life science professionals, 15% of academics and 6% of doctors come from low socio-economic groups¹. With salaries 20% higher in STEM careers compared to other sectors², In2scienceUK's mission is to support young people to achieve their potential and progress to STEM careers and provide a way out of economic inequality. In2scienceUK aims to support greater diversity and inclusion in the UK STEM sector.

Why In2scienceUK Exists:

The UK is suffering from an annual shortfall of 173,000 STEM skilled workers and it has never been so important to ensure a pipeline of strong talent of biomedical scientists, engineers, coders and NHS staff. In2scienceUK helps tackle these problems by supporting all to achieve their potential, addressing the STEM skills gap and supporting the growth of the UK economy.

In2scienceUK's students and programme:

In2scienceUK works with young people that are recipients of free school meals, with no family history of attending university and who live in areas in which significantly less young people progress to higher education. In 2018 the majority of young people on the programme are female and from BAME backgrounds.

The programme involves a 2 week placement working alongside STEM professionals and researchers to gain insights into STEM careers and research in addition to inspiring workshops and skills days giving young people high quality information on university and careers access as well as employability skills. Public engagement competitions support young people to develop their creative and literacy skills.

The External Evaluation

The results presented in this evaluation report were collated from quantitative and qualitative research.

The quantitative element relies on data collected from evaluation surveys students (participants) completed since 2012. Every cohort was asked to fill in three surveys: at the beginning of the programme (baseline, usually in May); after completing the programme (follow-up, usually in late September) and one year on. A comparison group from the 2018 and 2019 cohorts were also surveyed, consisting of individuals who were accepted to the scheme but did not participate.

The qualitative element was implemented in September 2019 and consisted of 12 in-depth semi-structured phone interviews. Included are 6 participants from the

2018 cohort and 6 from the 2019 cohort. The interviews were summarised, and a coding framework was used to analyse the responses.

STEM engagement, confidence and knowledge impact

The evaluation shows that students highlighted the growth in their confidence as a result of participating in in2scienceUK Programme. Areas of increased confidence cited most often were:

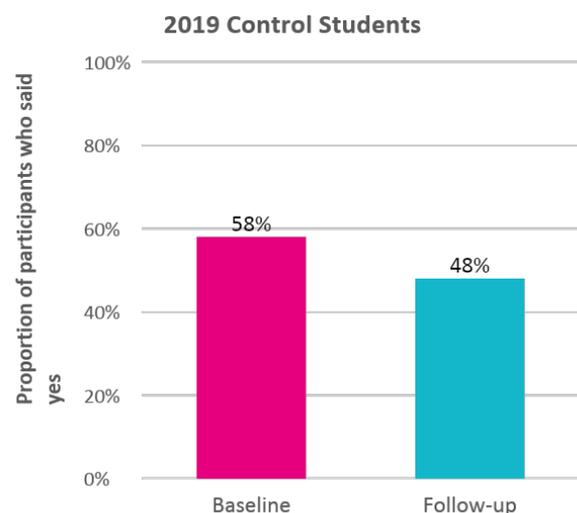
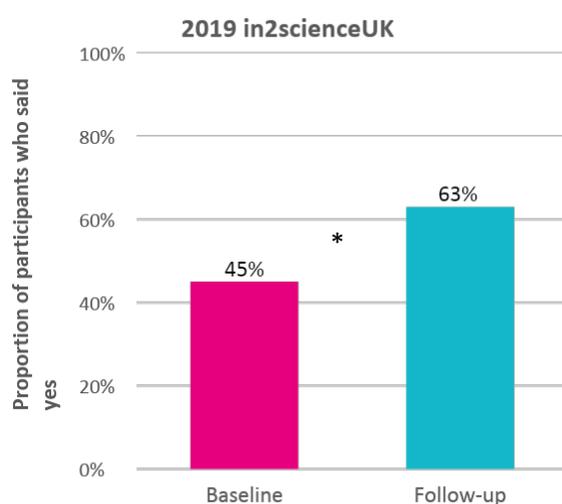
- Their capacity to communicate with others about STEM topics.
- Their ability to get into university.
- Their ability to work in a STEM job.
- Feeling that more opportunities were open to them.

