

A Research Evaluation of the Francis Crick Institute Education Outreach Programme

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Headline Report

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Introduction to the Research Evaluation

1. Introduction to the Research Evaluation

1.1 Overview

This document presents the findings of a research evaluation of the Francis Crick Institute's 'Education Outreach Programme' (EOP). The EOP is organised as an intervention for 'sustained change in young people's aspirations for a science or STEM career, and for them to feel that the Crick is for them'. It comprises a broad programme of age-appropriate activities such as practical science workshops in schools, work experience and mentoring, and professional development for teachers, targeted at state schools in the London borough of Camden. Our evaluation report is based on a broad consultation of the Camden schools' community and Camden schools' stakeholders. It has been designed to identify experiences and perspectives of the EOP; its potential impacts; and ways within which such impacts might be further extended and enhanced. Moreover, our report offers a critical analysis of the efficacy of the EOP as a model for science engagement, aspiration raising and cultural/professional change within school communities.

1.2 The team

The research team led by Professor Richard Watermeyer (University of Bristol) involved Professor Catherine Montgomery (Durham University), Professor Tom Crick (Swansea University), Dr Cathryn Knight (University of Bristol), and Dr Ceri Brown (University of Bath) with support from Mar Borrás (University of Bristol). The team boasts expertise in the sociology of education with special reference to the schooling experience of disadvantaged learners in science/STEM formal and informal educational settings. The research team are highly experienced in leading longitudinal, multi-method and complex research and evaluation studies and in the domain of science education and engagement.

1.3 Methodology

We undertook a mixed method approach to the research evaluation and the generation of both qualitative and quantitative datasets. We focused on: (i) teacher/school research; (ii) pupil research; (iii) EOP team perspectives we undertook:

- 10 focus groups with Camden school children (primary and secondary – 2 in person and 8 undertaken online)
- an online survey consisting of scaled and open-text questions distributed to Camden (primary and secondary) teachers (with 94 responses)
- 18 semi-structured interviews with science leads, heads-of-science, science teachers and head teachers
- 5 semi-structured interviews with the EOP team

Executive Summary

2. Executive Summary

- Our consultation of the Camden school community reveals that the EOP is highly regarded and seen as a valuable if not essential aspect of support and enrichment for Camden schools' science teaching and learning. It is especially valued in the context of allowing young learners sight and experience of the world of scientists, and in supporting schools with resources and teachers with content knowledge they otherwise lack. Camden school staff were especially positive about their experience of interacting with the EOP.
- A shortfall of specialist expertise (particularly among primary teachers who are typically subject generalists) and resourcing for science education in Camden schools was seen to be generously compensated by the EOP.
- Demand for the EOP considerably outstrips supply. School staff repeatedly petitioned for more frequent interaction with the EOP, though were clearly cognisant of the limited capacity of the EOP team to deliver more.
- A strong case was made by the Camden school community for further staff investment in the EOP Team so as to accommodate growth in demand for their services within the borough.
- The EOP was reported as positively impacting pupils' *aspirations*, *confidence* and *attainment* as science learners and for making a major impact on female pupils' aspirations as science learners. However, pupils considered the impact of their experience of the EOP in more modest terms and as relates mainly to their changed understanding of scientists, in the form of the EOP team. The relational contribution of the EOP team is considerable in reframing learners' negative assumptions of science and scientists though is less potent in improving aptitudes for science. It is unclear quite the extent to which the EOP is changing mindsets about future imaginaries of work. Many of the learners we consulted had already established future work imaginaries that were non-science based. While the EOP experience had helped to debunk misassumptions made by learners related to what scientists are like, we detected little sense that the EOP had in any substantive way made them reimagine their educational and occupational futures. In part, this may be due to such imaginaries, though clearly articulated, being only vaguely conceptualised. Notwithstanding, the EOP provides pupils with direct experience of science careers putatively unavailable in the provision of careers' guidance by schools (cf. Watermeyer, Morton and Collins 2016)
- There is sound evidence of the EOP helping learners forge a connection with science and thus generating science capital – in informal and non-educationally specific ways such as family and birthday outings to the Crick – which requires ongoing scaffolding in the secondary school context where risk of learner disengagement is high.

Executive Summary

- Early introduction to the Crick through the EOP helps to normalise what might be for some a daunting encounter and positions the Crick as open to, and even a hub of the community. The physical grandeur of the Crick is not, however, lost on learners and is a core aspect of what makes their visits so memorable.
- The Crick is a frontier space for learning about science, with learners introduced to and becoming acquainted with alternative spatial and material modalities of science learning.
- Our data shows that the EOP has had an influence on cultural and professional change within school communities, encouraging new directions in professional development for teachers and orienting engagement practice for science in schools. The EOP's contribution to teachers' capacity building may be especially advantageous, given that many of the accounts of school-based science learning provided by pupils were critical of teachers' content knowledge and pedagogical expertise specific not just to delivering, but engaging learners with the science curriculum.
- The EOP is recognised for having aspects of informality yet is also distinctive in terms of what is commonly designated 'informal learning'. While freedoms of experimental and experiential learning are encouraged in the EOP laboratory, school visits follow an organisational structure not unlike the procedural logic of the typical classroom experience. The EOP differs however to schools, in that being comparatively resource-rich, it is able to provide greater opportunity for autonomous learning.
- Attitudes to science teaching in Camden schools appear from our survey data to be largely positive. When reflecting on their own practice, the majority of our survey respondents agreed that they enjoy teaching science (87%) and feel confident teaching science (85%). 93% of our survey respondents reported that the pupils they teach enjoy science.



