

## **Inspiring Minds Research-Engaged STEAM Outreach: How we can and should change our practice.**

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### **Research Domains**

Academic practice, work, careers and cultures (AP)

### **Abstract**

The OfS and academics agree “sustained” engagement is more effective, but not about what makes activity “sustained”, and not enough evidence to support the greater cost. We examine how we are building an evidence base, the pivotal role research relationships have played, and how the approach can be used elsewhere.

We will discuss the systems and relationships that enabled us to develop and evaluate outreach activity that had evaluation and impact analysis embedded into the design. Sharing both the challenges and success that have come through the development of the programme over the last five years. We then look to the future of how research-engaged practice can, and should, become central to our work and make some recommendations for next steps.

### **Full paper**

There is global agreement that we need to increase the number and diversity of people studying STEM at HE and entering the STEM workplace. When this is considered alongside the role of “sustained and progressive” outreach activity in creating shifts in students’ aspirations and attainment a picture emerges that seems to point to the need to prioritise activities that work more intensively with fewer numbers of students to maximise the impact of the opportunities we

provide. However, with increasing divergent pressures on educational finances, it is becoming even more important to understand the impact outreach activities are having so that stakeholders can make informed choices and assess the cost to gain ratio of high-reach low intensity versus lower reach higher intensity/more sustained activities.

The barrier to STEM engagement at post-16 and Higher Education is twofold firstly compartmentalisation of STEM in formal learning leads to reduced perception of its relevance/accessibility, secondly students from underrepresented backgrounds frequently have little or no science capital. These barriers mean that students have poorer science attainment (ASE 2018), and are three times less likely to take triple science GCSE (Archer et al. 2016, 302) influencing the STEAM opportunities available at post-16 and HE.

The Inspiring Minds Programme was conceived and developed in 2017 as a collaboration between the School and College Engagement Team and the LASAR Research Centre at Canterbury Christ Church University. The aim of the collaboration was to design a STEAM engagement programme that reached students who felt disconnected from their experience of STEM within the formal curriculum and, importantly to assess if the development of an outreach programme built on research-informed pedagogy (epistemic insight) could affect attitudinal and aspirational shifts in the young people attending. In 2021, by working with colleagues at HEAT we were also able to measure the impact on attainment for the first cohort of Inspiring Minds Scholars.

The programme was designed to address multiple engagement barriers within a single intervention, including relationship building with student ambassadors, access (and transport) to a university site, student-led inquiry, access to a range of university academics, and an alternative to the dominant knowledge generation/application narrative of STEM outreach driven by schools' demand. The Inspiring Minds model is time and resource intensive but the research, embedded into its development shows significant shifts in students' aspiration and attainment, including post-16 study of STEM-related subjects.

This paper reports data from a mixed methods study with over 400

participants in the Inspiring Minds programme, including re-engagement data with 70 students and quantitative attainment data through a matched comparator study of 47 students from the first cohort. Initial data analysis shows statistically significant shifts in students' aspiration and future participation in HE. Furthermore, an independent impact study by HEAT on Key Stage 4 (age 16) examination results shows that the attainment difference cannot be attributed to a higher baseline level of attainment. Rather, participants had 'further to travel' having started from a lower baseline at Key Stage 2 (age 10), despite this they were more likely to achieve a 9 to 4 pass in English, Maths, and science than non-participants.

We will discuss the systems and relationships that enabled us to develop and evaluate outreach activity that had evaluation and impact analysis embedded into the design. Sharing both the challenges and success that have come through the development of the programme over the last five years. We then look to the future of how research-engaged practice can, and should, become central to our work and make some recommendations for next steps. Suggesting that this requires a combination of robust self-reported data and longitudinal studies to support the evaluation of the impact on student attainment. As noted above this comes at a greater (per student) cost—the development of relationships requires high ratios of staff (including ambassadors) to students and repeat engagement with the same students (potentially) reducing the opportunity to reach “new” students. These negotiations need to be fully evaluated to understand if the cost can be justified, and this requires commitment from funders and institutions to develop an evidence base for what works.

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