Increased confidence in learning

As expected, there was a significant increase in the proportion of young people who had participated in a scientific experiments outside the classroom, confirming that the project meets one of its core aims to extend participants' practical experience.

Students also perceived their knowledge of science, technology, engineering and maths to have significantly increased. The change between those agreeing they knew 'a lot about science or engineering' in the participant group compared to the control group was considerable and statistically significant.

Students who agree with the statement 'I know quite a lot about science' and/or engineering'



**indicates a statistical significance*

Students who were interviewed attributed increased confidence to knowledge and learning acquired through in2scienceUK and having built a positive relationship with their mentors.

"I think I have more knowledge to talk about now than before, and in2scienceUK gives me something to talk about."

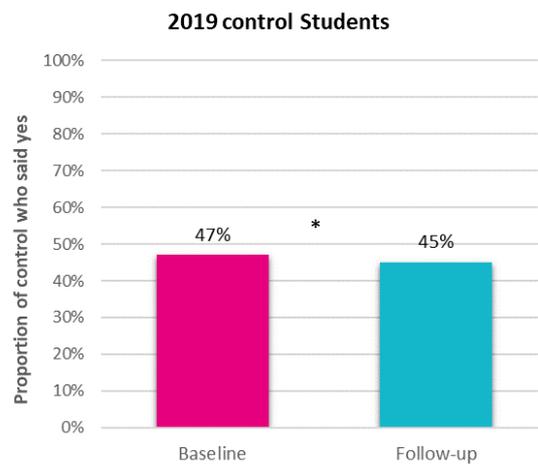
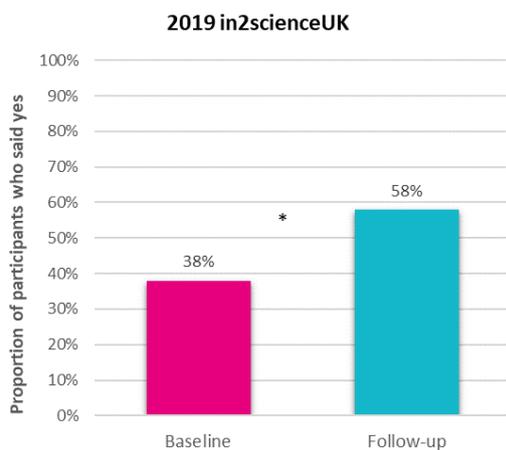
"They kindly offered for me to go back to the lab in case I wanted to do some more experience or wanted to talk to them about everything. They were really nice and helpful."

Students also felt that in2scienceUK had helped them to prepare for the workplace more generally by developing soft skills such as communication, networking and interview skills.

Increased confidence to pursue STEM careers

Many students changed their perceptions about 'scientists/engineers' after working with them on the placement. This shift in understanding was important for building their confidence. Students reported that they felt more comfortable with the idea of working in STEM knowing that people were working there from a range of different backgrounds. This effect appeared to be most pronounced when students felt that they could relate to their mentor or someone else within their lab – with perceived socio-demographic commonalities including age, (for girls) gender and (for immigrants/children of immigrants) country of origin. This may have helped students understand that "someone like me" can achieve the career to which they aspire.

Students who agree with the statement 'people who are like me work in science or engineering'