Recommendations

3. Recommendations

- The centrality of the EOP offering to the Camden school community cannot be underestimated and demands wider recognition (and support) as relates to:
 - the EOP team as highly visible and popular (and persuasive) role models challenging and breaking stereotypes and misassumptions of scientists prevalent among young learners;
 - the EOP embedding a scientific memory among learners that serves as an important reference point in formal science lessons and also in seeding self-efficacy (among those whose ‘science capital’ is less developed and whose risk of science disengagement is most acute)
 - the EOP providing a resource-rich learning environment, where learners are made accustomed to the spatial and material modalities of doing science – and in short become exposed to explicitly experiential or ‘situated’ forms of science learning
 - the EOP providing teachers (primary teachers especially) with enhanced subject knowledge and alternative pedagogical repertoires complementing an engaging science curriculum
 - the EOP in mobilising an inclusive educational ecosystem for science learning that exceeds the parameters of the school

However, the biggest challenge for the EOP programme is its level of staff resourcing and the fact that demand from Camden schools significantly outstrips what the EOP team can reasonably deliver. The EOP team therefore requires **an increased investment in personnel that will allow the Crick to not only continue to support the Camden ‘schools’ community and wider Camden community, but also expand on this provision (including digital provision)**. Dedicated support for **parental engagement is we would argue key, and much more could be done to bring parents closer to the Crick** and not just as organised through the school as gatekeeper. So too, is there strong evidence that **schoolteachers would benefit with closer and more prolonged interactions with the EOP team for purposes of their own professional development and in the amelioration of curriculum**. In the latter context, especially, there is significant value to be gained from a closer and **more collaborative relationship between the EOP and schools in terms of curriculum development and for the purpose of improved alignment and articulation**.

- The survey results suggest that more could be done to bring teachers from different schools together. Therefore, we recommend **the EOP looks at what more it could do, as**

Recommendations

a relational broker and/or hub, to encourage teachers across the Camden school community to work together to share best practice in science learning and teaching.

- Teachers reported that they would benefit from more training related to teaching science and teaching science careers. **We recommend a review of the CPD programme to ensure that teachers have access to high quality training in this area.**
- Only 34.9% of teachers agreed that the pupils they teach engage in science activities outside of school. Therefore, we believe that **more work could be done to encourage students to engage with the Crick *outside* of school.**
- Teachers reported that they would like students to have access to more work experience placements in the Crick. We recommend that the **Crick reviews how it can provide work experience placements to students, along with employability schemes and career outreach work.**
- Finally, cognisant of the Crick's interaction with special schools, we strongly recommend that **research be committed specifically to understand more fully the value proposition of the EOP to children with special needs** and as distinct from a typical rationalisation of engagement as a catalyst of science capital.



Conclusion

4. Conclusion

It has been a privilege to have undertaken the evaluation of the EOP and to have had the opportunity to consult with the Camden school community, of which the Francis Crick Institute is indisputably an integral member. While the COVID-19 pandemic massively challenged our approach to undertaking this study, we are confident that our findings provide a robust and honest appraisal. Ultimately, the widespread disruption caused by the pandemic provided us with a unique window of opportunity from which to observe the professionalism, tenacity and (infectious) personality of the EOP team; the adaptiveness and resilience of the EOP model; and the future of the Crick's engagement of the Camden school community. There are clues within as how to scale up engagement and lessons pertaining to its digitalisation and hybridisation.

The EOP is uniquely valuable in so many ways – pedagogically, socially *etc.* – and offers a blueprint of what works in schools' engagement, and public engagement more widely, that is as relevant to a time before the pandemic as it is now.

It confirms much of what is already known in terms for instance of:

- the value of (diverse) role models in enabling learners' future imaginaries and disrupting science (social) stereotypes
- experiential, object-based and situated learning as a powerful means of relativising abstract and complex knowledge, making connections to learners' personal worlds and building self-efficacy and sense of positive entitlement
- schools' engagement as a form of curriculum enrichment providing learners new ways to experience science, and providing teachers and school leaders new ways to think about teaching and inspiring science

Yet the EOP, in our estimation goes further, in providing insight into authentic processes of levelling-up for learners that are not just linked to the greater acquisition of so-called 'science capital' (by those already endowed) but of learners, the most disadvantaged, marginalised and excluded, benefitting from an experience of science with wider social and personal benefits. The contribution of the EOP to those with emotional and behavioural difficulties and acute learning needs, for instance transcends reductionist impact claims of science engagement tied for instance to the consolidation of learner aptitudes. In this sense, the EOP has at its root a profound social mission tied to the welfare of the Camden community, with schools at its heart. As such, the EOP reveals another dimension to the added value of engagement.

Conclusion

Concurrently, the EOP provides a rubric for thinking about engagement of schools that exceeds individual activities, the impact for which seeps well beyond the satisfaction gained by learners or teachers from experiencing science in novel ways. It also reveals the Crick as an internationally recognised and celebrated science organisation which is in every way a local, indeed anchor institution; a balance of focus and priority many universities (as similar organisations) fail to affect.

We might only anticipate further disequilibrium in terms of supply and demand for the EOP. Demand will surely grow further in Camden, and, needless to say, exists in abundance across other London boroughs and across the UK and internationally. There are possibilities in terms of supplying this demand but ultimately, only so much that might be realistically achieved. In such terms, we would anticipate the further expansion of the EOP yet within Camden and as relates perhaps not only to its schools but wider social mission. We also strongly recommend it as a holistic model of science engagement and enrichment; professional development; and community organising which other organisations seeking to engage their public communities can learn and draw from.

The EOP needs recognising as a treasured resource of the Crick and of Camden and as an international exemplar of schools' engagement.

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