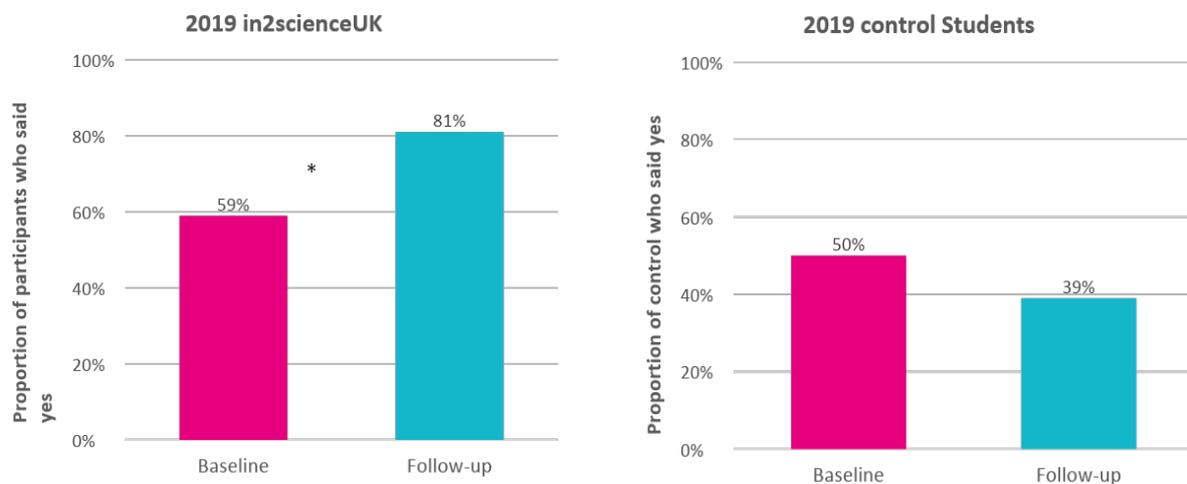
"It made me realise I don't have to worry about being a specific [type of] person... anyone can go into science."

STEM Career Impact

Improved professional & networking skills

There was a significant increase in the number of participants who felt confident in introducing themselves to scientists. In comparison, those in control groups felt proportionally less confident. This is a key aim of In2scienceUK to ensure all young people regardless of background feel confident in a STEM environment and speaking to STEM professionals.

Students who agree with the statement 'I feel confident introducing myself to a science or engineering professional in person'



Interviews showed that students expressed increased confidence in themselves, their capabilities and resilience following their placement. For most students the in2scienceUK Programme was their first exposure to the workplace within a professional STEM setting. Although some young people struggled initially, most reported feeling comfortable at the end of the placement. Importantly, students felt that this was a more general lesson about their capacity to overcome initial failures and learn.

Capabilities in STEM, Higher Education and Careers

Students who were interviewed highlighted that their confidence had grown as a result of participating in the in2scienceUK programme— in relation to their capabilities in STEM, higher education and their careers, and in general. Areas of increased confidence cited most often were:

- Their ability to read STEM texts at a higher level.
- Their capacity to communicate with others about STEM topics.
- Their ability to get into university.
- Their ability to work in a STEM job.
- Feeling that more opportunities were open to them.
- Feeling more resilient and better equipped to handle setbacks.

Strengthening networks of scientists and engineers

There have been clear and significant increases in the proportion of participants who have met a scientist or engineer. An even higher number may have been expected, as the project connects the participants with researchers in STEM fields. The lower number may be due to how participants define 'a scientist'. Many students work alongside engineers or PhD students host students, who might not be perceived by them as 'scientists'.

59% of students reported knowing someone who can give them good advice about career options in a STEM related area in the follow up survey, compared to 47% in the baseline survey.

Better understanding of STEM careers

Participants developed a more sophisticated understanding of a range of different types of science and engineering jobs. This included 'behind the scenes' roles and non-technical skills involved in STEM careers.

"Before I just used to think about the more obvious jobs like being a doctor or a teacher or I don't know, an engineer, but now I think about the roles behind the scenes, like for example within a hospital you have someone who works as a consultant or someone who works as part of the IT department and other things like that."

In regards to their own career goals, students who were interviewed stated the following:

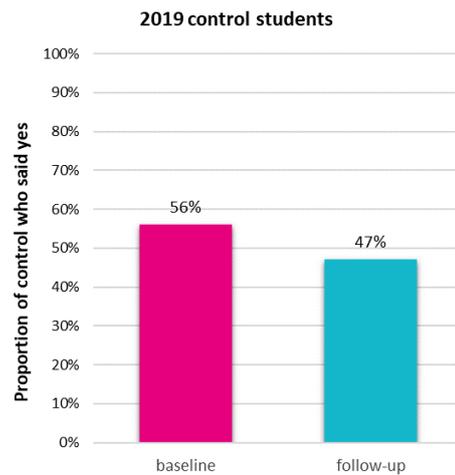
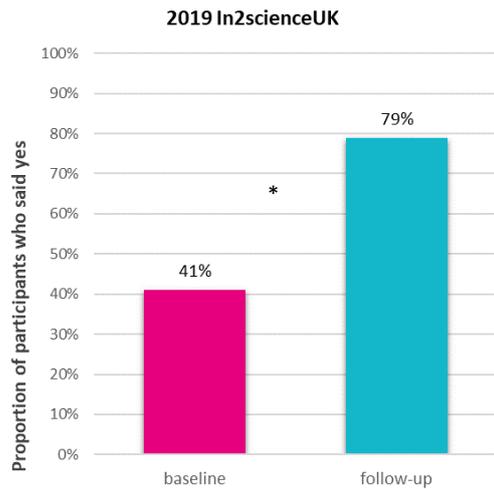
- They knew more about their desired career.
- They had a more realistic understanding of the demands of STEM jobs and how to get there.
- Their STEM career aspirations had been clarified and reinforced – transforming ambiguous aspirations into more concrete and actionable career goals.

Higher Education and Training Impact

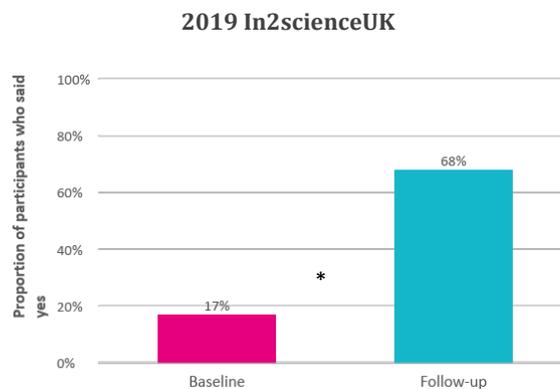
Better equipped to write high quality applications

The proportion of participants who reported knowing someone outside their school to give feedback on their UCAS Personal Statement increased from 36% to 54%. Those who had drafted their statement at the beginning of the placement compared to the end increased from 17% to 68%.

Do you know someone outside of your school who would give you feedback on your UCAS application and personal statement?



Have you drafted your personal statement for your UCAS applications?



Students reported that workshops and placements provided knowledge and support which improved university applications and CVs.

"A lot of what I learnt at in2scienceUK I put in my personal statement... if I had an interview I think I'd have a lot of knowledge and I'd be able to answer their questions."

"[The workshops] were useful because...beforehand, I didn't really know how to write CVs... in my colleges they'd just give you a brief summary... they wouldn't help you a lot. With in2scienceUK we sat down and talked about what I could improve... that helped me develop my CV and also my confidence."

Attending university

There was a significant increase in levels of confidence amongst students about applying for the degree that they had named as their first choice (a mean of 4.4 at follow-up compared to 3.9 at baseline). However, there were also decreases in, first, desire to attend a top university to study a STEM subject and, second, excitement at the prospect of doing a STEM degree. Those students who were less interested in attending a high-ranking university tended to have more vocational career goals (most often medicine). Furthermore, they were

understandably more concerned about securing the necessary degree than the institution where that degree would be obtained. Some participants realised that their existing grades might not be good enough to apply to a top university and were planning to apply to mid-level schools.

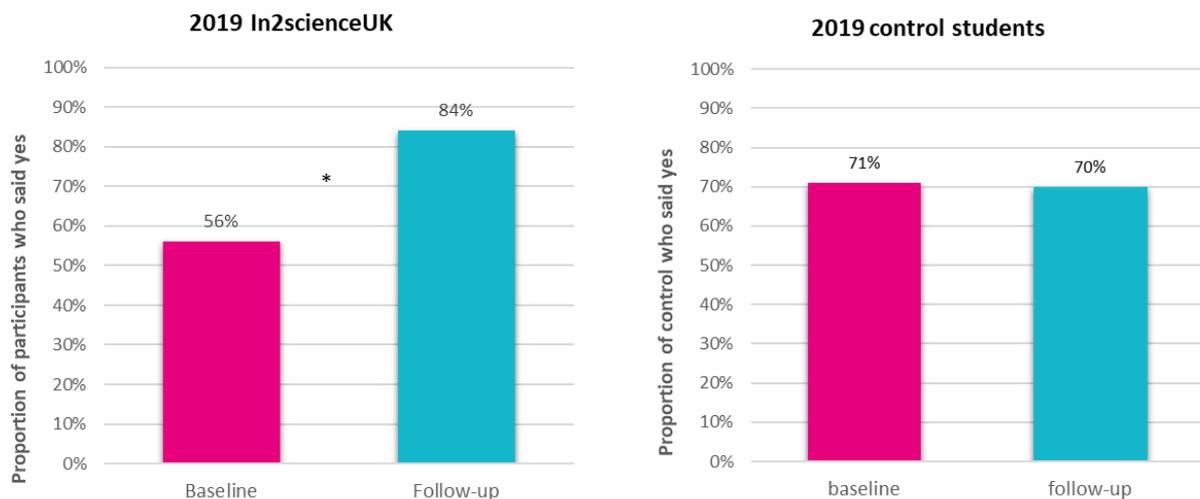
Nevertheless, most students interviewed who were already interested in pursuing higher education at a high-ranking university maintained that interest but now felt that this was a more realistic goal for them, after participating in in2scienceUK.

"I guess the placement gave me the idea that I could actually apply to those good universities and the people there are really nice."

Better understanding of university / apprenticeship application process

There was a significant increase in students' level of agreement with the statement, 'I know where to seek support and advice about the university application process'.

I know where to seek support and advice about the university application process.



Students who were interviewed repeatedly emphasised that they had learnt that there are multiple educational routes to achieving their career aims. Some commented that they were now more aware of the importance of practical work experience and considering applying for degrees which included a 'year in industry'.

"The people I talked to, some had civil engineering degrees, mathematics degrees, so it shows that in that kind of workspace, you don't have to have one [specific] technical thing [e.g. background]."

Ability to read STEM texts at a higher level

Several students mentioned that they were reading more advanced materials following on from the in2scienceUK Programme, having been encouraged by their mentors, who had introduced them to academic work.

“Beforehand, I wasn't actually reading anything because it wasn't a requirement for our Sixth Form or any of my subjects I was doing, but I think after the in2scienceUK competition I felt I was reading more and I was also encouraged to because people told me it's something to write about in the personal statement.”

Conclusion

There is robust evidence that in2scienceUK has a clear and positive impact on increasing students' confidence in their abilities, improving their understanding of career routes into STEM. By providing them with contacts that can offer them advice in the university application process. This evidence meets NESTA's Level 3 standard.

The findings suggest that some students had become less motivated to pursue a degree at a top university but that this may be due to poor attainment in year 12 or focus on specific subjects such as medicine. The in2scienceUK programme had:

- Reinforced their career aspirations.
- Provided them with valuable information which enabled them to map out realistic plans for achieving their career goals.
- Helped them to develop the necessary confidence to pursue those plans. Increased confidence in their own abilities, and the attainability of a STEM degree or career.

There is evidence of a much wider effect the project has on its participants. The evidence does meet level 2. Moreover, the clear patterns that we observe are oriented in the directions the ToC would suggest and are consistent across time. This offers further assurances as to the reliability of this insight.

Higher participant numbers would demonstrate a more significant student impact; the aim to expand the programme will help to achieve this in the coming years. The full report can be found on our website under impact.

Reference List

1. Friedman, S., O'Brien, D., Laurison, D. (2016). “Like skydiving without a parachute”: How class origin shapes occupational trajectories in British acting. *Sociology*, 51, 992-1010. doi:10.1177/0038038516629917
2. Greenwood, C., Harrison, M. & Vignoles, A. (2011) *The labour market value of STEM qualifications and occupations* (Institute of Education/Royal Academy of Engineering). Available at: www.raeng.org.uk/news/releases/shownews.htm (accessed 13 October 2016).